DEPARTMENT OF CONSUMER AFFAIRS

BUSINESS, CONSUMER SERVICES, AND HOUSING AGENCY • GOVERNOR EDMUND G. BROWN JR.

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Bureau of Automotive Repair

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July 25, 2013

Mr. Alberto Ayala,
Deputy Executive Officer
Air Resources Board
1001 "I" Street P.O. Box 2815
Sacramento, CA 95812

Dear Mr. Ayala,

The purpose of this letter is to memorialize an agreement between the Air Resources Board (ARB) and the Bureau of Automotive Repair (BAR) regarding an analysis of program changes mandated by AB 2289 (Eng, Chapter 258, Statutes of 2010). Although BAR has pursued regulations necessary to implement the improvements, many of the provisions of the new law could not be implemented until January 2013.

AB 2289, specifically Health and Safety Code section 44024.5, requires the BAR, in cooperation with the ARB, to perform an analysis of the Smog Check Program improvements made under AB 2289 using data collected from on-road inspections and statewide vehicle inspections. The results are to be reported annually, beginning July 1, 2011. During legislative committee reviews of AB 2289, amendments were made to delay the start dates of the legislation's key provisions to no earlier than January 2013. Unfortunately, the annual reporting requirement was not amended consistent with these changes.

As a result, this report does not include a complete analysis of the effectiveness of the AB 2289 improvements. However, a preliminary analysis based upon available data is included for the program improvements implemented as of January 1, 2013. Similar to the 2012 report, this year's report provides a summary of the major provisions of AB 2289 and the implementation status of the changes.

This year, BAR plans to present the annual report at the next public meeting of the Bureau Advisory Group on September 17, 2013. The 2013 Smog Check Performance Report will also be made available to the public on BAR's Web site at www.smogcheck.ca.gov.

Sincerely,

Patrick Dorais

Patrick Dorais, Acting Chief
Bureau of Automotive Repair

cc: Dave Lewis, Air Resources Board

2013 Smog Check Performance Report

Introduction

The enactment of AB 2289 (Eng, Chapter 258, Statutes of 2010) marked the first major improvements to the Smog Check Program since the mid-1990s. The new law, which has many provisions that could not legally be implemented until January 2013, is a comprehensive effort to modernize California's vehicle emissions inspection and maintenance program. It is in direct response to a March 12, 2009 report by Sierra Research. The improvements the law requires are made possible by advancements in vehicle technology, and enhanced resources to produce and analyze data from Smog Check inspection results.

Health and Safety Code section 44024.5, as amended by AB 2289, requires the Bureau of Automotive Repair (BAR), in cooperation with the Air Resources Board (ARB), to perform an analysis of the Smog Check program performance improvements made pursuant to AB 2289 using data collected from statewide Smog Check inspections and on-road inspections conducted by BAR. The results are to be reported annually, beginning July 1, 2011.

During legislative committee reviews of AB 2289, amendments were made to delay the start dates of the legislation's key provisions until after January 2013. However, no corresponding delay was made to the annual reporting requirement. As such, this report, like the 2012 Smog Check Performance Report, cannot include a complete analysis of the effectiveness of the AB 2289 improvements and only a preliminary analysis based upon available data is included for the program improvements implemented as of January 1, 2013. Similar to the 2012 report, this report provides a summary of the major provisions of AB 2289 and the implementation status of these changes. A complete biennial cycle of post implementation data to evaluate the impact of the new improvements will not be available for reporting until the 2015 Smog Check Performance Report.

In preparation for the 2015 report, BAR has four full-time roadside inspection teams collecting on-road data. In part, the data collection is intended to monitor the rate at which vehicles fail an on-road inspection after having previously passed a station inspection. To be consistent with previous analyses, the re-fail methodology requires data from a full two year Smog Check inspection cycle. Given a January 1, 2013 STAR implementation date, sufficient data to redo this analysis and estimate the after implementation re-fail rate across time will not be available until January 1, 2015. Reductions in this on-road failure rate compared to those observed in the Sierra Research study should reflect the effectiveness of the implemented program improvements. As required by Health and Safety Code (H&S) section 44024.5 b (1), BAR has also obtained an independent validation of the re-fail methodology used in the Sierra Research report[1]. The independent review was completed by the University of California, Riverside College of Engineering – Center for Environmental Research and Technology (UCR, C-CERT) in May 2013 (see attachment).

[1] Sierra Research, Inc. 2009. *Evaluation of the California Smog Check Program using Random Roadside Data* - submitted by ARB and BAR February 2010.

AB 2289 Implementation Status[2]

1. Station Performance Standards

Health and Safety Code (H&S) sections 44014.2 and 44014.5 now require Test-Only and Test and Repair stations to meet inspection-based performance standards for the right to inspect directed and gross-polluting vehicles pursuant to (H&S) sections 44010.5 and 44014.5, respectively.

The STAR Program was implemented on January 1, 2013 as required by AB 2289. STAR establishes performance standards designed to incentivize the proper performance of Smog Check inspections. Under the STAR Program, stations interested in inspecting directed and gross-polluting vehicles must apply for STAR certification. BAR will grant certification upon finding that the station meets various inspection-based performance standards and passes a review of the station and technician disciplinary actions based on each calendar quarter's performance. Failure of STAR-certified stations to meet the performance standards may result in decertification from the STAR Program and suspension of the right to inspect directed and gross-polluting vehicles. STAR Program information as well as station and technician report cards may be viewed on BAR's Web site www.smogcheck.ca.gov.

