CALIFORNIA INSPECTION AND MAINTENANCE REVIEW COMMITTEE

Review of the Smog Check Program
November 18, 2008

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EXECUTIVE SUMMARY

This report, by the Inspection and Maintenance Review Committee (IMRC) to the Governor and the Legislature, makes several recommendations for improving the Smog Check program and provides an update on our ongoing analysis of “missing” vehicles, those vehicles that might have been subject to a Smog Check but were not tested for some reason. Although we have made some of these recommendations before, in this report we have provided additional information to support the implementation of those measures. We look forward to discussing these recommendations if the Legislature deems them appropriate for Legislative action.

I. THE STATE IMPLEMENTATION PLAN (SIP)

State law assigns the responsibility for developing SIP strategies for mobile source and consumer products to the California Air Resources Board (ARB), regional air districts, and local councils of government. Once the SIP is created and approved by the United States Environmental Protection Agency (US EPA), it becomes a State obligation for emission reduction measures. The most recent SIP for the South Coast Air Quality Management District (SCAQMD) and for the San Joaquin Valley Air Pollution Control District (SJVAPCD), relative to improvement of California Smog Check program, cannot by fully implemented because the Bureau of Automotive Repair (BAR) lacks the statutory authority for three important measures.

RECOMMENDATIONS

Based on a review of the 2007 SIP strategies dated April 26, 2007 and BAR’s statutory authority, the IMRC makes the following recommendations for Legislative action:

Amend pertinent sections of the Health and Safety Code to authorize the following changes to the Smog Check program:

- To implement annual Smog Check inspections of older model year vehicles;
- To implement annual Smog Check inspections for High Annual Mileage Vehicles and gross emitters; and,
- To implement a non-loaded-mode biennial Smog Check inspection on motorcycles.

In the absence of annual Smog Check inspections for older model year vehicles, the IMRC suggests that BAR use their existing authority to promulgate regulations to implement substitute measures that allow off-cycle testing using remote sensing in urbanized areas that may fail to meet conformity due to SIP shortfalls.

II. OBD ONLY SMOG CHECK INSPECTIONS

The IMRC has evaluated the second-generation On-Board Diagnostics (OBD) technology for two years, calling in a number of outside experts and analyzing more than 50 million Smog Check test results ourselves. As a result, we believe that the Smog Check program can benefit by adopting OBD-only inspection procedures to improve efficiency and cost effectiveness for the Smog Check program. Since its implementation in 1996, OBD technology has continued to improve and has become a robust and effective component of the Smog Check program. Twenty eight other states use OBD-only testing in their programs. Both the US Environmental Protection Agency and the California Air Resources Board agree that this technology can be used as a stand-alone Smog Check inspection to improve cost effectiveness and efficiency in the program. IMRC staff estimate that OBD-only testing may save California’s consumers as much as $266 million in 2010 and $324 million by 2014.
RECOMMENDATIONS

Amend sections 44012 and 44013 of the Health and Safety Code to authorize the Bureau of Automotive Repair to make the following changes to the Smog Check inspection protocol:

1. In cooperation with the California Air Resources Board, authorize BAR to implement OBD-only emissions testing for OBD II equipped vehicles for model years determined as effective by both agencies. The proposed legislation should encourage the use of more advanced technologies after evaluation by BAR and ARB. To ensure an effective implementation, IMRC recommends that OBD-only testing should begin after evaluation and/or consideration of the following safeguards:
   a. Reducing the number of incomplete “monitors” from two to zero for 2000 model-year and newer vehicles;
   b. Additional OBD training for automotive repair technicians to ensure a high level of competency for OBD type repairs;
   c. Ensure that all testing is conducted at Smog Check stations using licensed Smog Technicians;
   d. Consideration of implementing OBD-only testing in the fleet sector for a period of time before going statewide;
   e. Consideration of a transition to OBD-only testing in concert with the new emissions analyzer in 2010;
   f. Evaluation of BAR’s Vehicle Information Database and ARB’s EMFAC emission model to validate support for OBD-only testing;
   g. A sample of OBD-only eligible vehicles of at least 2% should also receive full ASM (tailpipe) tests to validate the accuracy of OBD-only testing;
   h. Remote Sensing Devices should be used in urbanized areas to identify high emitting vehicles. Owners of these vehicles should be required to seek repairs along with a confirmation of having passed an emissions test.

III. SMOG CHECK PROGRAM AVOIDANCE AND MISSING VEHICLES

Since 2006, the IMRC has reviewed the subject of missing vehicles and vehicle owners that appear to avoid the Smog Check program. The issue of procrastination as it relates to the biennial Smog Check inspection was identified in 2006 and we recommended that vehicle owners be penalized for submitting late Smog Check Certificates of Compliance to DMV. We estimated 1 to 2 tons per day of HC and ROG emissions were lost as a result of these late Smog Check inspections. We believe that the majority of this problem will be abated with the passage of AB2241(Saldana, stats. 2008, Chap. 451).

However, we are continuing our research into the topic of missing vehicles since this pattern of disappearing and reappearing vehicles in current registration records is problematic and those vehicles that are most likely junked, or placed into a non-operational status known as PNO’ed, are also models and model years that have the highest emission failure rates. In contrast, vehicles that have received salvage certificates or have left the state tend to be newer. In 2009, we will be completing a joint project with Valley Clean Air Now, also known as Valley CAN, to determine the extent of this problem and potentially identify solutions.
INTRODUCTION

Background

The Inspection and Maintenance Review Committee’s assessment of the Smog Check Program 2008 is hereby submitted to the Legislature and the Governor in accordance with section 44021 of the California Health and Safety Code. This report is based on research and evaluation conducted by the Committee in 2007 and 2008.

State law authorizes thirteen members for the IMRC. Nine are appointed by the Governor, two by the Speaker of the Assembly, and two by the Senate Committee on Rules. Currently the Committee has five vacancies. Due to the number of vacancies on the committee and the subsequent lack of a quorum during the summer months, the committee was unable to meet for the months of May, June, July, and August 2008. The members, their areas of expertise, and a short biography are included in Attachment 1 of the Appendix.

California’s Smog Check Program

The Department of Consumer Affairs, Bureau of Automotive Repair administers California’s Smog Check program. Smog Check continues to be one of California’s most important and effective air quality programs needed to meet the federally mandated air quality standards. State law requires that California-registered gasoline-powered motor vehicles have a Smog Check inspection biennially in the enhanced and basic areas of the state and on change of ownership in other areas of the state. A loaded mode test is required in enhanced areas whereas a less demanding two-speed idle test is required elsewhere. Vehicles that come into California from out of state also require a Smog Check inspection. The type of inspection is determined by the vehicle’s registered address. Attachment 2 of the Appendix illustrates geographical areas identified as enhanced, basic, or change of ownership areas. Approximately eighty-seven percent of the vehicles subject to California’s Smog Check program are in the enhanced areas of the state.

The Smog Check program is “decentralized,” which means that Smog Check stations are privately owned and operated. In 2008, there were approximately 7,200 licensed Smog Check stations in operation and 11,000 licensed Smog Check technicians.

Legislative Changes of 2008

The 2008 Legislative session yielded two statutory changes designed to improve air quality.

1. Assembly Bill 619 (Emmerson, stats. 2008, chap. 420). By enacting this legislation, the legislature intends to improve compliance with state vehicle registration laws and accelerate and increase collections of certain owed state fees and taxes. This bill waives criminal prosecution in return for the immediate reporting and payment of previously underreported, nonreported, or certain nonpaid vehicles registration fee and taxes.

This bill requires that DMV develop and administer a vehicle registration amnesty program, which shall be in effect from January 1, 2010 until December 31, 2010. A criminal action for false statement relating to the value, make, model, or a failure to register the vehicle shall not be brought against a current vehicle owner who has been granted amnesty under this law.
Amnesty will not apply to violations of this code for which, as of January 1, 2010, either of the following applies:

- The current vehicle owner is on notice of a criminal investigation by a complaint having been filed against him/her, that he/she is under criminal investigation; and,
- A criminal court proceeding involving the vehicle has already been initiated against the current vehicle owner.

Specially constructed vehicles, whose owner applies for amnesty, shall not be exempted from the Smog Check inspection requirements as outlined in section 44011 of the Health and Safety Code. A copy of AB619 has been included in the Appendix.

2. Assembly Bill 2241 (Saldana, stats. 2008, chap. 451). Although the DMV has always had discretionary authority to issue temporary vehicle operating permits, this bill amends that provision of law for vehicle owners that have not completed their Smog Check inspection prior to renewing their vehicle registration, pursuant to Section 4000.3 of the CA. Vehicle Code. This bill requires that vehicle owners that fail to obtain a Smog Check Certificate of Compliance prior to the registration due date (when required), apply for a temporary operating permit. The applicant must present sufficient evidence that the vehicle has failed its most recent Smog Check. The fee shall be $50 and the permit will be valid for no more than 60 days. The applicant may obtain only one permit in a two year period. After deducting its administrative costs, the DMV shall deposit fees collected into a High Polluter or Removal Account in the Vehicle Inspection and Repair Fund.

The department shall not charge a fee for the temporary operating permit if the vehicle owner presents sufficient evidence that they are an income eligible applicant who had his or her vehicle accepted into the Bureau of Automotive Repair’s Consumer Assistance Program. A copy of AB2241 has been included in the Appendix.

Process

IMRC subcommittees were assigned to specific topics for the IMRC report of 2008. Each subcommittee was responsible for reviewing an assigned topic or category of topics and reporting back to the full committee. The IMRC conducts monthly public meetings to discuss the finding of each subcommittee and receive comments from the public, the automotive repair industry, and other interested parties. The majority of these meetings were webcast which made them available to the public statewide.

Prior to submitting this report, to the Governor and the Legislature, the IMRC distributed a draft of the recommendations to the following state agencies and organizations: California Highway Patrol, Department of Consumer Affairs, Bureau of Automotive Repair, Air Resources Board, and the Department of Motor Vehicles. Another 130 interested parties were notified of the draft recommendations via email, US mail, and fax.

Scope

Part I of this report provides an Executive Summary of the Recommendations. Part II includes the IMRC’s detailed review for each recommendation. Part III is the Appendix which includes comments from state agencies in addition to a summarization of comments from the automotive repair industry and the public at large.
SIP RECOMMENDATIONS

The IMRC created a SIP subcommittee to monitor and evaluate the implementation of the SIP measures associated with California’s Smog Check Program as identified in the State of California’s 2007 SIP. Current state law assigns the responsibility for developing SIP strategies for mobile source and consumer products to the California Air Resources Board (ARB), regional air districts, and local councils of government. Part of this responsibility includes the development of a comprehensive and effective strategy that depicts how the various regions in the State of California will attain healthy air quality standards by reducing emissions from both mobile and stationary source emissions in future years. Incorporated within a SIP’s plan is a demonstration of how a region will attain healthy air quality by deadlines cited by the Federal Clean Air Act (FCAA). It also establishes the emission’s budget for purposes of conformity findings for both transportation and general conformity. Therefore, the SIP becomes California’s obligation for emission reductions to the U.S. Environmental Protection Agency (EPA).

This analysis evaluates the status and progress of the SIP commitments associated with California’s Smog Check Program. This analysis does not attempt to assess the actual emissions benefits achieved by each of the commitments but rather identifies the progress of implementation by the committed emission reduction date. The stated benefits pursuant to the 2007 SIP are used as the basis for discussion and recommendations. A summary of the proposed On-Road Source SIP Measures begins on page 90 of the ARB document dated April 26, 2007. We have formatted those commitments in Table 1 that illustrate the specific measure, the emission reduction benefit, the projected implementation date, and the current status for each measure. Moreover, we have combined benefits for both the SCAQMD and the SJVAPCD in Table 1 for discussion purposes.

<table>
<thead>
<tr>
<th>SIP Measure</th>
<th>Emission Reduction Benefits</th>
<th>Anticipated Implementation Dates</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Pressure Fuel Evaporative Test</td>
<td>4.9 N/A N/A N/A</td>
<td>N/A</td>
<td>Implemented</td>
</tr>
<tr>
<td>More Stringent Emission cutpoints</td>
<td>1.0 2.4 N/A 2010</td>
<td></td>
<td>BAR anticipates adoption of regulations in 2009.</td>
</tr>
<tr>
<td>Annual Inspection for Older Model Year Vehicles</td>
<td>3.8 8.7 N/A 2010</td>
<td></td>
<td>Statutory authority needed for this measure.</td>
</tr>
<tr>
<td>Annual Inspection for High Annual Mileage Vehicles</td>
<td>0.7 2.4 N/A 2010</td>
<td></td>
<td>Statutory authority needed for this measure.</td>
</tr>
<tr>
<td>Visible Smoke Test</td>
<td>N/A N/A 0.25 N/A</td>
<td></td>
<td>Implemented</td>
</tr>
<tr>
<td>Inspection of Light and Medium Duty Diesels</td>
<td>N/A 0.9 0.02 2010</td>
<td></td>
<td>Pursuant to AB1488, BAR is currently developing the methodology and draft regulations for this measure</td>
</tr>
<tr>
<td>Inspection of Motorcycles</td>
<td>3.0 0.9 N/A 2010</td>
<td></td>
<td>Statutory authority needed for this measure for a cost effective implementation.</td>
</tr>
<tr>
<td>Expanded Passenger Vehicle Retirement</td>
<td>3.5 2.9 0.06 2008 - 2014</td>
<td></td>
<td>AB118 requires the development of regulations for implementation but AB118 only covers 1/3 of the annual funding required to implement this measure.</td>
</tr>
</tbody>
</table>

ROG – Reactive Organic Gases; NOx – Oxides of Nitrogen; TPD – Tons per day.
As illustrated by the highlighted SIP components in Table 1, statutory authority is lacking to implement three SIP measures. As a result, the SCAQMD and SJVAPCD could realize a shortfall by as much as 19.5 tons per day of ROG and NOx emission reductions. The SIP indicates that the expanded vehicle retirement program will reduce ROG and NOx emissions by 6.4 tons per day. Although statutory authority exists to implement this SIP component, BAR/ARB needs to complete the regulations for implementation. Funding provided by AB118 provides only 1/3 of the funding needed to meet the SIP commitment.

Following is a brief explanation of these strategies and the barriers to implementation.

1. **Annual Inspections for Older Vehicles:** Inspect older model year vehicles annually rather than every two years. Older model year vehicles tend to have greater deterioration of emission controls and consequently higher emissions. This measure was on schedule for implementation based on AB616 (Jones, stats of 2007). Unfortunately, AB616 failed passage prior to the deadline of August 31, 2008 pursuant to Art.IV, Sec.10(c), (J.R. 61(b)(17)).

2. **Annual Inspections for High Annual Mileage Vehicles:** Inspect annually rather than every two years, vehicles that accrue very high mileage on an annual basis. High mileage vehicles tend to have greater deterioration of emission controls and consequently higher emissions.

3. **Inspection of Motorcycles:** Include motorcycle inspections as part of Smog Check. Studies indicate that motorcycles are subject to high rates of exhaust system tampering which subsequently may increase the vehicle emissions. Section 44011 of the Health and Safety Code currently provides BAR the authority to test motorcycles providing that they first identify a test procedure and promulgate regulations. However, Section 44012 of the Health and Safety Code requires that any Smog Check inspection conducted in the enhanced areas of the state be a loaded mode test using a dynamometer.

Implementing motorcycle emission testing using a loaded mode test procedure would require a complete new design for the dynamometer at a significant expense and would create a very high cost for implementation. Therefore, Section 44012 of the Health and Safety Code should be amended to allow a simplified test procedure for motorcycles as determined by BAR and ARB.

As outlined in the SCAQMD and SJVAPCD SIP, these three emission reduction strategies total 19.5 tons per day of ROG and NOx. Failure to amend the Health and Safety Code to explicitly require these SIP strategies threatens California’s transportation “conformity” findings when applying for Federal funds on highway and building projects and jeopardizes hundreds of millions of dollars for these projects.

