REPORT TO THE GENERAL ASSEMBLY ON REMOTE SENSING OF VEHICLE EMISSIONS IN VIRGINIA

October 1, 2003

Virginia Department of Environmental Quality

EXECUTIVE SUMMARY

Background

This report has been prepared in response to Item 383 of the 2003 Budget Bill, which has the following provisions:

> *C. The Department of Environmental Quality is authorized to use up to $300,000 each year from the Vehicle Emissions Inspection Program Fund to implement the provisions of Chapter 710, Acts of Assembly of 2002, which authorizes the Department to operate a program to subsidize repairs of vehicles that fail to meet emissions standards established by the Board when the owner of the vehicle is financially unable to have the vehicle repaired.*
>
> *F.1. The Department of Environmental Quality shall initiate, beginning January 1, 2004, a program for on-road testing of motor vehicle emissions pursuant to § 46.2-1178.1, Code of Virginia, in all areas designated nonattainment for the 1-hour ozone air quality standard as of January 1, 2003. The Department shall develop a plan for implementation of this program and shall include a schedule to phase in on-road testing to enhance the current emissions inspection program, consistent with the federal Clean Air Act.*
>
> *2. The Department shall also develop a plan to implement a program for on-road testing of motor vehicle emissions pursuant to § 46.2-1178.1, Code of Virginia, in all areas designated nonattainment for the 8-hour ozone air quality standard as of July 1, 2004. This plan may also include on-road testing of emissions in areas that opt into Early Action Compacts for ozone and jurisdictions that are contiguous to designated ozone nonattainment areas. The plan shall include recommendations as to any amendments necessary to the Code of Virginia to implement and provide adequate funding for the program.*
>
> *3. The Department shall work with the U.S. Environmental Protection Agency to secure approval of on-road sensing to enhance the current emissions inspection program and shall identify any barriers to such approval.*
>
> *4. In completing these plans and implementing the provisions of subparagraph 1, the Department is authorized to expend such funds as may be required from the Vehicle Emissions Inspection Program Fund. In completing these plans, DEQ shall contract with a private sector vendor which has experience in remote vehicle emission testing.*
>
> *5. The Department shall provide these plans to the Governor, the Chairmen of the House Agriculture, Chesapeake and Natural Resources, Appropriations, Science and Technology and Transportation Committees and the Senate Agriculture, Conservation and Natural Resources, Finance and Transportation Committees, and the Joint Commission on Technology and Science by October 1, 2003.*

The Virginia Department of Environmental Quality (DEQ) has determined that the use of remote sensing devices (RSD) is the only cost effective means of performing "on-road testing" of motor vehicles. Remote sensing has been included in the Virginia State Implementation Plan (SIP) revisions submitted to EPA. DEQ plans to use remote sensing as a supplement to the existing vehicle emissions Inspection and Maintenance (I/M) program in Northern Virginia and is considering using remote sensing as the foundation of a new emission test program in proposed new "8-hour ozone standard" nonattainment areas.

Currently, gasoline powered vehicles up to 10,000 pounds gross vehicle weight rating that are registered in the Northern Virginia I/M area are required to pass (or receive a waiver) an emissions inspection every two years before the vehicle can be registered. The I/M test consists of emission control component checks and a tailpipe test, either the acceleration simulation mode (ASM) test or the two-speed idle (TSI) test, depending on vehicle model year, type and drive train configuration. DEQ plans to implement a new testing procedure, the on board diagnostic (OBD) test, for certain vehicles in 2004.

Plan for Using Remote Sensing Devices (RSD) in the Existing I/M Area

DEQ plans to use remote sensing device (RSD) technology to improve the effectiveness of the existing I/M program operating in Northern Virginia beginning January 2004. A remote sensing program in the Northern Virginia I/M area will accomplish the following:

- Identify high-emitting light duty vehicles operating in the program area for out-of-cycle "confirmation testing" and subsequent repair;

- Identify vehicles operated primarily in the I/M area that have not undergone an emissions inspection at a Virginia DEQ-permitted Emissions Inspection Station; and

- "Clean screen" very clean vehicles, verifying that these vehicles are emitting significantly less than allowable limits, potentially postponing their next regularly scheduled biennial emissions inspection test.

