# DISCUSSION PAPER:
# ADDRESSING THE PROBLEM OF HIGH EMITTING AND SMOKING VEHICLES OPERATING IN THE DENVER METROPOLITAN AREA

Regional Air Quality Council
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## I. Introduction

On September 27, 1999, the Regional Air Quality Council (RAQC) proposed a Carbon Monoxide Maintenance Plan to the Colorado Air Quality Control Commission. The Maintenance Plan demonstrates compliance with the federal health standard for carbon monoxide through 2013, and is a prerequisite for the Denver metropolitan area to be redesignated to attainment status by EPA. The Commission will hold a public hearing to consider this plan on January 10, 2000. After adoption by the Commission, the plan must be approved by the General Assembly before being submitted to EPA by Governor Owens.

One of the issues addressed in the Maintenance Plan is the future of the region's inspection and maintenance (I/M) program for light-duty gasoline vehicles. The I/M program is designed to identify vehicles with excessive emissions and to require those vehicles to be repaired. The Maintenance Plan recommends continued implementation of the I/M program, with certain modifications which are described below.

## II. Problem Identification

Despite the fact that the metro area has an I/M program, high emitting and smoking vehicles continue to operate in the region. High emitting and smoking vehicles operating in the Denver metro area are vehicles that may have broken since their last inspection, vehicles that were not adequately repaired after failing an inspection, or vehicles that in one way or another have avoided complying with the program. Motorists can avoid compliance by registering their vehicle outside the program area or by operating unregistered vehicles. Some have alleged that it is also possible to register vehicles in the program area without the required emissions certification.

Data from the recently released "1999 Audit of the Colorado AIR Program", prepared by the Office of the State Auditor, indicate that 22% of the vehicles that failed their emissions inspections in 1998 did not return to be retested. To the extent that these high emitting vehicles continue to operate, they have a disproportionately large impact on air quality. In fact, the data from the audit suggest that such vehicles make up only 1% of the metro Denver fleet, but represent 32% of the potential benefit of the enhanced emissions testing program.

The significant impact that a small number of high-emitting vehicles have on our air quality is further demonstrated in preliminary data from the "Denver Clean Screen Pilot Study" conducted by the Colorado Air Pollution Control Division. These data indicate

that as few as 0.5% of the vehicles in the fleet have excess emissions that are responsible for approximately 4% of total CO emissions in the Denver area.

Further evidence of the problem comes from the Northern Front Range Air Quality Study (NFRAQS) completed in 1998. This study found that 13% of the Denver area's fine particulate matter problem comes from smoking vehicles and high particle-emitting vehicles that do not emit visible smoke, or exhaust emitted during hard accelerations and under heavy loads. The NFRAQS "Report to the Governor and General Assembly" indicates that between 0.1% and 2.5% of the in-use, light-duty vehicle fleet emits visible particles. Fine particulate matter causes the visibility problem along the Front Range which is known as the "Brown Cloud".

**III. Consideration of New Programs to Address Problem**

Through the process of developing the Carbon Monoxide Maintenance Plan, the RAQC has identified several methods to address the problem of high emitting and smoking vehicles. The RAQC is not proposing to include such programs in the federally-enforceable Maintenance Plan, and at this time it is not possible to consider these programs as substitutes for a routine inspection program. However, the RAQC does believe that it is appropriate for state and local policy makers to consider whether new programs to address the problem of high emitting and smoking vehicles should be implemented to improve air quality in the Denver metropolitan area. The RAQC is prepared to work cooperatively with state and local policy makers to address this problem.

**IV. Background**

In January 1995, the State of Colorado implemented an enhanced emissions testing program for vehicles in the six-county, Denver metropolitan area. The enhanced program was implemented to satisfy requirements of the Clean Air Act Amendments of 1990 and to help bring the area into compliance with the federal health standard for carbon monoxide (CO).

At the end of 1997, the Denver metropolitan area achieved compliance with the carbon monoxide standard, and carbon monoxide concentrations since 1997 have remained below the standard. As a result, the Denver metropolitan area is now eligible to be redesignated as a carbon monoxide attainment area by EPA.