**Expanded Vehicle Retirement:** The SIP committed to accelerate vehicle retirement in both the jurisdictions of the South Coast and the San Joaquin Valley by 50,000 and 10,000 vehicles respectively. Currently, the State retires approximately 18,000 vehicles annually. The expanded commitment is in addition to those vehicles already being retired annually by the Smog Check vehicle retirement program. To date, funding identified for this program totals $30 million annually from AB118 (Nunez, stats. 2007, Chap. 750) which may represent approximately one third of the annual funding required for this SIP commitment, slated to begin in 2010, with funding beginning to accrue in July 2008. Therefore, additional revenue sources need to be identified to fully fund this measure. As previously mentioned, failure to implement this component would reduce emissions reductions by another 6.4 ton per day of ROG and NOx in the South Coast and San Joaquin Valley. In addition, this program terminates in 2014 unless the Legislature extends the funding mechanism.
Substitute Measures

Off-Cycle Testing

The inability of the State to implement the aforementioned SIP components has raised the issue of the State committing to substitute measures. As an example, BAR currently has authority to conduct off-cycle testing for vehicles identified as Gross Emitters. Section 44081(b) of the Health and Safety Code states in pertinent part that “The department shall, by regulation, establish a program for the out-of-cycle testing and repair of motor vehicles found, through roadside auditing, to be emitting at levels that exceed specified standards...” Therefore, without any statutory change, BAR could adopt regulations for off cycle testing using remote sensing devices to mitigate the emission reduction shortfall created by the loss of the three previously discussed SIP measures. We suggest that these off-cycle directions be conducted only in urbanized areas where the local air board identifies a shortfall that results from the inability to implement SIP measures.

Remote Sensing as a Solution for Implementing Off-Cycle Testing

In March 2008, the Eastern Research Group released a report prepared for BAR and ARB entitled Evaluation of Remote Sensing for Improving California’s Smog Check Program which indicates that Remote Sensing is not a viable technology due to the perceived high cost identified in the report. However, IMRC disagreed with many of the findings in this report and advised ARB and BAR of our concerns in June 2007. As an example, their report never estimated the preventative benefits of remote sensing that could occur since these devices would continually monitor on-road emission test results. Ultimately, the report was released with a few edits but the IMRC continues to disagree with the findings. Therefore, we have determined that another study is warranted and intend to conduct a follow up study in 2009.

We believe that RSD could be used to identify high emitting vehicles on the roadway. Owners of vehicles identified as high emitting could then be notified that their vehicle requires an off-cycle Smog Check inspection. The early identification and repair of high emitting vehicle would help to mitigate emission reduction losses resulting from SIP shortfalls. Although our analysis is in the early stages, we recently compared RSD readings from high emitters identified in a pilot study conducted by the SCAQMD using equipment loaned by the Bureau of Automotive Repair. This analysis sought to determine whether or not a correlation exists between vehicles that measured as gross emitters using RSD and their previous Smog Check test history. In this analysis, we examined 19,099 vehicles that had recently measured as a high emitter and compared those vehicles to approximately 32 million Smog Check inspection records. Table 2 compares all Smog Check inspections ever passed in CA from January 1998 through July 2008 with the vehicles identified as high emitters using RSD. As illustrated in Table 2, gross emitters identified through RSD are twice as likely to have ever failed a Smog Check inspection and almost three times as likely to have ever been a gross polluter. These gross emitters were also more likely to have been tampered, failed for tailpipe emissions, failed for visual inspection and also had a Smog Check inspection aborted.

<table>
<thead>
<tr>
<th></th>
<th>All CA Vehicles (%)</th>
<th>RSD Group (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ever a fail</td>
<td>29.9</td>
<td>59.34</td>
</tr>
<tr>
<td>Ever a gross polluter</td>
<td>7.93</td>
<td>22.58</td>
</tr>
<tr>
<td>Ever a tamper</td>
<td>3.00</td>
<td>7.71</td>
</tr>
<tr>
<td>Ever an emission fail</td>
<td>20.23</td>
<td>49.78</td>
</tr>
<tr>
<td>Ever a visual fail</td>
<td>6.05</td>
<td>13.32</td>
</tr>
<tr>
<td>Ever an aborted test</td>
<td>15.84</td>
<td>29.61</td>
</tr>
</tbody>
</table>
Table 3 compares the gross emitting vehicles to their previous Smog Check history. Once again, these vehicles failed their most recent Smog Check inspection at almost double the rate of the control group and had three times as many multiple failures as the control group.

<table>
<thead>
<tr>
<th></th>
<th>All CA Vehicles (%)</th>
<th>RSD Group (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failed most recent test</td>
<td>17.29</td>
<td>28.31</td>
</tr>
<tr>
<td>Failed in two or more cycles</td>
<td>8.65</td>
<td>28.23</td>
</tr>
<tr>
<td>Failed in three or more cycles</td>
<td>2.32</td>
<td>11.2</td>
</tr>
<tr>
<td>Failed in four or more cycles</td>
<td>0.5</td>
<td>3.27</td>
</tr>
<tr>
<td>Pass within 12 hours of fail</td>
<td>7.92</td>
<td>17.3</td>
</tr>
</tbody>
</table>

Based on this preliminary analysis, we believe that RSD has a strong correlation to Smog Check inspection results and is a useful tool that could be used to identify gross emitting vehicles and require that those vehicles receive follow up Smog Check inspections and repairs as needed.

**Additional Support for Substitute Measures**

The need for this mitigation measure is further underscored by a problem first identified in an ARB/BAR report entitled *April 2004 Evaluation of the California Enhanced Vehicle Inspection and Maintenance (Smog Check) Program* dated September 2005. Section 4.6.2 of this report indicates that 40% of vehicles that initially failed the Smog Check inspection, presumably received repairs, and subsequently passed the Smog Check inspection failed the roadside inspection within six months on average of the repair.

In October 2006, Sierra Research, an ARB/BAR contractor presented information to the IMRC that indicates this pattern continues. The Sierra Research report has not yet been released and therefore it would be premature to comment on their findings. Although this problem may be costing the Smog Check program significant loss of emission reductions, additional analysis is required to quantify the losses.

The 2004 ARB/BAR report does not identify a specific cause of the problems related to the high roadside failure rate but we suggest that the causes could include the following:

- Fraud
- Incompetence
- Inadequate repairs
- Improper preconditioning
- Consumer resistance to repairs
- Additional emission component failure subsequent to repairs
- “Flipper”

To what extent each of these possibilities contributes to the high refail rate is unknown, but requires further research and analysis to improve the effectiveness of the Smog Check program. Fraud, incompetence, and inadequate repairs fall within BAR’s purview of enforcement authority. In contrast, improper preconditioning may result in a vehicle passing an emissions test that it should otherwise fail. Section 44012(b) of the Health and Safety Code requires that vehicles be preconditioned prior to the emissions test. In 2006, IMRC conducted a survey of Smog Check technicians on the subject of preconditioning and found that a majority of technicians were confused about the procedure. BAR has addressed that confusion in the draft version of the Smog Check Procedures Inspection Manual dated...
August 2008 that will be incorporated into regulation in the near future and should clear up any confusion on the subject.

Consumer resistance to repairs presents a different paradigm since the State cannot legislate that consumers spend any more money than that required to accomplish the minimum repair. In early 2008, BAR launched the “Drive Healthy Campaign”. This is an outreach campaign that uses television, radio, and print ads to convey to the public the importance of vehicle maintenance and driving a clean, low-emitting vehicle. BAR has also created an interactive website for additional consumer information to better educate the driving public of this important health issue. The goal is to improve consumer response to the necessity of proper emission related repairs.

The problem of additional emission component failure is one that cannot be predicted, although OBDII conducts various tests that allude to imminent component failures. Once again, a consumer cannot be forced into replacing a component that has not yet failed even though the more sophisticated on-board vehicle tests indicate that failure may be imminent.

The last possibility is “Flippers” which are vehicles that may legitimately pass very close to the emission cutpoint but flip back and forth between a pass and fail condition on subsequent tests. From a legal perspective, the vehicle passes as soon as the tailpipe emissions fall below the cutpoint for a period of time as determined by the Smog Check equipment. One solution mentioned in the aforementioned ARB/BAR report was to create after repair cutpoints that are lower than the initial cutpoint for tailpipe emissions. Since the release of that report, it has been determined that vehicle model specific cutpoints may mitigate the impact of this problem. BAR anticipates the promulgation of regulations to implement model specific emission cutpoints in late 2008.

In summary, significant research remains to determine the cause of the refail rate but we cannot overlook the potential loss of emissions that this problem is costing California. Therefore, the IMRC strongly recommends that substitute measures be considered to mitigate the potential emission reduction shortfalls in the South Coast and San Joaquin Valley caused by the delay in obtaining statutory authority to implement SIP measures and the current refail problem within California’s Smog Check program.

**RECOMMENDATIONS**

Based on a review of the 2007 SIP strategies dated April 26, 2007 and BAR’s statutory authority, the IMRC makes the following recommendations for Legislative action:

Amend pertinent sections of the Health and Safety Code to authorize the following changes to the Smog Check program:

- To implement annual Smog Check inspections of older model year vehicles;
- To implement annual Smog Check inspections for High Annual Mileage Vehicles and gross emitters; and,
- To implement a non-loaded-mode biennial Smog Check inspection on motorcycles.

In the absence of annual Smog Check inspection for older model year vehicles, the IMRC suggests that BAR use their existing authority to promulgate regulations to implement substitute measures that allow off-cycle testing using remote sensing in urbanized areas that may fail to meet conformity due to SIP shortfalls.
OBD ONLY SMOG CHECK INSPECTIONS

In the 2007 IMRC report, we recommended that the Legislature authorize BAR to implement OBD-only testing on newer model-year vehicles as determined to be appropriate by BAR and ARB. Since that time, we have conducted additional analysis regarding the Smog Check program and On Board Diagnostic systems. We want to reiterate our recommendation for a more streamlined and cost effective approach to the Smog Check program. Although critics of OBD-only testing suggest that all vehicles, regardless of model year or technology, should continue to be subject to tailpipe testing, we believe that tailpipe testing is not necessary for a subset of newer vehicles, perhaps those of 1996 model year and newer, more likely for those of the 2000 model year and newer. Certainly, tailpipe testing must continue for all 1995 and older model-year vehicles.

The computer technology installed in motor vehicles in 1984, the first year of the Smog Check program is vastly different from the technology used in today’s new automobiles. With the evolution of the second generation of On-Board Diagnostics (OBD) since 1996, the electronic emissions-monitoring systems are very sophisticated and robust. This new technology allows the use of a simple and very cost-effective test protocol that reduces the required test time, eliminates a significant amount of equipment, and provides an efficient alternative to the traditional Smog Check inspection. Based on analysis of the vehicle fleet and the comparative costs to conduct an OBD-only emissions test, implementing this technology could save consumers about $266 million in 2010, $324 million in 2015, and $341 million in 2020.

In addition, OBD-only testing would hold many vehicles to a tighter standard. OBD systems on 1996 and newer model year vehicles are required to illuminate the Malfunction Indicator Light (MIL) when the system determines that a problem with the emission or engine systems cause emissions to increase to 1.5 times the federal certification limit. In contrast, typical tailpipe standards in most I/M programs are set at two to four times the certification standard.

Since Smog Check stations will bear the brunt of the reduction of emissions testing revenues, it is of paramount importance that they are given ample time to make informed business decisions based on changes to the Smog Check program. In 2010, BAR anticipates introducing a new emissions analyzer for the Smog Check program which will require all Smog Check stations to purchase new equipment. IMRC recommends that any change to the program should be introduced before these capital expenditures are required by the industry.

Although 1996 and newer model year vehicles are equipped with OBD II technology, some vehicles were given an exemption for certain components of the OBD systems until 1998. Further improvements to the system were made for model years 2005 and after. Therefore, ARB and BAR may determine that OBD-only testing should begin with newer model year vehicles such as 2000 and newer or 2005 and newer. The IMRC’s own research indicates that the correlation between failing tailpipe emissions and the MIL illumination improves with newer model year vehicles. Finally, in a report released in April 2008 by a federally created committee called the Transitioning I/M workgroup, they conclude that “OBD systems obviate the need for a tailpipe emission test on 1996 newer light-duty vehicles because a simple, inexpensive check of the OBD system does a better job of detecting which vehicles need repair.” This report reflects the work of the Transitioning I/M workgroup of the Mobile Source Technical Review Subcommittee, which in turn is part of the Clean Air Act Advisory Committee established under the Federal Advisory Committee Act. This workgroup was formed as a result of a meeting between EPA and various states that occurred in May 2006. A copy of this report has been included in the Appendix. Our own research can be found on our website at: http://www.imreview.ca.gov/presentations/jw_OBD2_1.29.08.pdf
**Recommendation for Legislative Action**

Amend sections 44012 and 44013 of the Health and Safety Code to authorize the Bureau of Automotive Repair to make the following changes to the Smog Check inspection protocol:

1. In cooperation with ARB, authorize BAR to implement OBD-only emissions testing for OBD II equipped vehicles for model years determined as effective by both agencies. The proposed legislation should encourage the use of more advanced technologies after evaluation by BAR and ARB. To ensure an effective implementation, IMRC recommends that OBD-only testing should begin after evaluation and/or consideration of the following safeguards:

   a. Reducing the number of incomplete “monitors” from two to zero for 2000 model-year and newer vehicles;
   b. Additional OBD training for automotive repair technicians to ensure a high level of competency for OBD type repairs;
   c. Ensure that all testing is conducted at Smog Check stations using licensed Smog Technicians;
   d. Consideration of implementing OBD-only testing in the fleet sector for a period of time before going statewide;
   e. Consideration of a transition to OBD-only testing in concert with the new emissions analyzer in 2010;
   f. Evaluation of BAR’s Vehicle Information Database and ARB’s EMFAC emission model to validate support for OBD-only testing;
   g. A sample of OBD-only eligible vehicles of at least 2% should also receive full ASM (tailpipe) tests to validate the accuracy of OBD-only testing;
   h. Remote Sensing Devices should be used in urbanized areas to identify high emitting vehicles. Owners of these vehicles should be required to seek repairs along with a confirmation of having passed an emissions test.

**Background**

California implemented a biennial Smog Check inspection program in 1984, which required all passenger cars and lights duty trucks, in certain areas of the state, to be tested biennially based on their vehicle registration due date. At that time, the state adopted a two-speed idle test in conjunction with visual inspections to determine whether or not a vehicle was in emissions compliance. With the passage of time, the program has improved using newer technologies such as dynamometers and more sophisticated emissions analyzers. The last major equipment upgrade to California’s program occurred in 1998 with the implementation of the BAR 97 emissions test equipment that introduced loaded mode testing to California's emission testing program. The next major equipment upgrade is scheduled for 2010 when BAR anticipates the introduction of a new and improved gas analyzer and computer that incorporates some of the existing hardware such as the dynamometer, gas cap tester, and fuel evaporative tester. It is worth noting that many minor changes have occurred in the Smog Check program in the interim such as the addition of a test for liquid leaks, a visual smoke test, and for 1995 and older model-year vehicles, a fuel-evaporative test.

While BAR was planning and implementing the BAR 97 equipment to accommodate loaded-mode testing, the vehicle manufacturers were also making significant changes to vehicle on-board emission control systems as required by state and federal law. The vehicle manufacturers implemented an emission control system known as OBD II. Although OBD I systems had been installed on vehicles since 1980, the focus of the OBD II systems was to monitor emission control systems and illuminate a Malfunction Indicator Light on the dash board (visible to the driver) when the system sensed a
problem with emission controls. Since the first OBD II systems in 1996, the technology has continually improved to provide significant benefits over previous on board computer controls. Today, 28 states use OBD-only testing on 1996 and newer model-year vehicles with no need to perform tailpipe, visual, or functional tests. Colorado and California are the only two states that have not adopted OBD-only testing for newer model year vehicles and that still conduct tailpipe tests on those newer vehicles.