Status: The STAR Program regulations were adopted November 1, 2011. BAR published online station and technician report cards containing actual technician and station scores on December 28, 2011 as required in H&S section 44014.6. BAR redesigned the station report card to a more user-friendly format in June 2012. BAR began accepting applications from stations to participate in the STAR Program on July 1, 2012. The technician report was redesigned shortly after the STAR Program started in 2013. A variety of database, procedural, and enforcement revisions are in place to accommodate and process STAR Program applications. BAR is continuing the outreach program it began during the regulatory process. This outreach includes web posted Q&A documents, newsletter articles, and an industry help desk. BAR also completed over 30 workshops in order to share information about the STAR Program.

Preliminary Results:

Program data collected prior to the implementation of the STAR Program was compared to data collected after the program was in place. Although a complete post-implementation biennial cycle of data will not be available for analysis and reporting until July 2015, BAR has prepared a preliminary analysis of the available data to date. In particular, station participation in the STAR Program was examined by station type (stations may choose to not participate in the STAR Program). The analysis also included investigation of changes to the Smog Check overall failure rate, and the duration of initial inspections, as well as a selection of short-term performance measures before and after the implementation of the STAR Program.

[2] For more information concerning the status or to access the regulation text, go to www.smogcheck.ca.gov.

A. STAR Station Participation:

Table 1 below shows a distribution of the 6,943 active Smog Check stations by station type as of June 2013. Of the 6,943 active stations, 4,644 were Test and Repair stations and the remaining 2,299 were Test Only stations. One half of all active stations applied to and were accepted into the STAR Program.

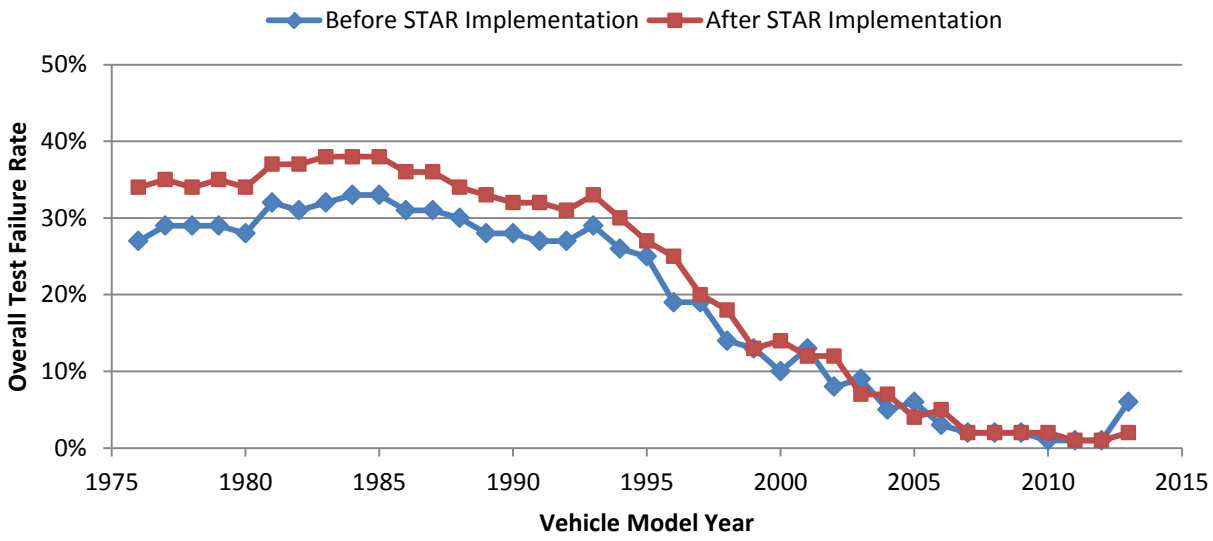
Table 1: Station Status Based on STAR Performance Measures
As of June 3, 2013

	Station Type	Number of Stations
Applied to And Accepted Into STAR Program	Test and Repair	1,768
	Test Only	1,671
Did Not Apply / Not Accepted into STAR Program	Test and Repair	2,876
	Test Only	628
	Total	6,943

B. Overall Failure Rate Comparison by Model Year

Figure 1 below shows a comparison of the Smog Check overall test failure rate by vehicle model year prior to and after the implementation of the STAR Program. Since the STAR Program was implemented on January 1, 2013, only five months of post-implementation program data was available to be processed. Though not a full two-year inspection cycle, there is a trend showing a higher post-implementation failure rate in particular for the older model year vehicles. Older vehicles are expected to have higher emissions than newer vehicles but are driven less frequently on average. This increased failure rate is an expected byproduct of improved inspection quality. For years, random roadside inspections have shown that the true failure rate for 1976-1999 model year vehicles was approximately 1.5 to 2.0 times the failure rate seen in the Smog Check program[1].

Figure 1: Smog Check Overall Test Failure Rate[1]
Before and After Implementation of STAR Program