In an effort to reduce the future cost of the vehicle inspection and maintenance program, and to improve motorist convenience, the Carbon Monoxide Maintenance Plan proposed by the Regional Air Quality Council recommends implementation of a "clean screen" program in the metro area. The proposed "clean screen" program would use remote sensing technology to measure vehicle emissions on the road. When the remote sensing technology identifies a vehicle as clean for carbon monoxide and hydrocarbon emissions, the owner would be notified that they do not need to have an emissions test before registering their vehicle. Vehicles that are not seen by the remote sensing technology, or

do not pass the clean screen test, would continue to be inspected on a routine basis. The remote sensing technology might also test for nitrogen oxide emissions, but this pollutant, which is covered by the centralized testing program, is not proposed for inclusion in the clean screen program at this time.

One of the opportunities associated with implementing an extensive remote sensing clean screen program in the Denver area is that the data could also be used to identify high emitting vehicles. Once identified by remote sensing, high emitting vehicles could be required to submit to another emissions test and comply with applicable standards. If this type of program is to be effectively implemented in the Denver area, various statutory and regulatory changes would be needed. (See Attachment A: Summary of Additional Authority Needed to Address High Emitting and Smoking Vehicles).

**V. Remote Sensing, High Emitter Identification and Enforcement Program**

Current Colorado law, in accordance with federal requirements, requires an on-road remote sensing program that annually measures emissions from at least 0.5% of the vehicles covered by the enhanced emissions program (C.R.S. 42-4-307(6)(a)(I)). Subpart (II) of this section provides some authority to use the remote sensing data to identify high emitters and require them to be repaired. Specifically, it says that "based on confirmatory tests at an emissions technical center which identify such vehicles as exceeding applicable emissions standards, off-cycle repairs may be required for non-complying vehicles."

While this language appears to give the state the authority to move ahead with a remote sensing, high emitter identification program, such a program has never been implemented in Colorado. This is partly due to the limited amount of remote sensing done in the metro area, and also due to potential conflicts in the statute -- such as the provisions which state that an emissions certification is valid for 2 years.

Another problem with the current statute is that it requires confirmatory tests to be done at the State's "emissions technical centers", which are operated by the Colorado Air Pollution Control Division as research and diagnostic facilities, and are not equipped to conduct tests on the potentially large number of high-emitting vehicles that would be identified through remote sensing.

Therefore, if a remote sensing, high emitter identification and enforcement program is to be effectively implemented in the metro area, it appears that certain statutory changes would be needed. At a minimum, this would include: 1) clarifying the State's ability to require off-cycle testing and repairs; and 2) allowing confirmatory tests to be conducted at the regular emissions testing stations.

a) Costs and Benefits

According to the "1999 Audit" report, the testing and administrative costs of implementing a stand alone, high emitter program with IM240 confirmatory testing

would be $13.6 million per year. This includes $6.5 million per year for the remote sensing infrastructure, $2 million for remote sensing administrative costs, $3.2 million for confirmatory testing, and $1.9 million for confirmatory testing administrative costs. This estimate is based upon the remote sensing infrastructure necessary to evaluate 80% of the total fleet. The testing and administrative costs of a stand-alone, high emitter program that attempted to evaluate only 50% of the total fleet would be $9.7 million per year, but would obviously identify fewer high emitting vehicles.

If a high emitter identification program is implemented in combination with the clean screen program recommended in the Carbon Monoxide Maintenance Plan, the audit report estimated the total remote sensing infrastructure costs for 80% fleet coverage would be reduced to $5.9 million per year. The estimated cost in this case is lower than a stand-alone, high emitter program because the contractor assumed there would be an incentive for motorists to seek out a remote sensing device in order to avoid routine testing. As a result of this increased efficiency, somewhat fewer remote sensing devices would be needed to achieve the same level of fleet coverage. For the clean screen program alone, the audit report estimates the remote-sensing costs would be $4.1 million per year, recognizing that even greater efficiencies would occur without the negative disincentive of high emitter identification.