The IMRC is recommending legislation that would authorize the BAR to implement OBD-only testing. OBD II does not test exhaust. Instead, this system checks a vehicle’s computer-controlled emissions systems and components to ensure that no malfunction exists that would cause an increase in emissions. OBD II is installed on most 1996 and newer passenger cars and light duty trucks. Table 1 illustrates the likely percentage of tests that can be tested with OBD II equipment by calendar year, assuming typical replacement of the fleet. As an example, by 2010, IMRC staff estimate that 76.74 percent of all 1976 and newer model-year vehicles, namely those vehicles subject to the Smog Check program, will be equipped with OBD II technology. (In other words, pre-1996 vehicles will become an ever smaller percentage of the fleet.)

<table>
<thead>
<tr>
<th>Calendar Year</th>
<th>Estimated Percentage of OBD II Equipped Vehicles (%)</th>
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<tr>
<td>2008</td>
<td>66.81</td>
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<tr>
<td>2009</td>
<td>71.62</td>
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<td>76.64</td>
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<td>2011</td>
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<tr>
<td>2019</td>
<td>97.68</td>
</tr>
<tr>
<td>2020</td>
<td>98.08</td>
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</table>

There is a concern that OBD-only tests will reduce emissions benefits. Logically, this may be true. OBD fails some vehicles that pass tailpipe tests, and it passes some vehicles that fail tailpipe tests. In early 2008, the IMRC, analyzing Smog Check inspection data covering 1998 through 2007 found that of those OBD II equipped vehicles that failed the Smog Check inspection for visual, functional, or tailpipe, 85% had the MIL illuminated. In part, this percentage of less than 100% overlap is due to the fact that California still allows up to two monitors not set to completion as part of the OBD test component. Federal law mandates that 2000 model years and newer vehicles should have no more than one monitor not completed. The discrepancy between OBD only and full ASM failures could be further reduced by beginning OBD-only testing with 1998 or newer model-year vehicles, or even 2000 model-year vehicles, since these systems have continually improved since their introduction.

Our analysis pointed out two additional findings for 1996 and newer model-year vehicles which are:

a. Failures found solely by visual inspection are about 0.2% of all vehicles tested; and,

b. Gross polluters found solely by tailpipe testing are about 0.1% of all vehicles tested.
With regard to adopting OBD only testing protocols, IMRC has heard varying estimates of emissions losses, which range from 1 ton per day on the low side to as much as 7 tons per day on the high side. Given our estimate of $266 million in savings in 2010 using OBD only testing procedures, a 7 ton per day loss costs consumers $104 thousand per ton for those emission reductions. In contrast, if the loss is 1 ton per day, then consumers pay $728 thousand a ton for the increase in emissions reductions. In either case, these are extremely expensive emission reductions. The ARB recently presented information to the IMRC that stated the emissions losses for OBD only testing would be less than 1 ton per day to as much as 3 tons per day. They further stated that these minor emission gains cost the consumer from $1 million per ton to $200 thousand per ton respectively. These are extremely expensive emission reductions by anyone’s standards. As an example, compare the aforementioned cost per ton benefits to the costs estimated in the 2004 BAR/ARB report that indicated Smog Check in enhanced areas costs $5,317/per ton, and that stationary source measures may cost $10,000 per ton; once again, a significant difference in cost effectiveness. Also, based on an earlier OBD presentation to the IMRC by ARB staff, (January, 2006), another advantage of OBD only testing is that defects can be repaired before tailpipe readings show a failure. This could result in immediate emission repairs and subsequent emission reductions and thereby help to prevent deterioration of the vehicle’s catalytic converter.

OBD-only is inexpensive. IMRC staff has evaluated programs and costs in other states. In upstate New York, a decentralized program covering five million vehicles does OBD-only testing. The state-mandated charge is $11, of which $4 goes to the state for administrative purposes. Stations keep just $7.00 for the test. Due to substantial cost-of-living differences, we estimate that this equates to approximately $16.00 per vehicle testing cost in California. The current full ASM test costs about $47 per vehicle.

Proposed Safeguards in Connection With Implementing OBD

The IMRC understands the State has a large testing infrastructure and wants to ensure that OBD-only testing is sensibly expanded. Therefore, we suggest that the following measures be considered prior to implementing the OBD–only testing inspection process.

1. Decrease the number of monitors allowed not to be set – To comply with new enhanced emission control and emission compliance standards, the California Air Resources Board required most 1996 and newer passenger vehicles sold in California to be equipped with numerous on-board emissions diagnostic systems known as OBD II. These systems are capable of performing tests on the vehicle’s computer controlled emission systems and alert the driver when a problem is detected via a Malfunction Indicator Light (MIL). These tests are referred to as readiness monitors (monitors) and are typically executed when the vehicle is driven under a specific set of driving conditions. If these monitors are reset (e.g. as a result of the automotive technician clearing diagnostic trouble codes or the removal of power from the on-board computer by someone briefly disconnecting the battery), the vehicle must be driven through a very specific set of driving conditions that allow the monitors to run to completion once again to check for emission system defects.

In 2002, BAR implemented the OBD II component of the Smog Check program. This new component required that the Smog Check technician connect the vehicle’s computer to the BAR 97 Emission Inspection System (EIS) via a data link connector. The EIS, following a preprogrammed set of instructions, checks the vehicle’s on-board computer to determine if the OBDII system identified any malfunctions and also determine if all monitors have run to completion.
2. Require additional OBD technician training – Converting to OBD only emissions testing will place an additional burden on Smog Check technicians and may require additional training to assure competent and professional repairs to the vehicle emission system. Therefore it should also be required that additional training be made available for technicians to improve these skills which need to continually evolve to keep pace with the new and more complex emission systems.

3. Consider initial implementation of OBD-only for fleets – As an option to initially implementing OBD only testing statewide, BAR could implement OBD-only testing on fleet vehicles. Fleet vehicles are typically company owned vehicles in which the company provides their own maintenance facilities which includes the Smog Check inspection capability. This small scale implementation could serve to remedy any testing difficulty or deficiencies prior to going to a statewide program.

4. Evaluate the data contained in BAR’s VID and ARB’s EMFAC Model – BAR’s Vehicle Information Database contains information for over 100 million Smog Check inspections that have been conducted since 1997. Using this information in conjunction with ARB’s EMFAC Emissions Model could provide a significant amount of insight into possible emission benefits that could be lost as a result of eliminating the tail pipe, visual, and functional components of the Smog Check inspection.

5. Consider OBD only testing with transition to BAR’s 2010 Emission Inspection System – The current Emission Inspection System referred to as BAR 97 is rapidly becoming obsolete. As the IMRC understands the concept, BAR is currently in the development process for a new analyzer referred to as the BAR 2010. BAR is adopting a new concept in analyzers. The new analyzer will be capable of changes and also uses some of the existing hardware of the BAR 97. The new analyzer will also contain “Universal Software” which means that regardless of manufacturer, the software will be identical among the various machines, unlike today’s BAR 97. If the emission testing industry is required to purchase the new analyzer to remain in the Smog Check program, we believe that it is imperative that the station owners and technicians be advised of upcoming changes prior to converting to the new equipment. This allows them to make an informed business decision regarding their continued participation in the Smog Check program. Put differently, it makes little sense to change to OBD-only testing for some component of the fleet in 2012; the sensible time is 2010 if BAR’s estimated implementation date remains firm.

6. To continue the current licensing scheme in the Smog Check program, all OBD-only testing should be conducted in licensed Smog Check stations by licensed Smog Check technicians. In the event of an OBD-only failure, then only licensed Smog Check technicians employed in licensed Smog Check stations should be authorized to complete the repair.

7. As part of the program evaluation, BAR should sample OBD-only test results and compare these vehicles to an ASM emissions test. This provides an additional comparison to ensure that the program minimizes any emission losses that could result from someone circumventing the OBD system. In the current system, a sample of 1.9% of vehicles are “directed” to Test Only and Gold Shield facilities even without the “High Emitter Profile” that determines which vehicles go to Test Only facilities; another sample of 0.1% can go anywhere they want, even if they would have been directed according the High Emitter Profile. Perhaps the sample of model years eligible for OBD only could be a similar 2%; statistical validity for particular makes and models is the appropriate standard.
8. Because some repairs are less than durable (and less happily, some tests are fraudulent), Remote Sensing Devices (RSD) should be used in urbanized areas where local air districts need additional emission reductions. RSD is effective at identifying gross-emitting vehicles. Vehicles so identified should be called in immediately, not at their next regular Smog Check, to validate the failures and to require emissions-related repairs as necessary.
UPDATE ON PROGRAM AVOIDANCE AND MISSING VEHICLES

Since 2006, the IMRC has been researching what might be called program avoidance. Program avoidance comes in several forms. As was addressed in the 2006 and 2007 IMRC reports for example, some vehicle owners simply pay their DMV renewal fees by the registration due date yet then drive their vehicle for a prolonged period of time before they comply with the requirement to have a Smog Check. As a result of this procrastination, those vehicles that would have failed and been repaired continue to pollute the air, in the amount collectively of 1 – 2 tons per day of HC and NOx, until the Smog Check inspection has been completed. The passage of AB2241 (Saldana, stats. 2008, Chap. 451) should mitigate some of these emission losses, because vehicle owners must now apply for a temporary operating permit if their Smog Check is not complete by the registration due date. The fee for this permit is $50 and will be valid for no longer than 60 days. This penalty for procrastination helps to resolve one of the forms of Smog Check program avoidance.

Although AB2241 resolves one form of Smog Check program avoidance, we are continuing to research this issue since other forms of program avoidance appears to exist. As an example of our most recent analysis, we have been analyzing four categories of vehicles that appear in the DMV records of vehicles with registrations no longer current. These four categories are junked vehicles, vehicles for which a salvage certificate has been issued (issued to an insurance company), vehicles registered as permanent non-operational (PNO), and vehicles re-registered out of state. These four vehicle classifications account for about 70% of the vehicles that were registered in 2000 but are not currently registered in 2008. That leaves 30% of the vehicles, several million in total, about which we know nothing. Perhaps they left the state and no record was passed back to the California DMV. Or maybe they are being driven without a current registration. We do not know the full breakdown at this point, although we do have evidence that some vehicles identified as high emitters by RSD (in the SCAQMD pilot study) were being driven without a current registration.

Based on our analysis to date, many vehicles reappear in the registration records at various intervals but we are uncertain of their emission test results. This pattern of disappearing and reappearing in current registration records is problematic since those vehicles that are most likely junked or PNO’ed are also models and model years that have the highest emission failure rates. In contrast, vehicles that have received salvage certificates or have left the state tend to be newer. The table on the next age illustrates these four vehicle registration categories by model year among those vehicles processed over 2005-2007.
Many uncertainties remain in this analysis. In early 2009, we will be entering into a joint agreement with Valley Clean Air Now (also known as Valley CAN) and Carfax to help determine the location and status of some of these vehicles and we will present those findings in the 2009 IMRC report. If the continued analysis substantiates the preliminary indications that we have an avoidance problem within the Smog Check program, then the IMRC may suggest recommendations that include the following:

1. That owners of vehicles identified as avoiding the Smog Check program by out of state registration or lapsed registration be fined and that a portion of the money collected through such a fine be returned to the jurisdiction where the offense occurred.

2. Require that owners of vehicles identified as avoiding the Smog Check inspection, by whatever means, be required to have all necessary repairs completed to bring the vehicle into compliance with California’s Smog Check program regardless of cost and that these owners be prohibited from participating in the Consumer Assistance Program.
APPENDICES


COMMITTEE MEMBER INFORMATION

<table>
<thead>
<tr>
<th>Member Name</th>
<th>Area of Expertise (1)</th>
<th>Date Appointed</th>
<th>Appointing Authority (1)</th>
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<tr>
<td>Jeffrey Williams, Ph.D.</td>
<td>Economist</td>
<td>August 1, 2007</td>
<td>Governor</td>
</tr>
<tr>
<td>Acting Chair</td>
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<td></td>
<td></td>
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<tr>
<td>John Hisserich, Ph.D.</td>
<td>Social Scientist</td>
<td>November 6, 2003</td>
<td>Governor</td>
</tr>
<tr>
<td>Vice Chair</td>
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<tr>
<td>Dennis DeCota</td>
<td>Representative of I/M Industry</td>
<td>September 8, 2007</td>
<td>Senate Rules Committee</td>
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<tr>
<td>Eldon Heaston</td>
<td>Air Pollution Control Officer</td>
<td>May 25, 2006</td>
<td>Governor</td>
</tr>
<tr>
<td>Bruce Hotchkiss</td>
<td>Local Law Enforcement Agency</td>
<td>August 21, 2001</td>
<td>Speaker of the Assembly</td>
</tr>
<tr>
<td>Herman “Bud” Rice</td>
<td>Representative of I/M Industry</td>
<td>July 15, 2008</td>
<td>Governor</td>
</tr>
<tr>
<td>Dean Saito</td>
<td>Expert in Air Quality</td>
<td>May 24, 2007</td>
<td>Senate Rules Committee</td>
</tr>
<tr>
<td>Al “Skip” Solorzano</td>
<td>Public Member</td>
<td>November 1, 2006</td>
<td>Governor</td>
</tr>
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(1) As defined by Section 44021 of the California Health and Safety Code

Committee Member Background

Dr. Jeffrey Williams

Dr. Jeffrey Williams, of Palo Alto and Davis, was first appointed to the Inspection and Maintenance Review Committee in 2002 and was re-appointed on August 1, 2007. Dr. Williams was an Assistant Professor in the Economics Department at Brandeis University from 1981 to 1987, and was a visiting economist at the Banca d’Italia in 1986. He worked for the Food Research Institute of Stanford University from 1987 to 1998 as an associate and full professor, and later as Director. In 1992, Dr. Williams was awarded a Quality of Research Discovery Award from the American Agricultural Economics Association for a book *Storage and Commodity Markets*. Since 1997, he has served as the Daniel Barton DeLoach Professor in the Department of Agriculture & Resource Economics at the University of California, Davis. Dr. Williams earned his Doctor of Philosophy degree from Yale University and his Bachelor of Arts degree from Williams College.

Dr. John Hisserich

Dr. John C. Hisserich was appointed to the Inspection and Maintenance Review Committee on November 6, 2003. He recently retired as the Associate Vice President for Health Affairs at the University of Southern California where he had participated in administration, teaching, and research for 32 years. He has served as a public member of the California Coastal Commission and the Committee of Bar Examiners. He has also served as a reserve Deputy Sheriff with the Los Angeles County Sheriffs Office for over 30 years. Dr Hisserich earned his Masters and Doctorate degrees in Public Health from the University of California, Los Angeles, and a Bachelor’s degree in Government from California State University, Los Angeles.
Mr. Dennis DeCota

Mr. Dennis DeCota was originally appointed to the Inspection and Maintenance Review Committee in 1994 by Governor Pete Wilson and was reappointed by the Senate Rules Committee on September 8, 2007. Since 1991, Mr. DeCota has served as the Executive Director of the California Service Station and Automotive Repair Association. He oversees the daily activities of the Association, its annual budget, and membership benefits programs. He also organizes and manages CSSARA’s Board meetings and the annual general membership meeting. In addition, Mr. DeCota maintains good working relationships with all levels of management at State of the California, Department of Consumer Affairs, Bureau of Automotive Repair, California Air Resources Board, California Environmental Protection Agency, California Energy Commission and California Legislature.

Prior to his employment at CSSARA, Mr. DeCota was the Merchandising Sales Supervisor for Unocal Corporation from 1966 to 1978 and the Marketing Director for CSSA Pro from 1982 to 1985. Mr. DeCota has been instrumental in the passage of Legislation that has benefited both the Smog Check program and small businesses involved in oil company franchisees. These bills include SB 629 (statutes of 1994) and SB1178 (statutes of 1999). In addition, Mr. DeCota has served on the California Attorney General's Gasoline Pricing Task Force, the California Environmental Protection Agency Service Station Permit Regulatory Reform Task Force, the California Air Resources Board Cleaner Burning Gasoline Committee, the Bureau of Automotive Repair’s Technical Education Committee, and the President of the Automotive Repair Coalition from 1999 - 2002.