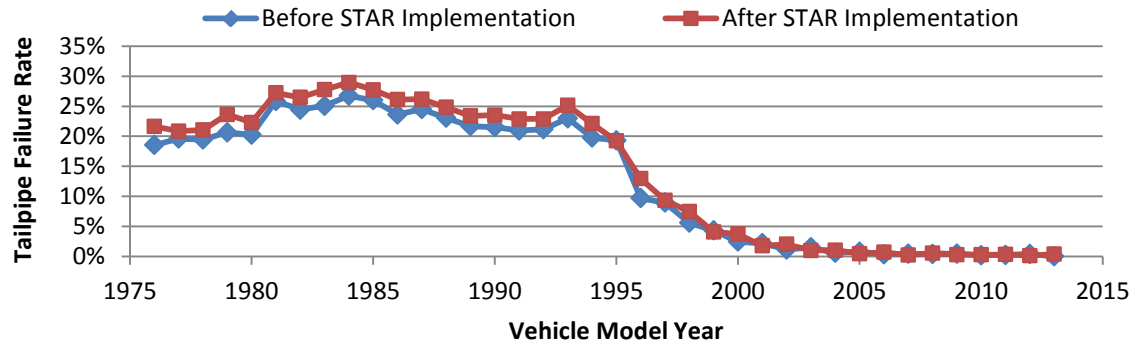


1. BAR-97 initial tests from January - May 2012 versus January - May 2013.

C. *Failure Rate Comparison by Test Component*

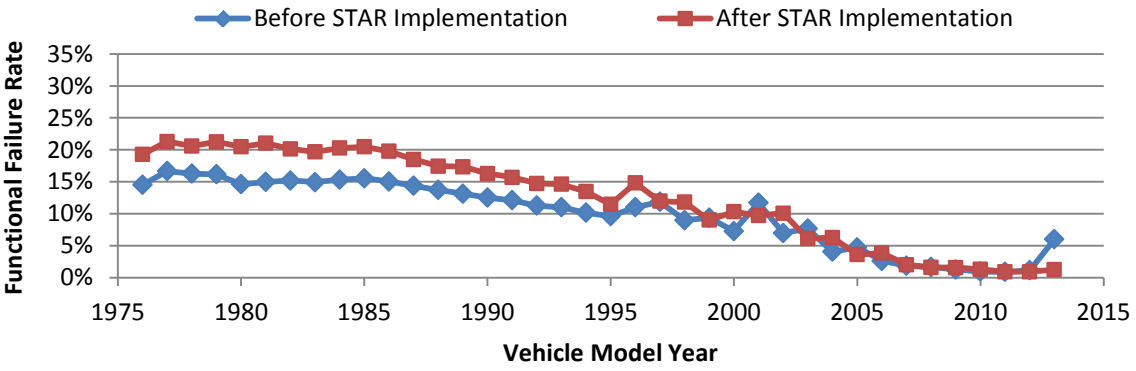
There are three components to the Smog Check inspection: the tailpipe test, the visual inspection and the functional check. Figures 2 - 4 below show a breakdown of the Smog Check overall test failure rate shown in Figure 1 above by component. For all three components of the Smog Check inspection, the after STAR implementation failure rate exceeds the before STAR failure rate for older model year vehicles. The most significant change is observed for the functional check failure rate. One might infer that technicians are performing a more thorough inspection of older vehicles since the implementation of the STAR Program.

Figure 2: Smog Check Emissions Test Failure Rate[1]
Before and After Implementation of STAR Program



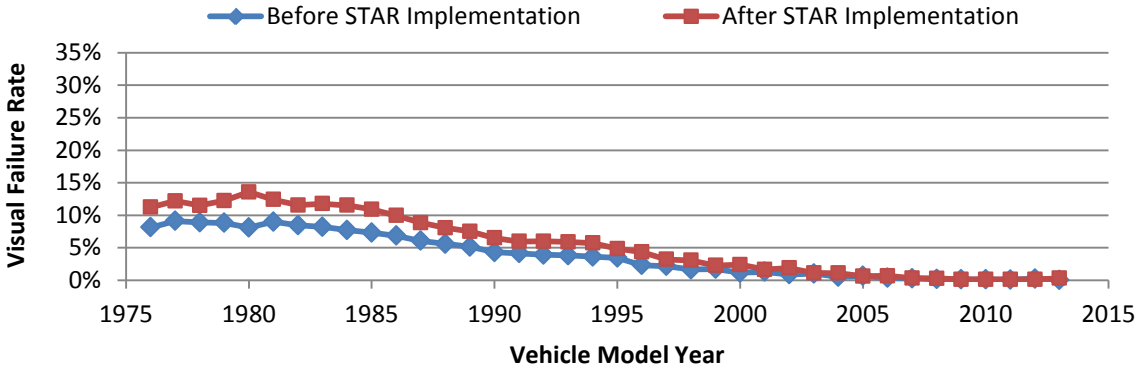
1. BAR-97 initial tests from January - May 2012 versus January - May 2013.

Figure 3: Smog Check Functional Check Failure Rate[1]
Before and After Implementation of STAR Program



1. BAR-97 initial tests from January - May 2012 versus January - May 2013.

Figure 4: Smog Check Visual Inspection Failure Rate[1]
Before and After Implementation of STAR Program