According to the audit, a high emitter element added to the clean screen program would result in an additional 7,000 IM confirmatory tests per year, with 3,300 of these vehicles failing the test. This type of supplemental high emitter program would restore the full benefit of the IM program by offsetting the loss of benefit associated with a clean screen program. (The benefit of the proposed IM program with clean screen was estimated in the audit at 94% of the current benefit. If a high emitter component is added, the audit indicates a benefit of 101% of current.)

The Office of the State Auditor states that:

*The most cost effective option for addressing high emitting vehicles is .... to test about 80% of the fleet per year (with remote sensing). Vehicles with emissions that exceed standards based on readings from the remote sensing would be required to go through a confirmatory IM240 test. This option costs about half as much (as the current program), yet it would produce 65 percent of the CO benefit of the current program.*

At the present time, a high emitter only approach to IM is precluded by EPA requirements for maintenance plans and redesignation to attainment status. However, the data and program experience gained by beginning with a high emitter program that is implemented in conjunction with a clean screen program may make it easier to transition to this type of approach in the future.

The data from a clean screen program with a high emitter component would show: 1) how many high emitting vehicles are identified with various amounts of remote sensing; 2) how many of these vehicles fail their confirmatory tests; 3) the effectiveness of repairs; and 4) the cost of operating the remote sensing infrastructure. This information would be

helpful for justifying a high emitter only approach to EPA, and would also help policy makers determine an appropriate funding mechanism for such a program in the future.

b) Implementation Issues

1) Funding

Identifying a viable funding option is one of the critical issues to be addressed if a high emitter identification program is to be implemented in the Denver metropolitan area. If a high emitter program is implemented in conjunction with the clean screen program recommended in the Carbon Monoxide Maintenance Plan, most of the costs could be covered by the fees collected by the contractor through the clean screen program.

If there is no clean screen program, the program could be funded through a broad-based fee, such as on vehicle registration, paid by all motorists. Fully funding the $13.5 million cost of the program in this way would require an annual fee of approximately $7 - $8 for each vehicle registered in the program area.

The audit report indicates that about 150,000 vehicles would be tested each year under a stand alone, high emitter program that evaluates 80% of the fleet with remote sensing. Another option would be to have the owners of these 150,000 vehicles continue to pay the IM240 fee ($25) and then recover the remaining costs through a registration fee of approximately $5 - $6 on all vehicles registered in the area. It is important to consider that a registration fee or other broad-based approach to funding may have TABOR implications.

Another option would be to recover all of the program costs through a higher test fee on the 150,000 vehicles that would continue to be inspected each year. Based on the numbers presented in the audit report, this would require a test fee of approximately $90. However, this fee may be unrealistically high considering that the audit report indicates that 78% of the vehicles tested would be expected to pass.

2) Exempt and Out-of-Area Vehicles

Currently, vehicles less than four years old and collector cars are exempted from routine emissions testing. Colorado vehicles registered in counties outside the I/M program area are also exempted as long as they do not regularly operate in the program area. However, some of these exempt vehicles would be identified with remote sensing as high emitters. Therefore, one of the questions to be addressed is whether or not these exempted vehicles would be required to submit to a confirmatory test and to make off-cycle repairs if they are found to be out of compliance with the applicable emissions standards. If confirmatory testing and off-cycle repairs are to be required for these vehicles, changes to current statute would be needed.

3) Payment for Confirmatory Testing

One of the implementation issues associated with a remote sensing, high emitter identification program concerns payment for confirmatory testing. If a vehicle identified as a high emitter with remote sensing fails its confirmatory test it is probably reasonable to require the owner to pay the testing fee. In these cases, the owner would probably be issued a new emissions certification that would be valid for two years.

However, some vehicles identified as high emitters with remote sensing will pass the confirmatory test. In these cases, it may not be reasonable to require the owner to pay the testing fee, and the contractor or the state would have to absorb the cost of the test. Another option in these cases might be to give the vehicle owner a new emissions certification with the cost prorated based on the length of time remaining on their original emissions certification.