Mr. Eldon Heaston

Eldon Heaston of Claremont, was appointed to the Inspection and Maintenance Review Committee on May 25, 2006. Since 1991, he has served as executive director of the Mojave Desert Air Quality Management District. Previously, Mr. Heaston served as senior technical staff for the Computer Sciences Corporation from 1990 to 1991 and in refinery operations for the Atlantic Richfield Company from 1977 to 1987.

Mr. Bruce Hotchkiss

Mr. Bruce Hotchkiss was appointed to the Inspection and Maintenance Review Committee on August 21, 2001. Mr. Hotchkiss has worked for the Bureau of Automotive Repair (BAR) since 1991 and is currently assigned to the Hayward Complaint Mediation Center. Prior to this assignment, the BAR enforcement division employed Mr. Hotchkiss where he worked with automotive repair dealers to ensure compliance with the Automotive Repair Act.

Prior to his employment at BAR, Mr. Hotchkiss worked for Honda Canada, Inc., in Service Engineering; Chrysler Canada/American Motors Canada, as an Owner Relations Specialist in the Central Regional Office; and, Peterson, Howell, and Heather, Canada, as a Fleet Maintenance Specialist. In 1977, Mr. Hotchkiss earned a Certificate of Qualification as a Motor Vehicle Mechanic from the Province of Ontario's Ministry of Colleges and Universities automotive apprenticeship program. This was later split into two certificates, Automotive Service Technician and Truck and Coach Technician, which are kept current.
Mr. Hotchkiss writes a monthly automotive review column for the Pacifica Tribune, contributes to www.AutoWire.net, and is a member of the Western Automotive Journalists. In addition, he was a member of the Pacifica Planning Commission, from 1997 until March 2004.

Mr. Hotchkiss is the President of the California Association of Regulatory Investigators and Inspectors (CARII), and is an affiliate of CAUSE, a union of state public safety employees. Bruce is the Chairman of CAUSE’s Scholarship Committee, and is a member of CAUSE’s Controller’s Committee, Political Action Committee and the Negotiation Team during the last two bargaining sessions (2001 and 2003).

Mr. Herman “Bud” Rice

Herman "Bud" Rice of Pleasanton was appointed to the Inspection and Maintenance Review Committee on July 15, 2008. He has worked for Quality Tune-Up shops as president since 2004, vice president from 1987 to 2004, franchisee from 1985 to 1987, area supervisor from 1981 to 1985 and shop manager from 1976 to 1981. Mr. Rice is a member of the California Automotive Business Coalition Executive Board.

Mr. Dean Saito

Dean K. Saito is currently the Manager of Mobile Source Strategies within the Mobile Source Division at the South Coast Air Quality Management District (SCAQMD) in Diamond Bar, California. Mr. Saito has over twenty-five years of experience at the California Air Resources Board (CARB) in various functional areas including air quality planning, enforcement, and rule development. Mr. Saito was a Manager in the Air Quality and Transportation Planning Unit in the Executive Office of CARB for nearly ten years. After leaving CARB in 2001, Mr. Saito accepted a position with the Bureau of Automotive Repair as Chief of Smog Check Operations. In 2004, Mr. Saito accepted a position as Manager of Fleet Rules Operation within the Office of Technology Advancement Office for the SCAQMD. In 2007, he became Manager of Mobile Source Strategies within the newly created Mobile Source Division of the SCAQMD.

Mr. Al “Skip” Solorzano

As a corporate manager and independent consultant, Skip Solorzano has provided technical expertise and support to market, manage and facilitate the delivery of services in the utility, consumer services, health care and social service industries. In 2006, Mr. Solorzano was appointed by Governor Schwarzenegger as a member of the Inspection and Review Committee.

Formerly, Mr. Solorzano served as a manager with Pacific Gas and Electric Company. During his twenty-year tenure with the utility, his responsibilities were directed to expand the level of services within target markets, enhance marketing efforts to increase program participation, and serve as a liaison to the diverse community segments. In 1991, the utility sponsored Solorzano as an executive on loan to the California Hispanic Chambers of Commerce. Under this assignment he served as the chief executive administrator for the statewide trade association.

Mr. Solorzano has been an entrepreneur for nineteen years and in 1993, established his consulting practice of Solorzano Communications Group. As a consultant, he has been affiliated with several statewide projects including serving as the bilingual media spokesperson for California deregulation
campaign, Plug In California. An accomplished trainer, Mr. Solorzano has delivered curriculum in leadership and organization development, working with retail, employee groups and business organizations. In 2003, he served as the master trainer for the eligibility worker certification process of California's Healthy Families/Medi-Cal programs. Mr. Solorzano has held an array of leadership positions with nonprofit, business and community-based organizations. Mr. Solorzano is a past award recipient of the National Concilio of America, the United Way Most Influential Hispanics of the Bay Area, and the United States Hispanic Chamber of Commerce Corporate Advocate of the Year award. Mr. Solorzano is a graduate of LaSalle University, receiving a Masters of Science degree in Communications.
AB 619, Emmerson. Vehicle registration amnesty program: specially constructed vehicles.

(1) Existing law generally requires all vehicles operating upon the highways of this state to be registered and all fees and taxes to have been paid.

This bill would require the Department of Motor Vehicles to develop and administer a vehicle registration amnesty program which would be in effect from January 1, 2010, until December 31, 2010, for vehicles that were previously registered or classified incorrectly and that, pursuant to the program, become correctly registered, as defined. The department would be required to grant amnesty to a vehicle owner if all of the specified conditions are met by December 31, 2010, including, but not limited to, the owner filing a completed application, signed under penalty of perjury, with the department. Because a violation of this provision would expand the scope of the crime of perjury, this bill would impose a state-mandated local program.

These provisions would not become operative until July 1, 2009, and would be repealed on January 1, 2011.

This bill would require that for those specially constructed passenger vehicles or pickup trucks that participated in the amnesty program, the model year of the previous registration would be required to be the calendar year of the year in which the vehicle owner applied for amnesty, but exemptions from smog check requirements based on model-year would not apply.

(2) The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the
state. Statutory provisions establish procedures for making that reimbursement.

This bill would provide that no reimbursement is required by this act for a specified reason.

THE PEOPLE OF THE STATE OF CALIFORNIA DO ENACT AS FOLLOWS:

SECTION 1. (a) It is the intent of the Legislature in enacting a vehicle registration amnesty program to improve compliance with state vehicle registration laws and accelerate and increase collections of certain owed state fees and taxes.

(b) The Legislature finds and declares that a public purpose is served by the waiver of criminal prosecution in return for the immediate reporting and payment of previously underreported, nonreported, or certain nonpaid vehicle registration fees and taxes. The benefits gained by an amnesty program include, among other things, accelerated receipt of certain owed fees and taxes, permanently bringing into the vehicle registration system vehicles that have been previously misidentified to avoid appropriative state taxes and fees, and providing an opportunity for vehicle owners to correct their vehicle registration requirements and satisfy tax and fee obligations before stepped-up vehicle registration enforcement programs take effect.

(c) Further, the legislative intent of enacting this amnesty program is that the program is a one-time occurrence that shall not be repeated in the future, because any expectations of future amnesty programs could have a counterproductive effect on current compliance.

SEC. 2. Section 4750.1 of the Vehicle Code is amended to read:

4750.1. (a) If the department receives an application for registration of a specially constructed passenger vehicle or pickup truck after it has registered 500 specially constructed vehicles during that calendar year pursuant to Section 44017.4 of the Health and Safety Code, and the vehicle has not been previously registered, the vehicle shall be assigned the same model-year as the calendar year in which the application is submitted, for purposes of determining emissions inspection requirements for the vehicle.

(b) If the department receives an application for registration of a specially constructed passenger vehicle or pickup truck that has been previously registered after it has registered 500 specially constructed vehicles during that calendar year pursuant to Section 44017.4 of the Health and Safety Code, and the application requests a model-year determination different from the model-year assigned in the previous registration, the application for registration shall be denied and the vehicle owner is subject to the emission control and inspection requirements applicable to the model-year assigned in the previous registration. For a vehicle that participated in the amnesty program pursuant to Section 9565, the model-year of the previous registration shall be the calendar year of the year in which the vehicle owner applied for amnesty. However, a denial of an application for registration issued pursuant to this subdivision does not preclude the vehicle owner from applying for a different model-year determination and application for registration under Section 44017.4 of the Health and Safety Code in a subsequent calendar year.

SEC. 3. Section 9565 is added to the Vehicle Code, to read:
9565. (a) (1) The department shall develop and administer a vehicle registration amnesty program, which shall be in effect from January 1, 2010, until December 31, 2010, for vehicles that have been previously registered or classified incorrectly and that are correctly registered in accordance with this section.

(2) Except as provided in subdivision (b), a criminal action for false statements relating to the value, make, model, or a failure to register the vehicle shall not be brought against a current vehicle owner who has been granted amnesty under this section.

(b) This section does not apply to violations of this code for which, as of January 1, 2010, either of the following applies:

(1) The current vehicle owner is on notice of a criminal investigation by a complaint having been filed against him or her, or by written notice having been mailed to him or her, that he or she is under criminal investigation.

(2) A criminal court proceeding involving the vehicle has already been initiated against the current vehicle owner.

(c) The department shall grant amnesty to a vehicle owner if all of the following conditions have been met by December 31, 2010:

(1) The vehicle owner has filed a completed amnesty application with the department attesting, under penalty of perjury, to the owner's eligibility to participate in the vehicle registration amnesty program.

(2) Specially constructed vehicles participating in the amnesty program shall be assigned the model year of the calendar year in which the vehicle owner applied for amnesty under this section.

(3) The vehicle owner has correctly registered the vehicle or has been issued a certificate of ownership without registration, pursuant to Section 4452.

(d) Vehicle license fee revenue derived from the vehicle registration amnesty program shall be allocated in the same manner as required by Section 11001.5 of the Revenue and Taxation Code.

(e) Specially constructed vehicles that apply for amnesty under this section shall not be exempted from the requirement to obtain a certificate of compliance as provided in subparagraph (B) of paragraph (4) of subdivision (a) of Section 44011 of the Health and Safety Code.

(f) (1) This section shall not become operative until July 1, 2009.

(2) This section shall remain in effect only until January 1, 2011, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2011, deletes or extends that date.

(g) For the purposes of this section, "correctly registered" means that all of the following have been completed:

(1) The vehicle owner has disclosed to the department the make, model, and the true cost of the vehicle including parts and labor.

(2) The vehicle owner has paid to the department all fees and penalties owed for the underreporting of the vehicle's value and the nonpayment of taxes or fees previously determined or proposed to be determined.

(3) The vehicle has been issued a certificate of compliance in accordance with Section 44015 of the Health and Safety Code, as appropriate.

SEC. 4. No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution because the only costs that may be incurred by a local agency or school.
district will be incurred because this act creates a new crime or infraction, eliminates a crime or infraction, or changes the penalty for a crime or infraction, within the meaning of Section 17556 of the Government Code, or changes the definition of a crime within the meaning of Section 6 of Article XIII B of the California Constitution.
BILL NUMBER: AB 2241 CHAPTERED

BILL TEXT

CHAPTER 451
FILED WITH SECRETARY OF STATE SEPTEMBER 27, 2008
APPROVED BY GOVERNOR SEPTEMBER 27, 2008
PASSED THE SENATE AUGUST 18, 2008
PASSED THE ASSEMBLY AUGUST 20, 2008
AMENDED IN SENATE AUGUST 11, 2008
AMENDED IN SENATE JUNE 26, 2008
AMENDED IN ASSEMBLY MAY 23, 2008

INTRODUCED BY Assembly Member Saldana

FEBRUARY 20, 2008

An act to amend Section 4156 of, and to add Section 9257.5 to, the Vehicle Code, relating to vehicles.

LEGISLATIVE COUNSEL'S DIGEST

AB 2241, Saldana. Vehicle operation: temporary permits.
Existing law authorizes the Department of Motor Vehicles in its discretion to issue a temporary permit to operate a vehicle when a payment of fees has been accepted in an amount to be determined by, and paid to, the department, by the owner or other person in lawful possession of the vehicle.

Existing law requires the department to require a person to obtain a valid certification of compliance upon initial registration, transfer of ownership and registration, or biennial renewal of registration of a motor vehicle that is subject to vehicular air pollution control requirements.

This bill would, with regard to biennial renewal of registration of a motor vehicle, require that a fee of $50 be paid for each temporary permit issued pursuant to these provisions when a certificate of compliance is required, except that the fee would not be charged for a vehicle that has been accepted into the Bureau of Automotive Repair Consumer Assistance Program if the owner of the vehicle qualifies as an income eligible applicant for the program and presents sufficient evidence of this fact. The bill would limit the issuance of a temporary permit under these circumstances to a vehicle that has failed its most recent smog check inspection. The bill would also limit, under these circumstances, the issuance of a temporary permit to not more than one permit to a vehicle owner in a 2-year period, and the temporary permit would be valid for either 60 days from the date of the expiration of the registration of the vehicle or 60 days from the date that the vehicle is removed from nonoperation, as specified.

THE PEOPLE OF THE STATE OF CALIFORNIA DO ENACT AS FOLLOWS:
SECTION 1. Section 4156 of the Vehicle Code is amended to read:

4156. (a) Other provisions of this code notwithstanding, and except as provided in subdivision (b), the department in its discretion may issue a temporary permit to operate a vehicle when a payment of fees has been accepted in an amount to be determined by, and paid to the department, by the owner or other person in lawful possession of the vehicle. The permit shall be subject to the terms and conditions, and shall be valid for the period of time, that the department shall deem appropriate under the circumstances.

(b) (1) The department shall not issue a temporary permit pursuant to subdivision (a) to operate a vehicle for which a certificate of compliance is required pursuant to Section 4000.3, and for which that certificate of compliance has not been issued, unless the department is presented with sufficient evidence, as determined by the department, that the vehicle has failed its most recent smog check inspection.

(2) Not more than one temporary permit may be issued pursuant to this subdivision to a vehicle owner in a two-year period.

(3) A temporary permit issued pursuant to paragraph (1) is valid for either 60 days after the expiration of the registration of the vehicle or 60 days after the date that vehicle is removed from nonoperation, whichever is applicable at the time that the temporary permit is issued.

(4) A temporary permit issued pursuant to paragraph (1) is subject to Section 9257.5.

SEC. 2. Section 9257.5 is added to the Vehicle Code, to read:

9257.5. (a) Except as provided in subdivision (c), a fee of fifty dollars ($50) shall be paid for each temporary permit issued pursuant to Section 4156 when a certificate of compliance is required pursuant to Section 4000.3.

(b) After deducting its administrative costs, the department shall deposit fees collected pursuant to subdivision (a) in the High Polluter Repair or Removal Account in the Vehicle Inspection and Repair Fund.

(c) The department shall not charge a fee pursuant to subdivision (a) if the department is presented at the time the temporary permit is issued with sufficient evidence, as determined by the department, that the owner of the vehicle is an income eligible applicant who had his or her vehicle accepted into the Bureau of Automotive Repair Consumer Assistance Program as established pursuant to Chapter 5 (commencing with Section 44000) of Part 5 of Division 26 of the Health and Safety Code.
ARB AND BAR
COMMENTS
December 10, 2008

Mr. Rocky Carlisle  
Executive Officer  
California Inspection and Maintenance Review Committee  
1001 I Street Room 106  
Sacramento, California 95814

Dear Mr. Carlisle:

The Air Resources Board appreciates this opportunity to offer comments to the Inspection and Maintenance Review Committee’s draft Annual Report to the California Legislature.