The Northern Virginia remote sensing program will have the following elements:

Remote sensing tests will be performed on a year round basis at a variety of sites in the Northern Virginia I/M area. DEQ estimates that 600,000 vehicles per year would be tested at the level currently budgeted for data collection.

DEQ's current vehicle information database (VID) contractor will compile the RSD results into a database. The VID contractor would then analyze the database to identify vehicles that have been seen with excessive emission readings, and those seen with very clean emissions.

Using lists of vehicles provided by DEQ's VID contractor, and vehicle owner information from DMV, DEQ will notify vehicle owners that their vehicles have been observed to have high emissions. These vehicles must receive a confirmation emission test at an official DEQ I/M station. Both in program area and out of program area vehicle owners would be notified. Out of program area vehicles would be limited to those that appear to be "operating primarily" in the Northern Virginia I/M area, based upon RSD observations.

- Using lists of vehicles provided by DEQ's VID contractor, and vehicle owner information from DMV, DEQ will notify vehicle owners that their vehicles have been observed to have very low emissions, and that their next periodic I/M test may be postponed.
- The basic remote sensing program in Northern Virginia is estimated to cost $300,000 per year for data collection. It is estimated to reduce hydrocarbons (HC) and oxides of nitrogen (NOx) emissions by over 350 tons per year in addition to the existing I/M program benefits.

Regulations establishing standards for remote sensing have been developed and have been approved by the Air Board. DEQ plans to release a request for proposals (RFP) in October of 2003 to secure an RSD contractor to begin collecting RSD emissions data in January of 2004. Initially owners of high polluting vehicles would be advised only that their vehicle was observed as a high polluter. After identification and notification procedures are working smoothly, vehicles observed as high emitters would be subject to confirmation testing and repairs if needed.

Plan for Using Remote Sensing in Future Designated 8-Hour Ozone Nonattainment Areas

Several areas in Virginia are likely to be designated as nonattainment for the 8-hour ozone standard. DEQ must develop a state implementation plan (SIP) to show how it would bring these areas into compliance with the ozone standard. One of the strategies under consideration is to identify high emitting vehicles and require that they be repaired. DEQ is considering using remote sensing devices (RSD) in combination with OBD testing as the method to identify these high emitters. Vehicles identified as high emitters by remote sensing would then be subjected to a confirmation test to confirm that the vehicle is indeed a high emitter, or that the problem causing it to be a high emitter has been corrected.

Using remote sensing to identify high emitting vehicles can significantly improve the cost effectiveness of an emission test program in new ozone nonattainment areas. As an example, DEQ evaluated using remote sensing as the basis of an emission test program in the Richmond area, which is expected to be nonattainment for the 8-hour ozone standard. The recommended remote sensing based inspection and maintenance (I/M) program in Richmond would have the following elements:

All 1996 and newer vehicles would receive a biennial on-board diagnostic (OBD) test at OBD-only testing facilities.

RSD would be used to identify high emitting vehicles, primarily 1995 and older model vehicles, that would then be subject to a confirmation tailpipe ASM or TSI test at an authorized test facility.

RSD equipment would be set up and operated throughout the Richmond nonattainment area on a year round basis. Three remote sensing vans would be needed to obtain valid measurements on 80% of the vehicle fleet for an annual cost of $900,000.

The RSD contractor would send DEQ's VID contractor test results that would then be compiled into a database.

The VID contractor would identify vehicles meeting DEQ's high emitter criteria. DEQ would then notify vehicle owners that they must obtain a confirmation test at an authorized test facility.

DEQ would license confirmation test facilities to test vehicles identified by RSD as being high emitters. Approximately 6 ASM/TSI test facilities would be needed in the Richmond area to perform approximately 21,000 confirmation tailpipe tests in 2007.

DEQ would license OBD-Only test facilities to test all 1996 and newer vehicles. Approximately 48 OBD-Only test facilities would be needed in the Richmond area to perform approximately 300,000 OBD tests in 2007.