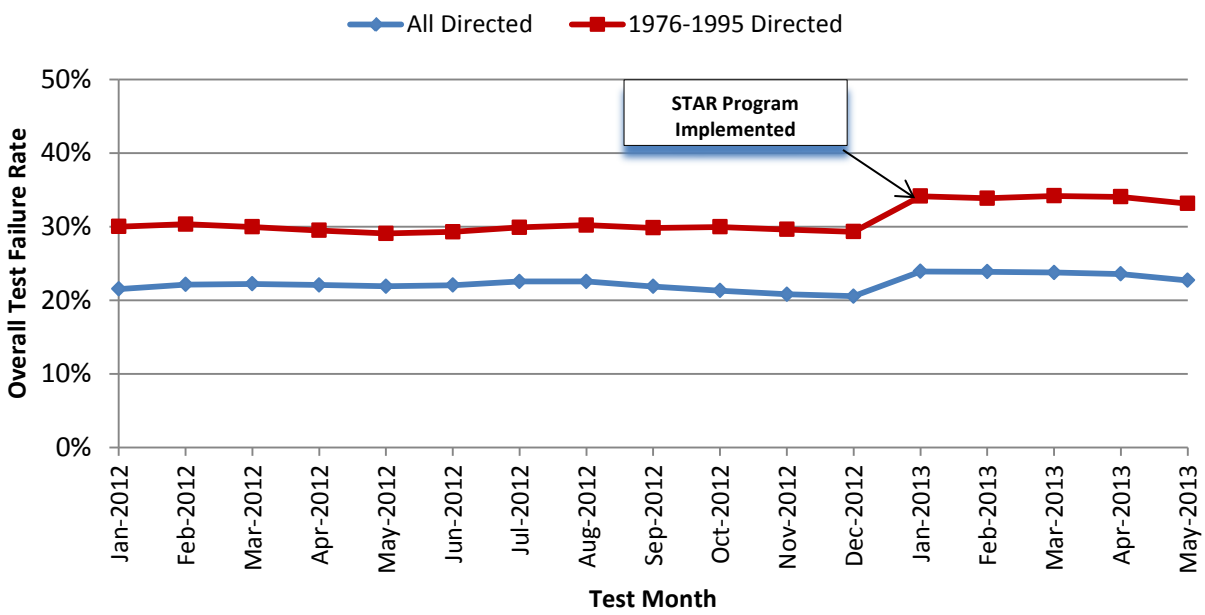


1. BAR-97 initial tests from January - May 2012 versuls January - May 2013.

D. Failure Rate Comparison for Directed Vehicles

A detailed look at directed vehicles in particular is shown in Figure 5 below. Currently, in 2013, all gasoline-powered vehicle model years 1976 to 2005 are eligible for direction. The 1976 - 1995 model year group vehicles are partitioned out because they were specifically studied in the Sierra report. There was a 10% increase to the overall failure rate for all directed vehicles after the implementation of the STAR Program. By comparison, a 14% increase was observed for the older 1976 - 1995 directed vehicles.

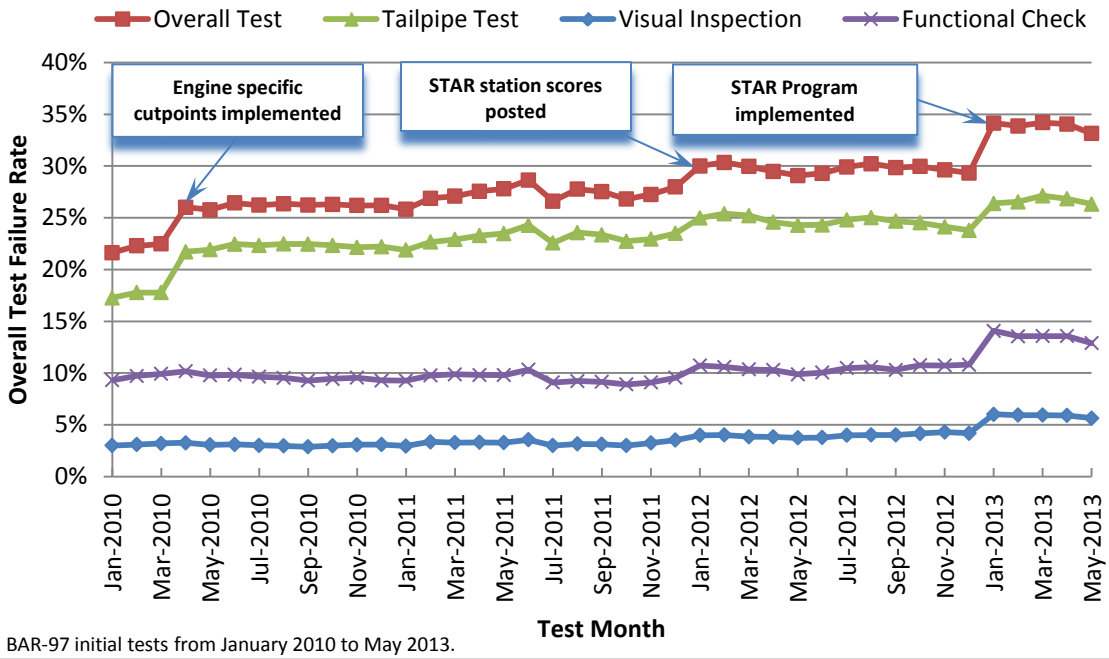
Figure 5: Smog Check Overall Test Failure Rates for Directed Vehicles Before and After STAR Implementation



1. BAR-97 initial tests from January 2012 to May 2013.

A more detailed graph for the older model year directed vehicles is shown in Figure 6 below. In addition to the Smog Check overall test failure rate, Figure 6 also shows the failure rate for each component of the inspection. The direct impact of the implementation of program changes such as vehicle specific cutpoints (that tightened emissions standards for older vehicles) as well as the STAR Program (that directed older vehicles to better performing stations) can be seen on the directed vehicle failure rates across time.

Figure 6: Smog Check Overall Test Failure Rate1 for Directed Vehicles 1976 - 1995 Model Year Vehicles