Your recommended changes to California’s Smog Check Program have been reviewed and under joint cover with the Bureau of Automotive Repair, comments are offered for your review and consideration.

Sincerely,

[Signature]

Tom Cacklette  
Chief Deputy Executive Officer  
Air Resources Board

Enclosure
December 10, 2008

Mr. Rocky Carlisle, Executive Officer
California Inspection and Maintenance Review Committee (IMRC)
1001 I Street, Room 106
Sacramento, CA 95814

Dear Mr. Carlisle:

Thank you for the opportunity to comment on the draft 2008 IMRC report recommending changes to the Smog Check Program. Attached please find the joint comments of the California Air Resources Board and the Bureau of Automotive Repair.

Sincerely,

[Signature]
Debbie Balaam, Assistant Chief
Bureau of Automotive Repair

cc: Tom Cackette, Chief Deputy Executive Officer
California Air Resources Board

Attachment

10240 Systems Parkway, Sacramento, California 95827  ▲  Telephone 916.255.4300  ▲  Fax 916.255.1369  ▲  www.smogcheck.ca.gov
Comments on the Inspection and Maintenance Review Committee
Draft 2008 Report
Review of the Smog Check Program
November 18, 2008

The Air Resources Board (ARB) and Bureau of Automotive Repair (BAR) appreciate the opportunity to comment on the Inspection and Maintenance Review Committee’s (IMRC) 2008 report. We understand that our comments will be appended to the IMRC’s final report.

Comments are provided below according to the section of the IMRC draft report. Our comments primarily address our concerns with specific recommendations or statements in the report.

I. The State Implementation Plan (SIP)

The IMRC recommends legislative action based on three items included in the 2007 State Implementation Plans for the South Coast Air Quality Management District and the San Joaquin Valley Air Pollution Control District. They are as follows: implement annual Smog Check inspections on older model year vehicles; implement annual Smog Check inspections for high annual mileage vehicles and gross emitters; and, implement a non-loaded mode biennial Smog Check inspection for motorcycles. The ARB and BAR have no comments specific to these recommendations at this time.

In addition, the IMRC has recommended that BAR implement off-cycle testing of vehicles using remote sensing device (RSD) technology. This recommendation is suggested as a substitute measure in the event that legislation is not enacted to allow for annual inspections of older model-year vehicles.

The BAR and ARB have concerns with this recommendation. First, there is no statutory authority to enforce a plan such as mandatory Smog Check tests for high-emitting vehicles identified “off-cycle.” While the law provides for an off-cycle inspection program, it provides no means of enforcing compliance by vehicle owners. The current Smog Check test mandate is tied to vehicle registration requirements for biennial registration, transfer of ownership transactions and initial registration in the State. There is no similar requirement for off-cycle testing. IMRC’s proposal would rely on voluntary compliance by the vehicle owner once a vehicle is identified. The vehicle owner could be notified of the need for a Smog Check inspection, but could then choose to ignore the directed follow-up inspection entirely.

Second, at least one study has determined that RSDs would not provide for a sufficiently accurate or cost-effective method to identify individual vehicles that would benefit from off-cycle testing. Based on its 2008 study, Eastern Research Group (ERG) concluded that RSDs are best used within the context of California’s Smog Check Program as a tool for characterizing overall fleet emission levels by averaging together the remote sensing results for large groups of vehicles. ERG’s study determined that too many variables exist that hinder the ability to use RSD data to reliably predict how individual vehicles would fail when called in for an off-cycle Smog Check inspection. As a result, RSD does not appear to be a reliable tool for targeting

Prepared on 12/10/2008
specific vehicles. Further, ERG found that identifying vehicles for "off-cycle" testing and repair could be done more cost effectively using data from BAR’s existing Smog Check database. We are disappointed that the IMRC fails to take the results of this peer reviewed study into account when formulating its recommendations.

II. OBD Only Smog Check Inspections

Similar to its 2007 proposal, the IMRC in its 2008 report recommends an abbreviated inspection for newer technology (OBD-II equipped) vehicles. We agree that inspection requirement flexibility is critical to dealing with vehicle technology advances. However, we note that this or any other recommendation to change the current mandated inspection protocols will require changes to existing statutes.

As indicated in our response to IMRC’s 2007 report, we agree that a non-tailpipe, OBD-focused, test will be more cost-effective in identifying certain, newer model-year vehicles in need of repair based on experiences in other states, and studies of OBD-II in California. The IMRC’s 2008 report even quotes information from studies conducted by the United States Environmental Protection Agency and the ARB. Thus, there appears to be no need to expend additional resources to further justify OBD-II-focused testing based on analysis of BAR’s Vehicle Information Database or ARB’s EMFAC emissions model, as has been recommended by the IMRC.

The ARB and BAR have already begun discussion of OBD-related implementation issues should a statutory change afford the opportunity to be more flexible with regard to vehicle inspection requirements. The issues under consideration include many listed in IMRC’s draft report, such as how to define vehicles that would be subject to OBD-II-focused testing, and the number of incomplete OBD-II readiness monitors that would be allowed for a valid test of these newer technology vehicles and whether other visual or functional inspection elements should be included. Because sufficient data and experience already exists to address these implementation issues, the IMRC recommendations should not prescribe specific requirements for further evaluations, which may ultimately slow down progress toward OBD-focused testing or unnecessarily constrain options for the design of the inspection protocol. For example, OBD-II testing of 1996 and newer vehicles has been performed as part of the Smog Check inspection since 2002. As a result, the Smog Check industry, including technicians and vehicle fleet operators have over five years of experience in testing and repairing vehicles equipped with OBD-II. Applicable training currently exists and there does not appear to be a need to phase-in OBD-focused inspections prior to implementing such a program statewide. The OBD-II system can be a useful tool for technicians to recognize components that may indicate potential future failures even though it is only designed to record and identify component failures as they occur.

We also caution overuse of the term “OBD-only,” as it may be necessary to continue certain visual and functional inspections of OBD-II equipped vehicles. Similarly, certain OBD-II vehicles may benefit from a tailpipe inspection under specific conditions, such as vehicles with readiness design flaws.

Prepared on 12/10/2008
In response to IMRC’s proposed recommendations for legislative action, ARB and BAR have the following comments regarding OBD-II-focused Smog Check inspections:

- We strongly believe that the specific protocol for OBD focused inspections, including vehicles to be tested (e.g., model year) and the pass/fail criteria (e.g., number of incomplete “monitors”) should be determined by ARB and BAR through regulation, and not through legislation.

- The IMRC also recommends use of RSD as a tool to identify high-emitting vehicles that receive an OBD-II-focused test. Concerns discussed earlier in this response regarding the use of RSD as a tool to identify individual high-emitters and the current inability to enforce an “off-cycle” inspection apply here as well.

- Please note that new Smog Check inspection equipment will be necessary to inspect and capture data for the newest technology on OBD-II equipped vehicles (e.g., Controlled Area Network (CAN) communication systems).

III. Smog Check Program Avoidance and Missing Vehicles

Since there were no IMRC recommendations regarding avoidance of the Smog Check program and missing vehicles, we have no comments on this item. We look forward to reviewing the results of the IMRC’s planned research on this topic.
SUMMARY OF OTHER COMMENTS
SUMMARIZATION OF REPORT COMMENTS FROM OTHER INTERESTED PARTIES

On October 28, 2008, the draft IMRC report was made available to all interested parties to solicit their comments. Comments were accepted via e-mail, US Mail, fax, and in person until December 1, 2008. The committee received six sets of comments from organizations and other interested parties. The following provides a synopsis of the comments from various entities. A copy of all comments in their entirety is available on request.

Automotive Associations

The California Automotive Service Councils of California (ASCCA) and the California Emissions Testing Industries Association (CETIA) submitted comments regarding issues presented in the IMRC 2008 report. An abstract of their comments is as follows:

ASCCA offered opposition to the IMRC report recommendation concerning OBD-only Smog Check inspections. They cited four reasons for their opposition:
1. With the release of new engine specific cut-points they believe there would be emission failures with no illuminated MIL.
2. They believe it is important to retain all components of the Smog Check program as it currently exists.
3. They believe it is unfair to compare California to other states with regard to pollution problems and that OBD-only testing may not be in California’s best interest.
4. They believe that a large segment of vehicle owners will modify computer programs in their vehicles to circumvent the OBD system which would not be identified without an emissions test component.

CETIA expressed their opposition to “any and all program changes” recommended by the IMRC report.
1. They oppose the IMRC report recommendation regarding OBD because:
   a. They believe the seven tons per day emissions benefit loss under an OBD only program is optimistic and not supported by any public data analysis.
   b. They believe that California has unique challenges regarding air quality, and the size and composition of the motor vehicle population in California was not fully considered.
   c. They believe there is a potential for fraud and additional emissions loss due to the inability of the OBDII test to identify vehicle identification numbers, as well as the fact that California does not have an annual testing cycle.
   d. They believe that “ancillary” benefits, including higher vehicle maintenance and a process for emission repairs provided by the current testing program were not considered.
2. They oppose the IMRC report recommendation regarding off-cycle testing because they believe that the ARB/BAR analysis has shown remote sensing to be cost prohibitive and in their opinion there are other options that will achieve higher quality emissions reductions and better cost efficiency.

3. They object to any program changes prior to the release, review and analysis of the Sierra Research study evaluating the Smog Check program currently under contract to ARB and BAR.

Other Interested Parties

Coalition for Clean Air – American Lung Association of California expressed opposition to any changes in the Smog Check program until a review of the yet unpublished Sierra Research analysis of the Smog Check program has been completed. In addition they expressed the following comments:

1. They did not believe the IMRC report adequately addressed the durability of vehicle repairs, and they could not support the OBD-only testing for vehicles because of the up to 7 tons per day increase in pollution.

2. They also expressed concern over an increase in errors with the elimination of tailpipe testing and whether or not the 7 tons per day estimate took that fact into consideration.

3. Lastly they felt it would be more prudent for the IMRC to collect and analyze OBD data from other states before recommending OBD only testing for California.

Clean Air Performance Professionals oppose the IMRC recommendations unless amended to include amendments to Section 44036 of the California Health and Safety Code. The amendment would establish an “in-field audit” program using known vehicle emission defects. The “in-field” audits would be used to determine if technicians correctly diagnose and repair vehicle emission defects relating to the Smog Check program.

Environmental Systems Products provided the following comments.

1. They supported the annual testing of older vehicles and high mileage vehicles as well as a non-loaded mode biennial Smog Check inspection on motorcycles as outlined in the report.

2. They supported the use of remote sensing as a tool to identify gross polluters and as a benefit to consumer protection within the current program

3. They believe the transition to OBD-only is an important factor to be considered as the pending upgrade to the BAR 2010 tailpipe analyzer system is engineered.

4. They supported an ASM test for all high emitters.

5. They believed that the IMRC should recommend that some of the savings from the OBD only testing be used to fund methods to identify gross polluters, fraudulent testing and repair assistance.

Tom Wenzel from the Lawrence Berkley National Laboratory recommended that BAR continue tailpipe testing until the impact on emission reductions of the Smog Check program have been analyzed and estimated. He offered the following comments in support of his position:

1. He believes the report was unclear on page five, Table 2 and Table 3 as to whether the same two sets of vehicles were being compared. He recommended the use of “high on-road emitter” instead of “gross polluter/emitter”

2. He strongly agreed with the reports recommendation that BAR and ARB analyze the re-fail rate of vehicles after recently passing a Smog Check phenomenon more closely, although he challenged the date of when this phenomenon was first identified.

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3. He believes the tailpipe test for vehicles that fail an OBD II inspection should be retained to enable BAR to determine if it is cost effective to require that a particular vehicle be repaired to extinguish the MIL.

4. He noted that his analysis of 2007 VID data showed 73% of vehicles that failed a Smog Check inspection for visual, functional or tailpipe had their MIL illuminated, as compared to 85% of vehicles with the MIL illuminated referenced in the IMRC report. He suggested that as vehicles and OBD II systems age, their correlation with tailpipe test results will likely deteriorate.

5. He believed that one of the advantages referenced in the IMRC report regarding the “early warning” of the MIL light was less than perfect. He referenced that about 12% of 1996 vehicles reporting for Smog Check in 2007 had their MIL illuminated which is not in alignment with the suggested benefit in the IMRC report.

6. He suggested that at a minimum California should consider continuing dual tailpipe/OBDII inspection of vehicles already directed to test-only stations in order to collect data on criteria pollutant emissions of in use vehicles.
Transitioning I/M

Options for Inspection and Maintenance in the OBD Dominated Fleet

April 30, 2008
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Executive Summary

This report explores ways to maximize the inspection-related advantages of onboard diagnostic systems that have been installed on light-duty vehicles since model year 1996. These systems allow for a quicker, cheaper and more reliable test of the emission control systems on these vehicles than the traditional tailpipe emission test. Using this technology, new approaches to conducting an inspection of the OBD system are now available. These include remote OBD, a data logger and a kiosk.

Remote OBD consists of equipping the vehicle with a communication device which automatically transmits the status of the OBD system. Such devices are being tested in a few states around the country. They offer the advantages of being cheaper than the normal physical inspection conducted today and can also achieve greater emission reductions by triggering repairs sooner than an annual or biennial test program. The data logger consists of a recording device installed in the vehicle that records OBD status information. This information is then transmitted through some manual process to the state to determine pass/fail status of the vehicle. The third approach is to deploy self-service kiosks that are open and available to motorists at anytime, much like an ATM. The motorist conducts the inspection by following screen prompts to attach the kiosk to the vehicle’s OBD port. The system then automatically downloads the appropriate information.

All three of these approaches offer the opportunity to reduce inspection costs and, in the case of remote OBD and data loggers, dramatically reduce convenience costs associated with vehicle inspection programs. The report looks at how the fleet is expected to change over the next five years and the implications for inspection programs as they make changes due to contract expiration or sunset provisions of enabling authority.
Introduction

Background

This report reflects the work of the Transitioning I/M workgroup of the Mobile Source Technical Review Subcommittee, which in turn is part of the Clean Air Act Advisory Committee established under the Federal Advisory Committee Act. This workgroup was formed as a result of a meeting between EPA and various states that occurred in May 2006. The initial organizing meeting of the workgroup took place on September 25, 2006. The purpose of the workgroup was to develop a joint strategy and background information for states and EPA to consider in transitioning I/M programs from primarily tailpipe-testing systems to primarily or exclusively OBD-testing systems. This report supports that purpose by describing OBD-based technology that could be used outside of a traditional I/M network of test facilities.

Clean Air Act Requirements

The Clean Air Act Amendments of 1970 first required states with nonattainment areas to implement all necessary measures, including inspection and maintenance (I/M) programs, and the 1977 Amendments established mandatory deadlines for states to implement I/M. The 1990 amendments to the Act further specified various requirements with regard to I/M. Among those requirements, section 182(a)(2)(B)(ii) and section 182(c)(3)(C)(vii) required that states conduct checks of the onboard diagnostic (OBD) systems on motor vehicles. Section 202(m) specified that EPA require vehicle manufacturers to install OBD systems on light duty cars and trucks starting in 1994 with full fleet coverage by 1996. EPA promulgated regulations covering OBD-related I/M requirements on August 6, 1996; May 4, 1998; and lastly on April 5, 2001 (see 40 CFR 51.351).