4) Enforcement

During the course of RAQC's Carbon Monoxide Maintenance Plan Subcommittee process, subcommittee participants suggested two enforcement approaches that could be taken after a vehicle is identified as a high emitter through remote sensing. These are described below:

i) *Require Confirmatory Test and Compliance or Fine*

Under this approach, the owners of high emitting vehicles identified by remote sensing would be issued a notice by the State that a confirmatory test is required within 30 days. If the vehicle fails the confirmatory test, the owner would have another 30 days to repair or retire the vehicle. If the vehicle owner fails to obtain the required confirmatory test, or does not comply after failing the confirmatory test, a summons would be issued and the owner would be subject to a substantial fine.

ii) *Limited pullover coupled with motorist education through "Smart Sign"*

Some have suggested an approach that would initially utilize remote sensing in combination with a "Smart Sign" that informs motorists if they have high emissions when they drive past. After a period of time when motorists would be informed of their emissions status and encouraged to carry out voluntary repairs, some of the worst high emitting vehicles would be pulled over by a police officer who would be accompanied by a certified emissions inspector. If the operator agrees to an anti-tampering inspection and there is no evidence of tampering, no enforcement action would be taken. If there is evidence of tampering with the emission control system, or if the operator does not agree to an anti-tampering inspection, a summons would be issued.

The philosophy behind this approach is to encourage motorists to comply voluntarily, with the threat of a pullover if they do not. The hope is that the threat of a pullover would induce most people to voluntarily repair their vehicles after the "Smart Sign" informs

them that they have high emissions, just as the threat of an audit by the IRS induces most people to pay their taxes.

**VI) Improved Enforcement of Smoking Vehicle Laws**

Current State law and local ordinances prohibit any gasoline-powered motor vehicle from emitting visible smoke. Smoking vehicles have excessively high emissions and are significant contributors to the region's visibility and fine particulate matter problems. The current State law is applicable to all vehicles operating in Colorado, not just Front Range vehicles registered in an inspection area.

While some smoking vehicles would be identified through remote sensing because they also might have high emissions of carbon monoxide, hydrocarbons, or nitrogen oxides, most smoking vehicles must be identified visually by trained personnel, such as local law enforcement or environmental officers.

Currently, smoking vehicles cited at the local level are not required by state law to reenter the emissions testing program and obtain an updated emissions certification.

a) Local Enforcement / Costs and Benefits

There is currently limited enforcement of smoking vehicle laws at either the State or local level. The most significant enforcement effort is conducted by the City and County of Denver. In Denver, when an environmental officer or other authorized personnel identifies a smoking vehicle, the owner is issued a summons to appear in court. Prior to the court date, the city will conduct a visual inspection of the vehicle if the owner does not believe it is smoking. If the vehicle is not visually inspected, or fails its visual inspection, the owner must appear in court and demonstrate that the vehicle has been repaired or retired. If the vehicle is retired or sold, the assumption is that it will not be re-registered in the metro area without first complying with an emissions test.

Denver issues about 500 summonses per year. Approximately 250 of these vehicle owners take some action to come into compliance (vehicle is repaired, retired, or sold). The other 250 vehicle owners are not contacted because they cannot be located or because the City is unsuccessful in its efforts to serve the summons.

Staff from Denver's Environmental Protection Division estimate the annual cost of their program at $50,000 per year. The majority of this cost is associated with staff time. No data are available at this time to estimate the repair or other costs for vehicle owners who bring their vehicle into compliance.

Environmental officers in Boulder enforce that community's smoking vehicle ordinance. Due to the reduced number of smoking vehicles on the road, and other demands on their time, Boulder environmental officers estimated that only 20 citations for smoking vehicles were issued in the last year. (Testimony at Air Quality Control Commission, November 1999).

The Denver program, along with efforts in Boulder and other communities, demonstrates that it is possible to address smoking vehicle problems at the local level. However, it is a resource intensive effort for local governments. Nevertheless, one approach might be for the RAQC to work with local governments in the area to encourage enforcement of smoking vehicle ordinances. This could include holding a workshop to showcase effective approaches for identifying and addressing smoking vehicles.