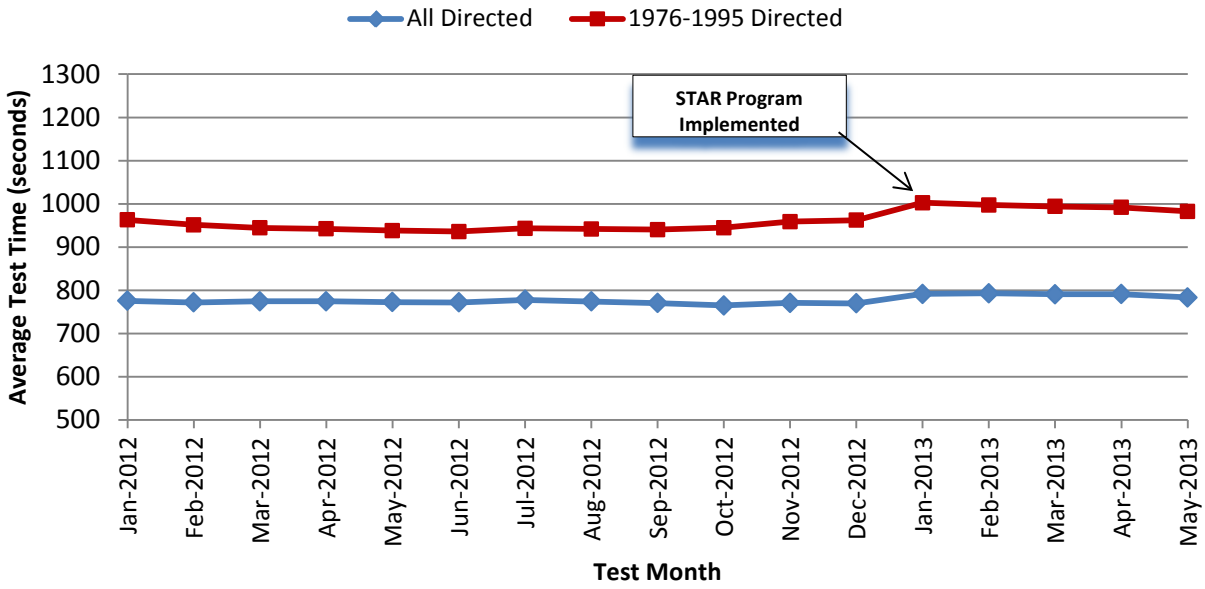
1. BAR-97 initial tests from January 2010 to May 2013.

E. Inspection Duration Comparison for Directed Vehicles

The average test times were calculated for Smog Check initial inspections occurring prior to and after implementation of the STAR Program. Prior to implementation of the STAR Program, it was anticipated that improved inspection quality would result in longer inspection times as inspectors were more careful while performing their inspections.

Figure 7 below shows the average test times in seconds for all directed vehicles and for the older 1976 - 1995 directed vehicles. For all directed vehicles, a 3% increase to the average amount of time taken to perform a Smog Check inspection was observed after the implementation of the STAR Program. For the oldest vehicles, 1976 - 1995 model years, a 5% increase was observed.

Figure 7: Smog Check Test Inspection Time[1] for Directed Vehicles Before and After Implementation of STAR Program



1. BAR-97 initial tests from January 2012 to May 2013.

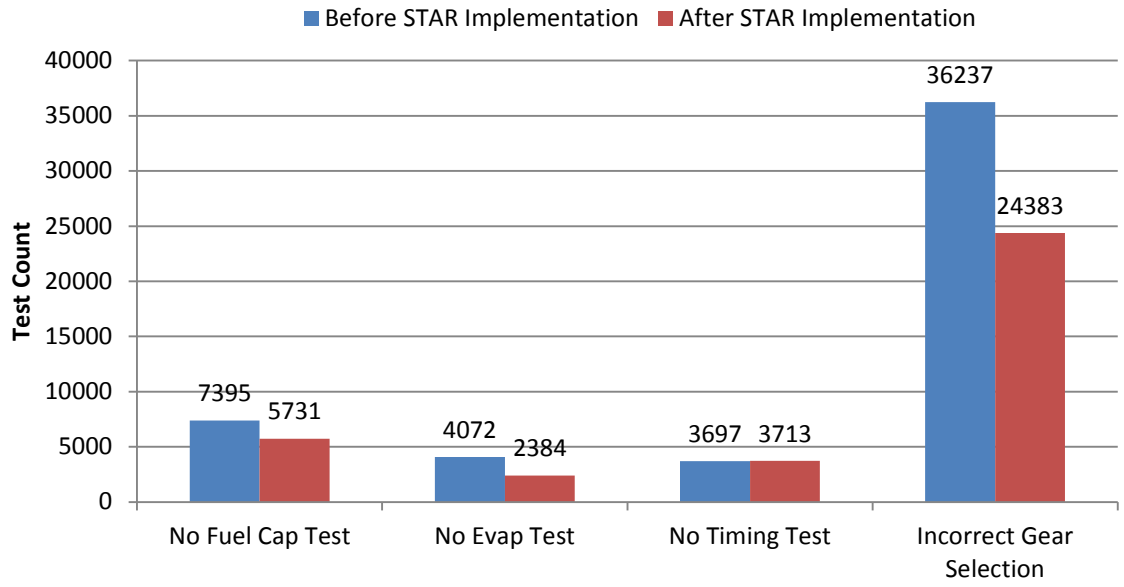
F. Short Term Measures Comparison

In part, a station's overall STAR performance is based on a series of short-term performance measures. The Station Short-Term STAR Program Performance Measures include: Test Deviations; Incorrect Gear Selection and Similar Vehicle Failure Rate (SVFR). Test Deviations are further divided into the following seven performance measures: (1) Fuel Cap Test Not Performed; (2) Fuel Evaporative Test Not Performed; (3) Timing Not Performed; (4) OBD II Not Performed; (5) Max Readiness Monitors; (6) ASM Restarts; and (7) Aborted Tests. Together, these nine inspection-based performance measures are considered short-term because they are calculated based on data from the three most recent months prior to the station evaluation.

Figure 2 compares three of the test deviations as well as the occurrence of incorrect gear selection by stations pre- and post-implementation. For example, in 2012, there were 7,395 occurrences where stations indicated that a fuel cap pressure test could not be performed on a vehicle when at least 90% of the inspections performed on "similar vehicles" statewide indicated that the fuel cap was testable. The number of occurrences dropped to 5,731, a 22.5% decrease, in the first quarter of 2013. Similarly, a 41.4% decrease was observed in the number of occurrences where stations indicated that an evaporative test could not be performed on a vehicle when at least 90% of the inspections performed on "similar vehicles" statewide indicated that the fuel evaporative test could be completed. Similar to the inspection duration

comparison, this may indicate that the quality of inspections has improved since the implementation of the STAR Program.