I/M Implementation

Inspection and maintenance programs first started in New Jersey, Arizona, Rhode Island, Ohio and Oregon in the 1972-1975 timeframe. To date, approximately 35 states have implemented I/M programs, although not all 35 are still in place. In the early days, programs consisted of tailpipe emission tests and visual checks of the emission control systems on vehicles. In the early 1990s, enhanced tailpipe emission tests and evaporative emission tests were added to some programs. Beginning with the 1996 model year, all new light-duty vehicles were required to have onboard diagnostic systems that would illuminate a dashboard light in the event of a failure of the emission control or engine system that would increase either tailpipe or evaporative emissions typically by more than 1.5 times the standard. Since 1996, nearly all I/M programs have adopted a check of the OBD system as part of the inspection process for cars and trucks as required by the 1990 Amendments to the Clean Air Act. While some states perform both a tailpipe test and an OBD check on OBD-equipped vehicles, in most I/M states, only the OBD check is done on OBD-equipped vehicles. In addition, some states have also opted to continue to do gas cap pressure tests on OBD equipped vehicles.
Changing Vehicle Emission Characteristics

Since 1992, when EPA promulgated I/M regulations pursuant to the 1990 Amendments to the Clean Air Act, the emissions characteristics of the national fleet of vehicles operating on the road has changed dramatically. Starting in 1994 and fully implemented in 1996, new vehicle regulations referred to as Tier 1 emissions standards went into effect that significantly reduced the allowable emissions from new cars and light trucks. These vehicles employed OBD systems to assist in identifying and fixing problems with the emission control system. Following that, EPA promulgated the National Low Emission Vehicle program in 1999 and this further reduced emissions from 2001 and newer vehicles. Finally, Tier 2 regulations were put into effect for 2004 and newer model year vehicles. The upshot of these regulatory changes is that cars and trucks on the road today are vastly cleaner with better durability in emission performance than the fleet that existed in 1992.

EPA has developed emission factor models to estimate the emissions from mobile sources. The MOBILE series of models has been used for all categories of highway mobile sources. EPA issued MOBILE5 in 1994 and at the time it reflected the then-current understanding of emissions from motor vehicles on the road as well as their expected emission and deterioration trends into the future. An updated version of the MOBILE model - MOBILE6 - was issued in 2001 and it reflected the regulatory changes discussed above and also the fact that newer motor vehicles were performing far better in-use than earlier versions of the model had predicted and older vehicles were performing much worse. Figures 1-2 show the changes in emission projections from motor vehicles using these two versions of the MOBILE model. These figures show that MOBILE6 projects far lower emission rates in the future than did MOBILE5.

The fact that today’s fleet is so much cleaner than originally anticipated when the 1990 Amendments to the Clean Air Act were originally promulgated has significance for the design and implementation of I/M programs. There are relatively fewer high emitters for I/M programs to find and fix which makes it more challenging to design and implement cost-effective inspection programs.

Changing Fleet Composition

One of the primary drivers in determining emissions from a given fleet of motor vehicles is the change in fleet mix over time. As discussed in the previous section, newer motor vehicles are subject to tighter certification standards, employ improved technologies (including OBD) and, as a result, perform better on the road and are more durable than earlier generations of vehicles. The degree to which new vehicles replace or add to the existing fleet dramatically affects fleet-wide emission characteristics. For the purposes of this report, the degree to which OBD equipped vehicles have penetrated the fleet is of great interest. Fleet turnover is influenced by many factors including the local climate and the economy. In mild climates fleet turnover is slower than in harsh climes where salt, snow, and hard winters tend to reduce the life span of vehicles.

1 The data presented in Figures 1 through 7 are all based on MOBILE6 and were generated by various staff of the Office of Transportation and Air Quality.
Figure 1
Oxides of Nitrogen Emissions
Comparison of MOBILE5 to MOBILE6 NOx Estimates

Figure 2
Volatile Organic Compound Emissions
Comparison of MOBILE5 to MOBILE6 VOC Emissions
(Exhaust Only)
More significantly, the national fleet mix in the U.S. has shifted such that the majority of the light-duty vehicles on the road today are OBD equipped. Figure 3 shows the national fleet mix of pre-1996 and 1996 and newer light-duty vehicles between 2007 and 2012. Nationally, about 75% of the fleet is OBD-equipped and that fraction is expected to reach about 90% by 2012. Of course, local fleet mixes vary, as discussed above.

![Figure 3](image1)

**Figure 3**
Changes in Light-Duty Vehicle Registration Fractions over Time

In addition, older vehicles tend to be used much less than newer vehicles. Figure 4 shows the vehicle miles traveled of 1996 and newer light-duty vehicles versus pre-1996 light-duty vehicles. Even though 25% of the vehicles registered in 2007 are pre-1996, they only contribute 15% of the total vehicle miles traveled. In 2012, pre-1996 vehicles will contribute only about 5% of the VMT.

![Figure 4](image2)

**Figure 4**
Changes in Light-Duty VMT Mix Over Time
While registration fractions and VMT are both important factors, older vehicles emit more because they were certified to looser emission standards, have less robust emission control systems, and they have had more time to deteriorate. Figure 5 shows the contributions of pre-1996 light-duty vehicles versus 1996 and newer light-duty vehicles to total emissions of VOC and NOx (accounting for the VMT and registration fractions shown in Figures 3 and 4). In 2007, pre-1996 vehicles contribute about 60% of the VOC and 32% of the NOx. The contribution of pre-1996 vehicles declines over time such that by 2012, they contribute about 40% of the VOC and 17% of the NOx.

Figure 5
Changes in Contributions of Pre- and Post-OBD Light-Duty Vehicles

Total emissions, however, only tell part of the story. It is also important to look at the emission reduction potential from each of these subsets of the fleet. Starting in 1996,
new vehicles were certified to the much tighter Tier 1 emission standards. EPA tightened these standards further in 2004 (Tier 2) to very low levels. Pre-1996 vehicles were required to meet much looser emission standards (Tier 0) that went into effect in 1981. So, Tier 0 vehicles, even when new, were designed to emit much higher amounts of pollution than Tier 1 and Tier 2 vehicles. I/M is intended to address the deterioration that occurs among in-use vehicles – not the underlying emission design of the vehicle.

Figure 6 shows the relative contribution of reductions from the pre-1996 vehicles versus the 1996 and newer vehicles. In 2007, pre-1996 vehicles contribute over half the VOC benefit in an enhanced I/M program (using IM240 at full cutpoints on all pre-1996 vehicles, i.e., a best case scenario). In 2012, pre-1996 vehicles contribute 40% of the emissions but only about 17% of the VOC I/M benefit. In the case of NOx in 2007, pre-1996 vehicles contribute 40% of the benefit of an enhanced I/M program and that fraction dwindles to about 12% in 2012 even though they are contributing 17% of the NOx. The statistics presented here are based on national averages. It is important to re-emphasize that in some areas, especially those with a mild climate, the fleet is substantially older which means that pre-1996 vehicles will continue to contribute significantly to the inventory beyond 2012. By the same token, in other areas the fleet is newer than the national average and pre-1996 vehicles play even less of a role in the inventory. Each area must evaluate its situation based on local fleet data and its air quality needs. In some areas, for example, air quality needs may require the continuation of tailpipe testing for pre-1996 vehicles despite their diminishing numbers.

The significance of these trends is that 1996 and newer light-duty vehicles will come to dominate the fleet in many ways. Because they are OBD equipped, 1996 and newer vehicles only require an OBD system check rather than a tailpipe emission test (note that in some areas a gas cap check is done on 1996 and newer model year vehicles in addition to the OBD check). Thus, the need for tailpipe emission test equipment is diminishing over time. As the available reductions from the pre-OBD equipped fleet continue to shrink, at some point it will no longer be cost-effective to continue to maintain the infrastructure needed to do periodic tailpipe emission testing on this subset of the fleet. Some areas have already reached this point and are changing program structures to test only OBD-equipped vehicles. These changes raise questions about whether current approaches used to test both OBD-equipped vehicles as well as pre-OBD vehicles best serve the public and minimize I/M program costs adequately. These issues will be explored further in this report.
Figure 6
Changes in Enhanced I/M Benefit From Pre- and Post-OBD Vehicles

Volatile Organic Compounds

Oxides of Nitrogen

Declining Failure Rates/Improved Durability

The fact that cars and light trucks are cleaner today and stay cleaner longer has significant implications for I/M programs. Fewer vehicles on the road have high emissions. The Tier 1 and Tier 2 emission standards to which vehicles are certified are far tighter standards – both when vehicles are new and throughout the useful life which has been extended. The ability of tailpipe emission tests to properly pass/fail these vehicles is diminishing. For example, a typical IM240 tailpipe emission test uses a standard of 0.8 grams per mile of hydrocarbons. This is about two times the standard to which Tier 0 vehicles were certified at the time the IM240 test was developed. By contrast, today’s Tier 2 vehicles (bin 5) are certified to 0.018 grams per mile. The most
accurate exhaust measurement systems used in I/M programs (those conducting IM240
tests) are not capable of accurately measuring exhaust emissions in that range. The OBD
system, on the other hand, is calibrated to detect failures at much lower levels than can be
achieved with the kinds of tailpipe emission tests used in I/M programs.

Cost and Benefits of I/M

The combination of fewer high emitters and cleaner cars on the road in 2007
means that there are less excess emissions for I/M programs to reduce than there were
back in the 1990s. Thus, the potential benefits of I/M have declined. That being said,
most I/M areas will continue to need all of the remaining benefit to meet air quality
standards. Figure 7 shows the changes in I/M emission benefits from MOBILE5 to
MOBILE6. As a result, the cost-benefit ratio of I/M has also changed and states will
need to consider how best to retain or improve the benefits of I/M while reducing the
costs.

Figure 7
Enhanced I/M Emission Reductions in MOBILE5 vs. MOBILE6

![Figure 7](image)

OBD Technology

The On-Board Diagnostic systems on 1996 and newer light-duty vehicles track the
performance of various subsystems on a vehicle through the use of computer-controlled
electronic monitors. A computer on the vehicle, called either the powertrain control
module (PCM) or engine control module (ECM), tracks these monitors and stores
diagnostic trouble codes when a monitor finds an emission-related problem. Vehicle
manufacturers are required to design the OBD system to illuminate the malfunction
indicator light (MIL) on the dash board (the check engine light) and store a diagnostic
trouble code in memory if the impact on emissions would be (typically) 1.5 or more times
the applicable tailpipe or evaporative certification standard. Diagnostic trouble codes

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2 EPA and the California Air Resources Board both have regulations requiring OBD systems on vehicles. These regulations have been harmonized such that the same systems are on all U.S. vehicles.
may also be “pending” awaiting confirmation by the system that a problem in fact is present.

There are two types of monitors found in OBD systems: continuous and non-continuous. Continuous monitors run all the time when the key is turned on and/or the engine is running. There are three continuous monitors that every OBD equipped vehicle has: the comprehensive component monitor, the fuel monitor, and the misfire monitor. Non-continuous monitors require certain conditions such as speed, acceleration, deceleration, fuel level, or other conditions to be met in order for the monitor to run its testing sequence. If the specific conditions are not met, then the monitor does not perform its evaluation. Non-continuous monitors track the operation of the catalyst, heated catalyst, evaporative system, secondary air system, air conditioning system, oxygen sensor, heated oxygen sensor, exhaust gas recirculation system, the positive crankcase ventilation system, and the thermostat.

The types of conditions that a monitor requires in order to conduct a subsystem evaluation include, for example, starting the vehicle when it is cold, running it until it is at normal operating temperature, driving at different speeds, turning the vehicle off, and possibly repeating these sequences multiple times. Once the proper conditions are met for a non-continuous monitor to run and it does so, the monitor is set to “ready.” If not, the monitor is “not ready” and it does not assess the integrity of the subsystem it is designed to evaluate. Thus, non-continuous monitor “readiness” is an important issue when conducting an OBD test in an I/M program. The experience with OBD testing thus far shows there are a variety of issues that may result in a specific OBD system scanning as “not ready” for one or more non-continuous monitors – beyond the mere exercise of the vehicle to get the monitor ready. In some cases, the scan tool or the software that is used to test the vehicle could make it appear that the vehicle is not ready. In other cases, particular vehicle models may have design issues that result in frequent “not ready” monitor status.

In an ideal world, in order to conduct an I/M test, all monitors would be required to be “ready.” Under EPA guidance, however, one or two monitors may be “not ready” for a valid test to proceed (depending on model year). This is to avoid having to reject or fail large numbers of vehicles that have at least one “not ready” non-continuous monitor for any number of reasons including, for example, having recently been repaired.

Allowing vehicles to be tested without having all monitors “ready” means that some problems may go undetected in periodic OBD tests. The degree to which benefits are lost from this practice has not yet been fully examined. Assuming that some vehicles with monitors “not ready” have emission problems related to those monitors, this is one area where emission reduction benefits from OBD I/M perhaps could be improved. This is an area which deserves further research to assess the extent of lost benefits.

*Testing Technology*

Given the need to seek cost-effective ways to identify vehicles in need of repair, this section explores various options for conducting OBD tests that are likely to reduce
the cost and in some cases improve the effectiveness of OBD testing. The cost of inspection in I/M programs is a major part of the overall cost of the program. By bringing down the inspection cost, overall cost-effectiveness can be substantially improved.

**Innovative Approaches to OBD Testing**

Several innovative approaches to OBD testing have been proposed or are being implemented in existing I/M programs. This section will explore the costs, benefits, and issues associated with these different approaches.

**Remote OBD**

Remote OBD involves equipping subject vehicles with a transmitter that attaches to the OBD port. The device transmits the status of the OBD system to receivers distributed around the I/M area or through cellular or wi-fi networks. Transmission may be through radio-frequency, cellular, or wi-fi means. The overall approach offers many advantages over periodic inspections. Remote OBD is being piloted by the States of Oregon and California for the general public and Maryland for fleet inspections.

**Costs**

The first advantage is cost – lower test costs and “convenience” costs. Using radio frequency transmission as an example, there is a one-time cost for the Remote OBD device and its installation. In the case of Oregon, this cost is $50\(^3\) which covers not only the device but the network of receivers needed to detect the signals from passing motor vehicles. This cost was set by contract and is likely to vary in other areas depending on the size of the program and other contractual factors. It appears, however, that the hardware cost is low. An additional $2 per vehicle is assumed for installation costs not covered by the $50 device cost. The installed unit is then good for the life of the vehicle. Annual or biennial test fees are not required beyond this initial fee to operate the system but there are additional operational costs including data processing, reporting, and oversight. Using cellular technology, current wireless devices are more expensive at about $300 per vehicle and ongoing operation requires cellular communications to transmit the information. These devices, however, provide a host of other information unrelated to I/M; a remote OBD dedicated device would likely be less expensive. The cost of cellular service depends on the volume of motorists participating in the program and it is estimated that a minimum of 500,000 units are required to make the technology cost competitive with radio frequency transmission.\(^4\) Some vehicles, for example GM vehicles equipped with OnStar, already have cellular communication devices linked to the OBD system that can report the status. More and more manufacturers are equipping vehicles with similar systems that could be tied to the inspection requirements in a given state.

Using the radio-frequency approach as an example, the costs of periodic testing to Remote OBD can be compared. Note that this is just an example to illustrate the

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\(^3\) Oregon I/M Program contract.

\(^4\) Information provided by Chris Stock, ESP.
Individual states will need to evaluate costs and benefits on the local level using assumptions pertinent to the situation at hand. In this example, the assumption is that all 1996 and newer vehicles currently subject to I/M will participate in a mandatory Remote OBD program. We will look at the national fleet of vehicles over a 10 year period to conduct this comparison as a static set of vehicles (i.e., not accounting for vehicles dropping out or coming into the fleet). The estimated cost of setting up and maintaining a data processing and reporting system is shown in Table 1 and ranges from 50¢ to $3.00 per vehicle in the program per year. For the purposes of this example, we will assume $1 to $3 per vehicle per year. Actual costs will vary depending upon the level of effort devoted to reporting and auditing. Careful design of the data management system is necessary to achieve these cost levels. These estimates assume one record per vehicle per month is actually stored (although additional readings will usually be taken since vehicles will routinely pass receivers many times a month). This cost does not include installing Remote OBD on the vehicle or the network of receivers to pick up signals from equipped vehicles, which is included in the $50 fee discussed above. If we assume an average vehicle life span of 14 years, with the first test at 4 years of age, the typical vehicle will get 5 inspections in a biennial program and 10 in an annual program (not including additional change of ownership inspections, which are required in some areas). Thus, in a Remote OBD program, an additional cost of $10-$30 will be incurred for each vehicle over its life to cover data processing and reporting.