The program is estimated to reduce HC and NOx emissions in the Richmond area by 2,100 tons in 2007.

Based on the analysis of a remote sensing based emission test program in the Richmond area, DEQ projected the number of confirmation test facilities needed, number of vehicles tested and emission reductions for all the new 8-hour ozone areas.

Number of Stations Needed, Number of Vehicles Tested and Estimated Emission Reductions for Recommended Option (Option 3) in 8-Hour Ozone Nonattainment Areas in 2007

8-Hour Area	# of Confirmation ASM/TSI Test Facilities (could also do OBD tests)	# of OBD-Only Test Facilities	# of Vehicles Receiving Tests (Confirmation & biennial OBD)	Emissions Reductions Tons per Year (HC+NOx)
Roanoke	2	13	86,476	584
Frederick/ Winchester	1	6	39,486	267
Fredericksburg	3	17	117,399	793
Richmond	6	48	324,710	2083
Hampton Roads	8	64	438,403	2960

Plan to Secure Additional Emissions Reduction Credit

DEQ believes the EPA model for calculating emissions reductions may underestimate the effectiveness of both the current Virginia program and the additional remote sensing components discussed here. DEQ plans to present program data, along with data from the 2002 RSD study to EPA in order to support additional emissions reduction credits.

Low Income Repair Assistance

Section C. of the 2003 Budget bill requires DEQ to implement a program to subsidize the repair of vehicles that fail to meet remote sensing emissions standards established by the Board. Vehicle owners may apply to DEQ for repair assistance. DEQ would contact the Department of Social Services (DSS) to determine if applicants are eligible for assistance according to income level criteria provided by DSS. If eligibility criteria are met, DEQ I/M staff would review application records, including repair receipts, and would notify DEQ's Office of Accounts Payable of the amount of subsidy to be sent to the owner. A check would be mailed within 14 days from the notification to Accounts Payable. Currently, $300,000 per year is authorized for repair assistance (including administrative costs).

Recommendations

The following is a summary of recommendations concerning legislative changes that would enhance the use of remote sensing in Virginia:

New program areas:

- DEQ recommends that emission test programs for new 8-hour ozone nonattainment areas use RSD as a way of identifying high emitting vehicles, primarily 1995 and older, that then must receive ASM/TSI tests. All 1996 and newer vehicles would receive biennial OBD tests. DEQ plans to work with EPA to secure additional emissions reduction credits for this program.

Enforcement:

- Currently, DEQ will have to enforce the remote sensing program through a monetary penalty imposed through the court system. Since the maximum penalty is $620, it is unknown if collection of this fee would be a priority for collection from the Office of Attorney General. Program enforcement may be more effective if DEQ coordinated with DMV to identify out of compliance vehicles by utilizing the current process used in the Northern Virginia Inspection and Maintenance program. DEQ will work with DMV to explore effective, low-cost enforcement options. Legislation will be required to implement this change.

Northern Virginia area program funding:

The current budget for the basic remote sensing program in Northern Virginia is $300,000. Additional funding may be needed if an expanded program is needed to further reduce emissions or if more repair assistance will be provided to citizens. Additional funding could be obtained by charging all motorists an additional fee. Another option would be to collect a fee from vehicles opting to be clean screened in lieu of a visit to a testing station. These funds could then help defer some of the costs associated with running the RSD system. Funding would also be available to increase low-income repair assistance. Currently, DEQ does not have legislative authority to collect clean screen fees. DEQ recommends operating the high emitter identification program for one year in order to determine whether larger scale remote sensing would be cost effective and to assess how many vehicles would be clean screened.

New area program funding:

If emission testing and remote sensing programs are to be implemented in 8-hour ozone nonattainment areas, additional funding will be required. Funding for this new program could be obtained using one of the following options:

- A fee charged for each registered vehicle per year to cover remote sensing operations and administration, with inspection test fees (both biennial OBD tests and confirmation tests) paid by the vehicle owner to the inspection station

- A fee charged for each registered vehicle per year to cover both remote sensing administration and confirmation tests. DEQ would reimburse inspection stations on a per test basis.