Figure 8. Short Term Measures[1] for All Stations Before and After Implementation of STAR Program



1. BAR-97 initial tests from January - March 2012 versus January - March 2013.

2. Directed Vehicles

H&S section 44010.5 now includes a more detailed description of the types of vehicles to be included in the directed vehicle population. Directed vehicles have a higher than average probability of failing their next inspection and will be identified by BAR for inspection only at STAR stations. In response to the statute changes, BAR will designate the following vehicle groups as directed vehicles:

I. The first group will include all 1976 to 1999 model-year vehicles and all 2000 and newer model-year gasoline-powered and diesel vehicles with a gross vehicle weight rating (GVWR) greater than 14,000 pounds.

II. The second group will include vehicles with emissions-related problems that may not be adequately detected by the vehicle's OBD II system. As these vehicles are identified by BAR and ARB, they will be included in the directed vehicle population.

III. The third group includes any other vehicles for which direction is necessary to meet the emissions reduction standards established by the United States Environmental

Protection Agency (USEPA). The current rate of directed vehicles will remain the same until 2015.

Note: If a vehicle is directed, the vehicle owner will receive a DMV registration renewal notice requiring inspection and certification at a STAR station. Motorists may use BAR's on-line station locator to assist them in finding STAR stations in their area.

Status: Although the changes to the direction process are ready for implementation, these changes will coincide with the OBD-focused inspection implementation early next year (2014).

Target Implementation Date: Mid 2014

3. Citation Process

Amendments to H&S sections 44050, 44052, and 44055 were made to expand BAR's authority to issue citations for violations of the Smog Check Program. A citation may contain an order of abatement, which includes a training requirement, the assessment of an administrative fine, or both. The maximum administrative fine against Smog Check stations has been increased from $2,500 to $5,000 per vehicle inspection or repair. This provision also provides BAR new authority to cite and fine technicians up to $5,000 per incident, to require prescribed training attendance, or both. Previously, technicians only received prescribed training as discipline. Regulatory revisions specify penalty ranges and establish a framework for determining fine amounts. Similar changes were made to H&S section 44056, which allows BAR to levy civil penalties against any person who falsifies information or attempts to obtain a certificate of compliance or repair cost waiver.

In addition to an administrative hearing, the cited licensee may request one informal conference with the BAR Chief or his/her designee. Failure to comply with the order or to successfully appeal the citation shall result in the suspension of license, denial of renewal of the license, or revocation of the license.

Status: Regulations were drafted based on input received from stakeholders, including the Smog Check industry at public workshops held in March 2011. The draft regulations were modified in May 2012 after a public comment period. The proposed regulations were filed with the Office of Administrative Law (OAL) on June 11, 2012.

Implementation Date: July 2012

4. Inspection Procedures and Standards

Amendments to H&S section 44012 permit the adoption of inspection procedures based on various vehicle technology considerations. Most notably, model-year 2000 and newer vehicles will receive an OBD (on board diagnostic) focused inspection in lieu of a tailpipe based

inspection. Eligible vehicles will be inspected for the presence of OBD emissions-related malfunctions instead of elevated exhaust emissions that are caused by defective emission control components, overt tampering or vehicle deterioration. Ineligible vehicles, including those without OBD systems or with problematic OBD systems, will continue to receive the traditional tailpipe based inspection.

In response to H&S 44036 revisions intended to reduce illegal vehicle substitution and emission control system tampering and to better utilize each vehicle's OBD system capabilities, BAR defined more stringent OBD inspection standards. The new standards include the use of a real-time data that would prevent a certificate of compliance from being issued if data from the vehicle is identified as being excessively different from historic data for that vehicle, if there is mismatched information, or if other irregularities are indicative of an improper inspection. In addition, the new standards reduce the number of allowable incomplete diagnostic monitors for both gasoline and diesel powered vehicles. Diagnostic monitors are self-tests a vehicle runs within the OBD system to determine if the vehicle's emission controls are working properly. Allowed incomplete monitors for gasoline-powered vehicles will decrease from two to one for pre-2000 model year vehicles, and from any one to only the evaporative system monitor on 2000 and newer model year vehicles. These standards mimic USEPA guidelines for Inspection and Maintenance programs. Allowed incomplete monitors for diesel powered vehicles will decrease from one to zero for pre 2007 model year vehicles, and from any one to only the exhaust after treatment system monitor on 2007 and newer vehicles.

Status: Regulations containing revised inspection procedures and more stringent OBD inspection standards will be adopted July 1, 2013. Statewide OBD focused inspections will be fully implemented as early as March 2014, pending BAR equipment certification and station equipment purchases. After implementation begins, more stringent inspection standards will be phased-in to strengthen the criteria for unset monitors, and to begin real time certificate blocking when vehicle data irregularities are detected.

Target Implementation Date: Mid-2014

5. New Equipment

H&S section 44036 provides BAR the authority to adopt new equipment standards and requires stations to use BAR certified equipment to perform a Smog Check inspection. Under this authority, BAR developed new standards for the OBD-focused inspection equipment. These standards are defined in the BAR OBD Inspection System Data Acquisition Device Specification which is incorporated by reference in the aforementioned revised regulations. The equipment must be built to BAR's specification and will only be supplied by vendors that are granted BAR

certification. The revised Smog Check Manual, also incorporated by reference in the revised regulations, specifies the requirements for BAR certified equipment.