Table 1
Remote OBD VID Service Cost Estimate Per Vehicle Per Year

<table>
<thead>
<tr>
<th>Number of Vehicles in Remote OBD Program</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Database design, installation, maintenance, and communications</td>
<td>Add reporting</td>
<td>Add auditing</td>
</tr>
<tr>
<td>250,000</td>
<td>$1.50</td>
<td>$2.00</td>
<td>$3.00</td>
</tr>
<tr>
<td>250,001 – 500,000</td>
<td>$1.00</td>
<td>$1.50</td>
<td>$2.75</td>
</tr>
<tr>
<td>500,001 - 1,500,000</td>
<td>$0.75</td>
<td>$1.00</td>
<td>$2.50</td>
</tr>
<tr>
<td>&gt;1,500,000</td>
<td>$0.50</td>
<td>$0.75</td>
<td>$2.00</td>
</tr>
</tbody>
</table>

In addition to test costs, Remote OBD avoids most of the consumer convenience and indirect costs associated with I/M – the time and fuel it takes to drive to the station, get a test, and return home. The one-time installation of the transmitter requires a visit to the test station, but no further visits are required. Hard data are not available on the actual average time motorists spend driving to a test station, getting a test, and returning to the

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5 Not all members of the Workgroup were in full agreement over the methodology used to illustrate and compare costs. Some felt the simplifying assumptions do not take into account important factors such as fleet turnover. On the other hand, the time and cost of doing a in-depth analysis are beyond the mandate of the group. Again, each area should look closely at costs and benefits as it applies to its situation.
6 Table provided by Systech International, Inc. and Gordon-Darby, Inc.
7 Greenspan, A. & D. Cohen, Motor Vehicle Stocks, Scrappage, and Sales; October 1996
point of origin or to the next stop in a trip chain. In some centralized programs, wait times can be very long. In decentralized programs, motorists often drop off the vehicle (requiring two trips to the test station). For the sake of illustrating the convenience costs associated with I/M, a reasonable range for the typical test cycle is one to two hours. If we assign a cost of $20 per hour\(^8\) and a half-gallon of gas (10 miles round trip with an average fuel economy of 20 mpg) at $3 per gallon, the total cost of the typical cycle is $21.50 to $41.50. Over the life of the vehicle, this would amount to $104 to $208 in a biennial program or $208 to $415 if annual. Compare this to the one time install trip for Remote OBD at a cost of $21.50 to $41.50, and it is clear that substantial savings are realized.

For the purposes of illustrating the potential nationwide costs and benefits of doing remote OBD, the following analysis assumes 100% participation of all OBD-equipped, I/M-subject vehicles in the United States. It is likely, however, that states will introduce remote OBD on a voluntary basis (except possibly for fleets), and that participation rates will build over time as motorists recognize the cost and convenience advantages. Another caveat is that for those states that require motorists to get safety checks, the convenience costs may not be fully realized (see Discussion of Issues, below). Table 2 shows the lifetime inspection and convenience costs of a mandatory, nationwide remote OBD program versus a periodic OBD program (assuming the current nationwide mix of annual and biennial testing and current test costs; see Appendix 2) for a static fleet of about 80 million vehicles. In reality, fleet size generally grows over time and vehicles come and go. Thus, this is a simplifying assumption for the purposes of illustrating the comparative costs. The “low” and “high” refer to the range of convenience costs (1 to 2 hours) and oversight costs in the case of Remote OBD ($1 -$3). Current periodic OBD testing costs about $12 billion\(^9\) over a 10-year lifecycle with an additional $9 to $17 billion in convenience costs for a total of $21 to $29 billion. By contrast, Remote OBD has a test and install cost of $4 to $5 billion over the same 10 year period, and a convenience cost of $1 to $2 billion for a total of about $5 to $7 billion. Thus, nationwide installation of Remote OBD has the potential to save the nation’s motorists about $16 to $22 billion in inspection and convenience costs over a 10 year period.

Table 2
Range of Lifetime Inspection and Convenience Costs of I/M

<table>
<thead>
<tr>
<th></th>
<th>Periodic OBD</th>
<th>Remote OBD</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test/Install</td>
<td>Low</td>
<td>$12 billion</td>
<td>$4 billion</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>$12 billion</td>
<td>$5 billion</td>
</tr>
<tr>
<td>Convenience</td>
<td>Low</td>
<td>$9 billion</td>
<td>$1 billion</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>$17 billion</td>
<td>$2 billion</td>
</tr>
<tr>
<td>Total Cost</td>
<td>Low</td>
<td>$21 billion</td>
<td>$5 billion</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>$29 billion</td>
<td>$7 billion</td>
</tr>
</tbody>
</table>

\(^8\) This is the same dollar amount assumed in EPA’s original Technical Support Document published along with the 1992 Enhanced I/M Rule.

\(^9\) Test volumes and costs were derived from Sierra Research’s annual I/M summary for 2005 and updated in some cases by members of the workgroup.
Benefits

Looking at the benefits side, Remote OBD offers substantial advantages. The advantages are that the OBD system is continuously monitored and its status is reported on an ongoing basis, rather than once a year or every other year. This feature mitigates one of the limitations of OBD programs and that is monitor readiness (see discussion above). Eventually, conditions will be such that all monitors on a vehicle will become ready over time allowing a full evaluation of the vehicle – unless there is something wrong with the design of the monitor. In the event that certain monitors on a particular vehicle never become ready, that might constitute a failure that should lead to corrective action by the motorist. Alternatively, the Remote OBD system will also allow quicker identification of model/make-wide problems with OBD systems, resulting in faster issuance of technical service bulletins and emission recalls and in faster corrections on the part of manufacturers. By continuously monitoring the OBD system and eventually covering all monitors rather than allowing 1-2 to not be ready, Remote OBD will catch problems currently missed in periodic OBD inspections thereby increasing the benefits of the OBD program. It is also economical to install Remote OBD systems on vehicles when they are new, rather than exempting the vehicle until it is 4-6 years old as is the case in many I/M programs. (Note that this would result in a slight increase in oversight costs since vehicles would enter the monitoring system sooner than assumed in the cost analysis). This allows identification of early problems that, while infrequent, are currently missed by programs that exempt such vehicles.

In addition to the readiness issue, Remote OBD will find problems as they occur and require repairs sooner than in a periodic program. In most I/M programs, when a vehicle fails the I/M test, there is a grace period during which repairs must occur, typically 30-45 days. The same would apply in the Remote OBD context in order to achieve continuous benefits. EPA has proposed that continuous I/M garner additional credit because of this. Currently, MOBILE6 provides an increment of benefit when going from a biennial program to an annual program. A similar increment of credit has been proposed for going from an annual program to a continuous program. Actual credit would depend on various program design factors. Figure 8 shows examples of this credit for the Oregon I/M program for VOC and NOx. Similar credits apply to carbon monoxide as well. Note that the percent reduction in emissions from I/M increases in the future according to MOBILE6 (partly due to assumptions related to the number of high emitters in the fleet) but the actual tons of reduction are in fact declining as the base emission rates go down with fleet turnover.
Remote OBD presents one other challenge that offers the opportunity to improve on existing OBD tests. As discussed above, pending diagnostic trouble codes may be set when the OBD system senses something is out of range or tolerance or otherwise not working properly. Initially, in some cases, the MIL is not commanded on until the system “confirms” there is a problem, i.e., once it occurs on two consecutive monitoring events, an "active" trouble code is set. However, once commanded on, the light may
subsequently be extinguished after three consecutive "pass" confirmations when the
problem is no longer sensed. For example, a motorist fails to properly tighten the gas cap
and the MIL goes on. The motorist refuels a couple of days later and properly tightens
the gas cap this time. The light goes off soon thereafter and there is no need to fail this
vehicle. Thus, when a vehicle shows up for a periodic inspection, there is no way of
knowing whether a MIL commanded on or trouble codes stored represent a temporary
problem as a result of one-time operating conditions or an ongoing problem due to actual
component failure. With Remote OBD, it may be possible to refine the “failure”
determination to address problems identified by the OBD system that may result from
temporary operating conditions and the subsequent MIL extinguishment once operating
conditions produce results within range or tolerance.

Visual MIL and Gas Cap Checks

Remote OBD omits one aspect of traditional OBD inspections: the MIL check. As
part of the normal I/M test, the inspector checks the malfunction indicator light to be sure
that the bulb is not burned out. From an emission benefit perspective, there is no loss in
benefit for those cases where the MIL bulb is burnt out because the transmitter will still
be sending the signal to the receiver in the event there is a problem with the vehicle.
However, the motorist will not be informed about any emission problems until they are
notified by the state. This is not much different from the current situation where
motorists may not notice a MIL bulb burn-out and would only find out during the annual
or biennial inspection. Vehicle manufacturers are moving away from bulbs for the MIL
and are instead using inherently more reliable LED systems.

Some states also conduct gas cap checks on 1996 and newer model year vehicles
since in the 4 years after adoption of the OBD requirement, evaporative system monitors
were not fully deployed. As a result, gas cap leaks are not detected by the OBD systems
on some of these vehicles. In a Remote OBD system, conducting a gas cap check would
not be possible without a separate visit to a test station. For vehicles that are identified
with the MIL on and have to get repaired, a gas cap check could be conducted at the time
of repair, thus recovering some of the benefit of the periodic gas cap check. The benefits
of doing this would need to be weighed against the costs of oversight.

Privacy and Security

Remote OBD raises questions about privacy. The vehicle has a transmitter on it that
identifies the vehicle and by virtue of its proximity to a particular receiver, its location at
a particular time and date. Some motorists may balk at the idea that “big brother is
watching.” The Oregon DEQ did a survey of approximately 11,000 of its customers
inquiring about interest in Remote OBD. The overwhelming majority (over 80%)
indicated they would be interested in having the transmitter installed in their vehicle so
they didn’t have to show up for a test every other year. The Remote OBD system is
similar to the EZ Pass toll system used in many states. EZ Pass is very popular because
the convenience of not having to stop and pay a toll more than outweighs the “intrusion”
of being monitored (note that EZ Pass systems are used for monitoring traffic flow as
well as paying tolls). Like EZ Pass, the convenience and cost savings of not having to
get an inspection once every year or two will be very attractive to most motorists.
Otherwise, the issue of privacy can be managed by assuring motorists through regulation and marketing that the data collected in the program (i.e., time, date and location of the receiver the vehicle was near) are not used for purposes other than to determine compliance with the OBD requirements. The system can be arranged such that location and time information are suppressed. The data communications are encrypted to prevent unauthorized access. Of course, Remote OBD cannot tell who is driving the car, the direction it is headed, or any other such information other than the OBD status and the time of day. Instead of a mandatory system, Remote OBD could be operated as a voluntary system, with those who opt not to use Remote OBD having to show up at a test station or kiosk for an annual or biennial test. Obviously, the costs of a voluntary system will be greater than that of a mandatory system, and the benefits will be lower, although this may be an acceptable trade-off to ensure public acceptance.

The Remote OBD system is configured to protect against fraud by having the unit tailored to the particular vehicle. Thus, the VIN of the vehicle is programmed into the unit and it is installed by an official inspector. Various software protections are included to prevent tampering or use on another vehicle. The transponder will have a serial number which will be matched to the vehicle’s VIN. The transponder will be plugged into the data port and download the vehicle’s electronic VIN if available, the PID count, and other electronic identifiers. If a motorist tries to change the transponder to another vehicle it will not recognize the VIN and PID count, as well as other unique identifiers and therefore will not work. The traditional forms of fraud in OBD inspections could continue – such as defeat devices that tell the OBD system that all is well when in fact it is not. These may, however, be easier to detect because such devices generally transmit a static set of readings while in reality such readings fluctuate (within range) routinely. The lack of such fluctuation would be a tell-tale sign of tampering with the system. The Remote OBD system would need to be configured to capture this level of detail.

To conclude, Remote OBD offers substantial savings in test and convenience costs over periodic OBD. At the same time, Remote OBD holds the promise of resolving or better managing problems related to monitor readiness. It is also possible to implement Remote OBD in a way that addresses privacy concerns, insures integrity, and prevents fraud. Finally, Remote OBD can yield greater emission reductions than periodic inspection due to continuous monitoring and the ability to economically monitor new vehicles.

Data Logger OBD

The data logger approach to OBD testing is similar to that of Remote OBD and therefore this section will focus primarily on how the two approaches differ.

Under the data logger approach, a small device is attached to the OBD port on the vehicle and this device records the status of the OBD system. Unlike the Remote OBD system, however, the data logger does not contain a transmitter. Instead the data logger includes the ability to record and store information about the status of the OBD system. It can be configured as a snap-shot-in-time or can be programmed to take samples over
some prescribed time period. The data logger can also be configured to alert the motorist when all monitors are ready and thus a “valid” test is complete. Once a valid test is complete, the motorist would remove the data logger from the vehicle and either mail it in to the state or connect it to a computer via a USB cable and upload the information directly to the state’s website. The data logger is date sensitive and to be a valid test the most recently gathered data must be within one week of the date of it being received by the state. This assures the most recent test data and prevents someone from installing the device, getting a good reading, then unplugging it until the time for download.

Costs

The cost of this approach is likely to be similar to Remote OBD or possibly more expensive if installation and reinstallation are done by a technician rather than the vehicle owner, as all motorists may not be willing or able to perform these tasks. In such cases, the owner would need to report to a test station to do this, thus incurring convenience costs similar to a periodic I/M program. It is difficult to assess just how much of an issue this may be because this option has yet to be tried in an I/M program.

Hardware costs for the data logger approach are expected to be lower than for remote OBD because the data logger does not require a transmitter or a network of receivers. Transaction costs are higher, however, since the device has to be removed and reinstalled either annually or biennially. There is also the cost of mailing in or dropping off the device and someone on the receiving end having to handle it and upload the information, clear it and prepare it for re-use; being able to upload the information from a laptop avoids the mail-in or drop-off charge for those who are technically savvy enough to do this. Loss and damage in some small percentage of cases may be expected in mailing and uninstalling and reinstalling the device, unless there is a way to download the data without removing the device. There may be security issues that arise with this approach as well.

Benefits

One clear advantage of the data logger approach over traditional OBD testing is its ability to be configured in such a way that the problem of monitors not being ready is virtually eliminated with the possible exception of OBD systems with design defects. Unlike Remote OBD, however, the data logger would not constitute continuous monitoring of the OBD system and would accrue benefits similar to an annual or biennial inspection system. Another option for areas interested in eliminating traditional periodic inspections is to offer motorists the option of either the data logger or remote OBD.

Visual MIL and Gas Cap Checks

The data logger approach would not include a MIL check or a gas cap check. The MIL check could be performed by the motorist. As part of the mail-in or data upload process, the motorist could verify that the MIL was checked and the light bulb operational, but no oversight role is available to the state.
Privacy and Security

The least expensive data logger approach requires that the motorist install and remove the data logger. This is less secure than having the unit installed by an official inspector and it is not clear how to prevent the data logger from being “clean-piped” by putting it on a clean vehicle. Installation by an official inspector may be necessary to avoid this problem. The data logger also does nothing to avoid the same types of fraud found today that are designed to fool the OBD system itself. Because the data logger is not transmitting the status of the OBD system on a real time basis, there is no privacy concern.

Automated (Kiosk) OBD Testing

The OBD testing kiosk is analogous to an automated teller machine; it replaces a human inspector with a computerized system that guides the transaction. The kiosk can be designed to allow a motorist to get a test any time of day or night. The kiosk features a fully automated system that prompts the motorist through the test process after they insert a credit card. Vehicle and motorist data is either entered by the motorist or accessed via an online database. Some motorists may have trouble operating such a system so areas may want to offer some staffed kiosks. Alternatively, kiosks could be designed to allow for two-way communication with real-time customer support.