Another option to improve enforcement of smoking vehicle laws is to modify current State statute to allow state, county, and local law enforcement and environmental officers to report smoking vehicles directly to Department of Motor Vehicles which would issue a notice to the vehicle owner that a confirmatory test at an emissions inspection station is required within 30 days. Enforcement for failure to comply could then be done in a manner similar to that suggested above for high emitting vehicles (i.e., either comply or face a substantial fine).

If this approach is taken, the State would have to take steps to ensure that the vehicle is specifically inspected for visible smoke when it appears at the testing station. Currently, the technology at the metro area enhanced inspection centers does not effectively support a process to identify vehicles with visible smoke.

**VII) Voluntary Programs**

The RAQC has also identified options for voluntary programs that could be implemented to reduce the number of high emitting and smoking vehicles on the road. These are discussed below.

a) Outreach and education with remote sensing and Smart Sign

Public and private sector funding could be sought to implement an outreach and education program that includes the use of remote sensing and Smart Sign technology to encourage motorists to keep their vehicles in good repair and to take action if they have a high emitting vehicle. In cooperation with local governments, the Smart Sign could be deployed at different locations around the metro area so that motorists with high emissions will know they have a problem that needs to be addressed. The Smart Sign approach could be publicized by local governments and through the media.

b) Financial Incentives for Voluntary Vehicle Repair or Retirement

“Cash for Clunkers” is the common name for programs that provide financial incentives for repairing or scrapping old, high emitting vehicles. Such a program was implemented by the RAQC in 1993-94 following a $500,000 grant from Total Petroleum. While these programs have been demonstrated to be beneficial for air quality, they require a substantial source of funding. Financial incentives could come in the form of direct cash payments, state tax credits, or special incentives from auto dealers.

Attachment A
Summary of Additional Authority Needed to Address
High Emitting and Smoking Vehicles

| Issue | Current Statute | Potential Changes |
|---|---|---|
| High Emitter Identification and Enforcement | C.R.S. 42-4-307(6)(a)(II) gives the AQCC authority to require off-cycle repairs for non-complying vehicles identified by remote sensing. | See below. |
| a) Confirmatory Testing | Requires that a confirmatory test be given at one of the State-run emissions technical centers. | Allowing confirmatory tests to be done at the regular testing stations may be a practical and cost effective solution. |
| b) Vehicles with Valid Certification or Exemption | Current statute states that 1) an emissions certification is valid for two years, 2) new vehicles are exempt for four years unless sold, 3) collector cars must only pass a one-time test unless sold. | Need to clarify state's ability to enforce against high emitters with a valid emissions certification and exempt vehicles. |
| c) Out of Area Vehicles | Vehicles registered outside the program area are not required to comply with the emission standards unless the vehicle is operated in the program area on a regular basis. | Statutory change needed to require high emitting vehicles registered outside the program area to comply with emission standards. |
| d) Payment for Confirmatory Testing | None. | Provisions needed to describe when vehicle owner must pay for confirmatory test. Owner could be required to pay in all cases or only if the vehicle fails. |
| e) Enforcement and Fines | None. | Provisions needed to describe enforcement procedures when a vehicle is identified as a high emitter. Could include allowing a notice of violation to be sent to the vehicle owner or allowing law enforcement officials to carry out a pullover program. Also necessary to establish fines or other penalties for non-compliance. |

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|---|---|---|
| f) Funding | None. | Need to establish a funding mechanism for a high emitter program.<br>Funding mechanism would need to cover the cost of a stand-alone program or the costs of a high emitter program implemented as a supplement to a clean screen program. |
| | | |
| Smoking Vehicle Enforcement | State statute (42-4-412) & local ordinances make it illegal to operate a gas powered vehicle that emits visible smoke. Fines vary from $25 to $300 dollars. However, there is little enforcement and no requirement that smoking vehicles re-enter the emissions testing program. A vehicle cannot receive a waiver from the emissions test if it emits visible smoke. | See below. |
| a) Confirmatory Testing for Smoking Vehicles | None. | Modify the current statute to require any vehicle cited for smoking to submit to a confirmatory test at an emissions testing center and to comply with the program requirements. |
| b) Financial Incentives for Local Governments | -- | Some type of financial incentive from the State may be necessary to make smoking vehicle enforcement a priority with local police and environmental officers. |