STAR stations are required to have all the inspection equipment, and, thus, will be required to procure the new OBD-focused inspection equipment. All other stations may choose to purchase the new equipment if they wish to inspect 2000 and newer vehicles. The current tailpipe based equipment will continue to be required in all STAR stations to support testing of the 1999 and older model year vehicles that are directed to STAR stations for their biennial inspection. Non-STAR stations are not required to keep the old inspection equipment if they do not wish to inspect the 1999 and older model year vehicles.

The OBD-focused equipment design is such that only one component, the data acquisition device (DAD), is BAR certified and the rest of the ancillary equipment including the computer, printer, and bar code scanner are common off-the-shelf items. The web-based inspection software, developed by BAR's central database contractor, will be provided to stations and BAR will be able to make rapid inspection procedure or standard changes from a central location.

Status: BAR is currently testing the OBD-focused inspection software. Equipment specifications and the Smog Check Manual are part of the regulation package that will be adopted July 1, 2013. Immediately upon regulation adoption, BAR will begin certification testing of the equipment in the laboratory. In November, a limited number of stations will begin using the revised procedures while performing real world equipment certification testing. Once equipment is fully certified in early 2014, stations can purchase it and begin OBD-focused inspections.

Target Implementation Date: Mid-2014.

6. Referee Network

H&S sections 44014 and 44017 delineate the types of vehicles that require a Referee inspection. The list includes vehicles for which the manufacturer's design presents inspection incompatibilities (e.g., specially constructed vehicles, engine changes, etc.) and vehicles equipped with emission control configurations that do not match configurations certified by the USEPA or ARB.

Status: The Referee services regulation package has been filed with the Secretary of State and becomes active July 1, 2013.

Target Implementation Date: July 2013

Other Improvements

- Repair Cost Waiver

Beginning July 1, 2013, the Smog Check repair cost limit will be increased from $450 to $650. Health and Safety Code 44017 (c) requires the department to periodically revise the repair cost limits in accordance with changes in the Consumer Price Index, as published by the United States Bureau of Labor Statistics.

In accordance with Health and Safety Code 44017 (c), a vehicle owner may qualify for a repair cost waiver if their vehicle fails to meet the biennial Smog Check standards after the customer has spent a minimum of $650 on repairs at a Smog Check station. The repair cost waiver postpones the Smog Check certificate requirement for up to two years beginning on the due date of vehicle registration renewal. A vehicle that receives a waiver must be fully repaired by the next biennial Smog Check inspection requirement or title transfer. Of course, the owner can choose to repair the vehicle so that it passes the inspection and forgo the repair cost waiver option. A repair cost waiver can only be issued by a Referee facility.

In accordance with Health and Safety Code 44015 repair cost waiver limitations are as follows.

A vehicle cannot be issued more than one waiver under the same ownership and must be repaired before change of ownership. After changing ownership, the new owner may be eligible for another waiver.

A repair cost waiver can only be issued after all tampered systems have been repaired.

A repair cost waiver cannot be used for vehicles undergoing transfer of ownership.

A repair cost waiver cannot be used for an initial registration of a direct import or grey market vehicle, a vehicle previously registered outside the state or country.

A repair cost waiver cannot be used for a dismantled or salvaged vehicle, a vehicle with an engine change, an alternate fuel vehicle, or a specially constructed vehicle.

The emission related repairs must be performed at a licensed Inspection and Repair station, or a licensed Repair Only station, in order for the money spent to be applied towards the repair cost limit.

Repairs covered by a vehicle manufacturer emissions warranty shall not apply toward the repair cost limit.

- Consumer Assistance Program

In January 2011, BAR limited eligibility for repair assistance services under the Consumer Assistance Program (CAP) exclusively to income-eligible consumers (AB 787, Chapter 231, Statutes of 2010). In addition, income-eligible consumers can now receive $1,500 to retire a vehicle under CAP. In 2012, BAR further limited the Repair Assistance (RA) Program such that it no longer covers maintenance-related repairs. As of July 1, 2012, BAR began requiring consumers participating in RA to pay the total cost of testing and diagnosing the emissions-related problems of a vehicle.

- License Restructure

Recent regulatory changes allow an individual to become licensed as an Inspector and/or Repair Technician. The new licensing structure improves training requirements for the Inspector license, bolsters the qualification requirements for the Repair Technician license, and creates more comprehensive examinations for both licenses. The license restructure also provided more station licensing options that better align with the marketplace and industry. These options provide a viable path to license for both new car dealers and independent specialty shops that, for the most part, are not included in Smog Check. BAR consulted with a group of instructors from California Community Colleges and private technical trade schools. As a result, BAR developed new standards schools must follow in developing training for an initial Smog Check license. The new standards target specific competencies identified in a formal Smog Check job analysis, while providing schools with the freedom to develop training that best suits the needs of their students and classroom environments. The standards also recognize that automotive training should be derived from the industry, and that program related materials should come from BAR as the regulatory agency. Ultimately, the measure should result in higher quality inspections and repairs. Regulations were adopted in February of 2012. The improved training and more comprehensive licensing examination became available in August 2012.

- License Related Training

Beginning in January 2013, BAR amended the Smog Check update training process to improve training content, improve technician training choices, and provide schools additional flexibility in the Smog check update training arena.

Prior to January 2013, BAR had always created the Smog Check update training programs “in house.” The training could include several topics but only one training course was available every two years and all BAR certified schools taught the same course. In order to improve the update training courses and provide more technically up-to-date training programs and materials, BAR changed the methodology for creating the update training courses by

transferring that authority to BAR certified instructors with the caveat that all courses must be approved by BAR's contracted Subject Matter Experts (SME). The process requires that the instructor submit all materials to BAR. BAR staff ensures that all required materials such as presentation media, handouts, syllabi, etc. are contained in the package. BAR then assigns the package to 5 SMEs who evaluate the course.