Costs

Compared to traditional OBD testing, the kiosk eliminates the need for an inspector, which is a significant part of the cost of I/M. Compared to remote OBD or the data logger, there are no on-vehicle installation or equipment costs but there are the costs of the kiosks themselves and the surrounding infrastructure (i.e., test lane). A kiosk system is more convenient since the motorist does not need to take time off work to get to a test station during business hours. There may also be additional costs for video monitoring and customer support if those approaches are chosen.

Benefits

No additional emission reduction benefits are associated with kiosk testing as opposed to traditional, periodic OBD testing. Kiosk testing can be required annually or biennially and shares the same monitor readiness problems currently experienced by periodic OBD-I/M programs.

Visual MIL and Gas Cap Checks

Once again, a MIL check could be done manually by the motorist to verify that the bulb is working (note that Washington and Oregon are not requiring this as part of its kiosk inspection process). This requirement could be programmed into the software with instructions for the motorist on how to check the light. Through the use of video-taping, the state can monitor whether the motorist in fact gets back in the car and appears to check the MIL, although such monitoring cannot insure that the result is accurately reported. Gas cap testing could also be included in a kiosk configuration, as the skill involved is not notably different from that required to use a self-serve gasoline pump.
Privacy and Security

Privacy issues are not a concern with the kiosk system. Security is an issue on two levels. First, video surveillance is necessary to insure that the vehicle being inspected is the one for which data is being entered (i.e., to avoid using a vehicle that is known to be passing instead of the subject vehicle). Second, because the kiosk can be available day and night, like ATMs, the safety of the motorist may be an issue. Programs pursuing this option will need to take care to locate kiosks in safe places that are well lit. As with data loggers, the kiosk system does nothing to avoid the same types of fraud found today that are designed to fool the OBD system itself.

Discussion of Issues

Making the Transition to the Future

In making the decision of how and when to transition an area’s vehicle inspection and maintenance (I/M) program away from tailpipe testing and toward OBD I/M of whatever variety, program planners need to weigh several factors. As is often the case when it comes to making decisions about I/M program design, locally variable parameters (such as the distribution of vehicle miles traveled, the proportion of vehicle types in the fleet, the distribution of vehicle ages) will affect what sort of I/M makes sense for a given area. The numbers and figures presented in this report are national averages. Costs and benefits will be different for each I/M program. Some areas have newer fleets while others have older fleets and it is important to assess this in making program design changes. The following discussions are intended to outline various factors to be considered when redesigning an I/M program in a given area, given the changes in fleet composition and costs discussed in previous sections and the potential for innovative OBD testing.

Safety Inspections

Some I/M programs include safety checks of various systems on subject vehicles in addition to emission testing. These checks include such things as steering, tire condition, lights and brakes, and require a physical inspection in order to determine compliance. Onboard diagnostics do cover a few safety-related systems, such as anti-lock brakes and airbags, but nowhere near the comprehensive inspection currently done in most safety programs. Thus, the decision about how to proceed with emission-related inspections in the future will be influenced by whether or not a safety inspection is required. Kiosk OBD testing and data logger OBD testing may be less appealing in those inspection programs that include a periodic safety inspection because a physical inspection of the vehicle is still required and the cost and convenience factors of these innovative approaches are thus lost.

The benefits of continuous I/M could, however, still be achieved in a safety/emission test program. The certified safety inspector could do the installation of the monitoring device and check on its status during the periodic safety inspection. Because the inspector would not have to conduct the OBD interrogation, there would be a small savings in time and cost. There may or may not be an equipment cost savings if the
continuous I/M monitoring is not mandatory. In that case, the inspection shop would still need a state-approved OBD test tool to check the system.

In a safety/emission program in which motorists voluntarily opt-in to continuous I/M, there would need to be an incentive to participate. For example, the frequency of the physical inspection could be reduced to once every two or three years for those motorists that opt-in to continuous I/M, while those that don’t would have to get the safety/emission inspection annually. Flexible approaches could be used for scheduling the safety inspection. For example, if a vehicle fails a continuous I/M check and must be brought in for repair, the safety inspection could be performed at that time. Creative approaches to combining safety inspection and continuous I/M can achieve some of the motorist convenience savings while boosting emission reductions from the program.

**Repair of Aging OBD Equipped Vehicles**

As discussed previously, the check engine light is required to be turned on when a problem with the vehicle’s emission or engine systems would result in a 1.5 times increase in emissions, or more. By comparison, even the most stringent tailpipe emission tests in use in I/M programs have cutpoints that are generally two to four times the certification standard and many are much looser. In addition, the OBD system is quite comprehensive and is intended to cover any emission-related component failure, whereas tailpipe emission tests tend to be limited in this regard. In short, the OBD test is a more stringent test than the tailpipe emission tests being used in I/M programs for non-OBD vehicles (and what would be feasible for OBD equipped vehicles).

As OBD-equipped vehicles age and deteriorate, the concern has been raised that the cost of repairing such vehicles will become prohibitive. It has been suggested that conducting a looser tailpipe emission test on such vehicles could alleviate this concern. However, the emission benefits of such an approach would be much less than an OBD test on such vehicles and likely not remedy the problem with the OBD system, as discussed below. In addition, the Clean Air Act and nearly all operating I/M programs allow for a “waiver” in the case of prohibitive repair costs and most areas provide an opportunity for waivers once certain repair cost thresholds have been met.

It is not at all clear how much of a problem this presents or if it is any different in magnitude than the current emission standard structure for Tier 0 vehicles. In I/M programs today, older vehicles fail at a much higher rate than newer vehicles, which is to be expected given the affects of age and deterioration. High cost repairs are avoided through the use of the waiver system, but at some point, the cost of repairing an old worn out high emitter outweighs its value and it gets scrapped or sold outside the I/M area. These same mechanisms will continue to apply as the OBD-equipped fleet ages.

Yet, there is an important difference and that is the MIL. Today, when a pre-1996 vehicle is waived (or passed using the looser tailpipe emission test) there is no constant reminder in the form of a dashboard light that indicates there is a problem. Waiving an OBD vehicle or testing such a vehicle with the MIL on using a tailpipe emission test would result in vehicles being operated with the MIL illuminated all of the time. This
defeats the purpose of the OBD system and undermines its credibility. It also prevents
the owner from being notified of additional problems, perhaps adding to the cost of
repair.

Thus, as the OBD fleet ages, it may be useful to consider new mechanisms to avoid
this outcome. Possible strategies might include a repair assistance program for needy
vehicle owners or an accelerated vehicle retirement program (scrappage). A referee
system might also be useful in helping properly diagnose problems with such cars,
leading to more cost-effective repairs.

Heavy-Duty Vehicles

Heavy-duty vehicles present difficult challenges for I/M programs. MOBILE6
provides a nominal amount of credit for testing gasoline powered heavy-duty vehicles in
an I/M program. A few states conduct such tests. OBD requirements are now in place
for heavy-duty gasoline trucks between 8,500 and 14,000 pounds, similar to those found
on light-duty vehicles. EPA has proposed that vehicles over 14,000 be OBD compliant
by 2010. Such systems will allow states to include heavy-duty trucks in I/M programs
using the same kinds of innovative approaches to OBD testing discussed in this report.

The heavy-duty fleet is dominated, however, by diesel engines. As fleet turnover
reduces the overall contribution of light-duty vehicles to the inventory, the role of heavy-
duty vehicles grows. Additionally, heavy-duty diesel engines are major sources of
particulate matter and NOx. There are significant impediments, however, to conducting
heavy-duty diesel testing. First and foremost, is the lack of a measurement system that
accurately detects particulate matter in the exhaust. Currently, opacity testing is used in
some places to test both light- and heavy-duty vehicles. Unfortunately, there is no
correlation between opacity and particulate matter emissions, which means there are both
errors of omission and errors of commission with opacity testing. New technology is
emerging that might overcome this problem. EPA has been working with equipment
manufacturers to develop the ability to test heavy-duty engines using portable equipment
that does not rely on the gravimetric method for measuring particulate matter. These
emerging technologies may provide an accurate measurement system that could be used
in I/M programs for heavy-duty and light-duty PM testing for pre-OBD vehicles.

The challenge does not end there, however. Assuming measurement technology does
become available, test procedures and standards would have to be developed to cover the
wide and diverse range of heavy-duty vehicles in the fleet. This is a large and expensive
undertaking. Additionally, studies would need to be done to determine the level of
excess emissions typically emitted by such vehicles and how much they can be reduced
through repair. This is an even larger and more expensive undertaking. Until such work
is undertaken, the costs, benefits and cost-effectiveness of conducting such a tailpipe
testing I/M program are unknown and may be prohibitive. Thus, at this point, the advent
of heavy-duty OBD holds out the best hope for conducting tests and controlling in-use
emissions on these vehicles.
Issues Unique to Decentralized Programs

In decentralized programs, local business owners (gas stations, repair shops and the like) have partnered with state agencies to provide testing services to the public and have made a capital investment to provide tailpipe testing in addition to OBD testing. Such investments were made knowing that there was a level of revenue to be expected after the initial capital outlay. As the fleet turns over to OBD-equipped vehicles, the demand for tailpipe testing equipment will diminish, making that aspect of the business less profitable. Indeed, the tailpipe test equipment is very expensive to install and maintain compared to the OBD test equipment. Thus, it is important to provide information to these business owners about the changes that are happening in the fleet. Any transition of the I/M program to using innovative OBD approaches should provide sufficient lead time for such businesses to amortize the current equipment and adjust business plans to meet the changing needs. Most such programs are at a stage when sufficient time to amortize and recover the costs of the investments has passed.

As discussed above, decentralized testing stations can play a role in innovative OBD. Kiosks could be located at current emission test stations, conceivably right next to the gas pump allowing a refill and a test to happen simultaneously. Inspectors at such stations could install Remote OBD or install and remove data loggers. These activities may not be as lucrative as providing emission testing but they also require far less investment, training, equipment, and valuable space than tailpipe emission test systems. They also provide an opportunity for new relationships between stations and owners in providing preventative and more consistent vehicle maintenance rather than annual or biennial inspection and repair.

Options for Continued Reductions from the Pre-OBD Fleet

The best time to make the transition from a mix of tailpipe and OBD testing to OBD-only testing will vary from state to state based on the factors discussed in this report, such as the fleet mix. In areas that are in need of continued reductions from the pre-OBD fleet, periodic tailpipe emission testing of these vehicles may need to be retained for quite some time. In cases where the air quality need is not as great or the pre-OBD fleet is a much smaller fraction of the inventory, other options may be considered that are less costly than periodic I/M on all pre-1996 vehicles. One option is to conduct tailpipe emission tests only on change-of-ownership. This approach insures continued, although smaller, reductions from the pre-OBD fleet while greatly diminishing the network of inspection facilities needed to support the program and thus the cost. Another option would be to use remote sensing devices (RSD) to identify high emitters and require only them to get tested and repaired. The costs and benefits of these options must be carefully evaluated.

Impact of Change on Mandatory Planning Requirements

In considering changes to the I/M program, the role it plays in the area’s ability to meet its various planning requirements, such as demonstrating attainment and maintenance of a standard, Rate-of-Progress (ROP), and transportation conformity are
critical factors. Dropping periodic inspection of pre-1996 vehicles from the I/M program could result in a loss of emission reduction credit, unless it is made up through the use of continuous OBD, covering new model years, and/or using other options such as change of ownership or RSD on pre-1996 vehicles. A local evaluation will be needed to determine how much credit can be lost and gained through the redesign of the program. Other offsetting measures may be available and approvable to make up for losses in credit.

Timing and Public Acceptance

I/M is always a controversial program in the public and political arena. Transitioning to one of the innovative testing approaches discussed in this report will present challenges in terms of involving the public and communicating the need for change. These innovative approaches offer the advantage of making the I/M program more convenient and less expensive than current systems, so it will be a good news story. Any of these systems will require public education, especially self-service OBD kiosks.

Conclusions and Recommendations

The advent of onboard diagnostic systems in 1996 fundamentally changed the way I/M is conducted. OBD systems obviate the need for a tailpipe emission test on 1996 and newer light-duty vehicles because a simple, inexpensive check of the OBD system does a better job of detecting which vehicles need repair. As OBD-equipped vehicles become the dominant segment of the fleet in I/M areas, the need for tailpipe emission testing of pre-1996 vehicles diminishes. In this context, the cost of maintaining a network of tailpipe emission test stations may become prohibitive given the level of air quality benefits available.

Innovative approaches to OBD testing can provide vast improvements in motorist convenience and reduced inspection costs. Remote OBD offers the possibility of greater emission reductions through continuous monitoring of the OBD system and overcomes many of the problems with monitor readiness.

As states consider air quality plans, the changing role of I/M must be considered in the context of how the fleet is changing, the emission reduction needs, and the local inspection history.
Appendix 1
Transitioning I/M Workgroup Plan

Mission
By July 2007, develop a joint strategy and background information for states and EPA to use in transitioning I/M programs from tailpipe-testing systems to OBD-testing systems. Address overarching issues with existing OBD programs that may impact transitioning. Continue with ongoing work as needed until August 2008.

Inputs
Status of current I/M transition plans. Status of current OBD programs (as it pertains to transitioning issues). Ideas on innovative approaches and analyses of alternative choices. MOBILE6/MOVES estimates of benefits of passive and active OBD.

Outputs
Report describing options for achieving cost-effective reductions from I/M in the future, considering innovative strategies. Ways of talking about I/M’s role in the future, including costs and benefits as well as air quality imperatives. Calendar of upcoming program transitions.

Group Process
Conference calls. Collaborative approach. For each state-based meeting, we will focus on the listed topic and collect local fleet and modeling data to generate representative cost-effectiveness projections for future I/M program designs.

Key Milestones for Transitioning Report

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<td>December</td>
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Members

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## Appendix 2
### Number and Cost of Annual Tests in I/M Programs

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<td>Wisconsin</td>
<td>750,000</td>
<td>$20</td>
<td>$15,000,000</td>
<td>B</td>
<td>1,500,000</td>
</tr>
</tbody>
</table>

**Total Tests** | **60,916,000** | **$28.2** | **$1,714,933,250** | **88,554,000**
<table>
<thead>
<tr>
<th>State</th>
<th>Annual Tests</th>
<th>Total Vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996+ tests (68% of total)</td>
<td>41,422,880</td>
<td>60,216,720</td>
</tr>
<tr>
<td>Rounded</td>
<td>41,000,000</td>
<td>60,000,000</td>
</tr>
</tbody>
</table>

Current Tests | 41,000,000
Average Test Cost | $28
Current Total Test Cost | $1,154,249,512
Times 10 Years | 10
Life Time Test Cost | $12,000,000,000

<table>
<thead>
<tr>
<th>High Estimate</th>
<th>Low Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Tests</td>
<td>41,000,000</td>
</tr>
</tbody>
</table>
| Per Vehicle Convenience Cost | $41.5 | $21.5
| Current Convenience Cost | $1,701,500,000 | $881,500,000 |
| Times 10 Years | 10 | 10 |
| Life Time Convenience Cost | $17,000,000,000 | $9,000,000,000 |

Total Periodic Lifetime Cost | $29,000,000,000 | $21,000,000,000

Continuous Tests | 60,000,000 | 60,000,000
Device Cost/Install Cost | $52 | $52
Total Device/Install Cost | $3,120,000,000 | $3,120,000,000
Remote OBD Oversight Cost | $3 | $1
Total Oversight Cost | $180,000,000 | $60,000,000
Times 10 Years | 10 | 10
Life Time Oversight Cost | $1,800,000,000 | $600,000,000
Total Lifetime Cost | $4,920,000,000 | $3,720,000,000

Continuous Tests | 60,000,000 | 60,000,000
Convenience Cost | $41.5 | $21.5
Subtotal | $10,080,000,107 | $7,560,000,085
One time installation | 1 | 1
Life Time Install/Operate Cost | $2,000,000,000 | $1,000,000,000

Total Continuous Lifetime Cost | $6,920,000,000 | $4,720,000,000