Creating multiple update training programs allows the technician to select a training topic that they need most; formerly, all technicians had to attend the same training. To date, BAR has certified 17 different Smog Check update classes and 3 additional classes are undergoing the review/approval process.

- BAR-Certified Schools

Draft regulations to update the qualifications and performance of BAR-certified schools are in progress. These regulations will improve the school certification process, establish authority for schools and instructor performance measures, and broaden training standards to possibly include - "non-technical" training, such as ethics or other training related to the business of auto repair.

Status: Submitted to the Department of Consumer Affairs Legal Division for review in March of 2013.

Attachment

University of California, Riverside

College of Engineering – Center for Environmental Research and Technology (UCR, C-CERT)

UNIVERSITY OF CALIFORNIA, RIVERSIDE

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http://www.cert.ucr.edu

May 14, 2013

Mr. Garrett Torgerson
Department of Consumer Affairs
Bureau of Automotive Repair

Re: Independent technical review of the methodology in the Department of Consumer Affairs, Bureau of Automotive Repair (DCA/BAR) Technical Support Document (TSD) for the Annual Re-fail Report.

The University of California, Riverside College of Engineering – Center for Environmental Research and Technology (UCR, CE-CERT) was retained under Agreement Number REQ0009504 to review the July 5, 2012 "Technical Support Document For: Annual Re-fail Report Per AB 2289 Sections 44024.5 (a), (b)" to determine the validity of the method for re-creating Figure 4-1, Table 4-3, Table 4-4, and Figure 5-2 in the main body of the Sierra Research Report: "Evaluation of the California Smog Check Program Using Random Roadside Data". (Report No. SR09-03-01). After reviewing the Technical Support Document (TSD), obtaining additional information from BAR personnel in response to direct questions via email and conference calls, and being directed by BAR to focus only on the methodology to create the Re-fail Plot Figure 4-1, we conclude that the BAR proposed method accurately recreates Figure 4-1 in the Sierra Report

While, as stated, we believe that by following the current TSD instructions one can accurately recreate Figure 4-1 in the Sierra Report, it would be easier to reach this conclusion if one had a diagram of the variables in each dataset and how the datasets are linked together. In fact we reached the above conclusion after obtaining such a diagram following a direct request to BAR. A well-documented source program and test data would also be very useful for following the data analysis and would provide a new individual assigned to produce Figure 4-1 a clear roadmap for that assignment.

Some suggestions for improving the TSD are attached.

Sincerely,

Robert L. Russell
Tom Durbin
Kanok Boriboonsomsin
George Scora

Attachment: Suggestions for improving the TSD

On page 6, item 1.1 Include a reference to a diagram showing all the variables in the various tables and how the tables are linked during various programming steps.

On page 6, item 1.2.a. If the VIN matches the program should verify if the license plate also matches.

On page 6, item 1.2.b.i. If license plate number not found save record in new file instead of deleting the record so it can be investigated later for possible mistaken entries.

On page 6, item 1.2.b.ii.1. Don't discard roadside record, save record in new file so it can be investigated later for possible mistaken entries.

On page 7, item 1.5.a. Since the join is based on AnalyzerID and AnalyzerTestNumber the programming would be cleaner if the variable name in Roadside_Cleandata_Refail was AnalyzerTestNumber instead of TestRecordNumber. (Note that there are other datasets where different names are used for the same variable. The naming of variables should be consistent in all the datasets.) Note that, per the diagram sent by Nathan Chaplin showing how the tables are linked together, the join is on AnalyzerID, AnalyzerTestNumber, and StationID. If so then the instructions should reflect this.

On page 8, item 1.7.c. Change "Due to cleanup or missing data, both tables ..." to "Due to cleanup or missing data, the Roadside_Cleandata_Refail table..." as this is the only table which may have some records for which there is no match in Roadside_SecbySec_Refail.

On page 9, item 2.1. The source of the second-by-second records is not given. It should be specified that this information is in the file Roadside_Cleandata.

On page 9, 10, items 2.1, 2.2, and 2.3 it is not clear where the results of the calculations are stored.

On page 14, item 3.1.b reads: "Upload ROADSIDE_CLEANDATA_REFAIL table VIN field to ARCHBI schema after joining to ROADSIDE_SECXSEC_REFAIL to ensure second by second data exit for each vehicle". This statement seems to imply that only the VIN field is uploaded whereas presumably the joined dataset has all the variables from ROADSIDE_CLEANDATA_REFAIL and ROADSIDE_SECXSEC_REFAIL.

On pages 18, 19, 20, 22, 23, and 24 in the Calculation Sheet(s) the second column is labeled "Time Bin: Number of Days Since Smog", but given the entries are in month ranges a more appropriate label is "Time Bin: Months Since Smog". Alternatively the entries could be specified in day ranges.

On page 22 in Step 1, Classification 3:, Other Vehicles: it states "initial pass (initial smog tailpipe = 'Pass' and initial smog overall include ('blank' or 'Pass') but no cert", however the Calculation Sheet on page 24 is titled "Calculation Sheet: Classification 3 – All vehicles that Ultimately Passed with Cert Prior to Roadside Test" so the "but no cert" does not seem to be correct. (BAR indicated the "but no cert" should read "but no initial cert, subsequent cert prior to roadside test.)

On page 24 in the Example: it states "To calculate the weighted tailpipe failure rate and the weighted average number of days ...". The phrase "and the weighted average number of days" should be deleted because the "Average Number of Days Since Smog" is not included in the Calculation Sheet(s) on pages 22, 23 and 24.