Appendix A

Public Act 09-187, Section 55

An Act Concerning the Functions of the Department of Motor Vehicles

Senate Bill No. 1081

Public Act No. 09-187

AN ACT CONCERNING THE FUNCTIONS OF THE DEPARTMENT OF MOTOR VEHICLES.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Sec. 55. (*Effective from passage*) The Department of Environmental Protection, in consultation with the Department of Motor Vehicles, and with the use of appropriate models, approved by the federal Environmental Protection Agency, shall evaluate whether the present system for conducting motor vehicle emissions inspections could be replaced, upon expiration of the existing contract for providing such inspection system, by a system based on the exclusive utilization of on-board diagnostic information systems for model year 1996 and newer motor vehicles, and remain in compliance with the requirements of the Clean Air Act. The evaluation shall be completed and provided to the Commissioner of Motor Vehicles at least six months before said commissioner, in accordance with the provisions of section 14-164c of the general statutes, as amended by this act, enters into a negotiated agreement or agreements, notwithstanding the provisions of chapters 50, 58, 59 and 60 of the general statutes, with an independent contractor or contractors to provide the inspection system required pursuant to said section 14-164c.

Appendix B

2008 Annual Evaluation of Connecticut's Inspection and Maintenance Program

June 2009

ANNUAL EVALUATION OF CONNECTICUT'S INSPECTION/MAINTENANCE PROGRAM

FINAL REPORT

Prepared for:

Connecticut Department of Environmental Protection

Prepared by:

dKC – de la Torre Klausmeier Consulting

June 2009

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Executive Summary

As required by the Clean Air Act Amendments of 1990, the Connecticut Department of Environmental Protection (DEP) in partnership with the Connecticut Department of Motor Vehicles (DMV) conducts periodic evaluations of its enhanced inspection and maintenance program (I/M). This report is being submitted in fulfillment of the requirements to provide annual reports per 40 CFR 51.366. This report addresses data collected from January 1, 2008 to December 31, 2008. The United States Environmental Protection Agency (EPA) provided a checklist (Appendix A), which identified the data elements to be included in this annual report. The required data and reports from previous years have been submitted to EPA. The 2008 data elements are compiled in Appendix B and correspond to the indexing system used in EPA's checklist. Due to the structure of Connecticut's program, the following requirements of the attached checklist are not applicable: (a)(2)(xiii), (xiv), (xv), (xvi), (xvii), (xviii), (xx) and (5); (b)(3)(ii), and (iv); (4)(iii), (6), (7); (d)(3) and (4).

The vehicle inspection and maintenance program, is designed to identify vehicles that emit pollutants that exceed acceptable standards and require such vehicles to get repaired. The I/M program is an important part of the strategy to ensure that Connecticut is positioned to attain the National Ambient Air Quality Standard for Ozone. Connecticut's program, which dates back to 1983, has a long history of effectively reducing vehicle emissions and results in more emission reductions than any other state implemented reduction strategy. Current estimates indicate that in 2010, this program will result in approximately 19 of the 200 tons per day of air pollutant reductions that are included in Connecticut's 2007 Ozone Attainment Plan. The emission reductions resulting from this program are an integral part of our air quality attainment efforts and important as part of a balanced strategy that includes reductions from the stationary, area and mobile source sectors.

In 2003, Connecticut implemented a new I/M program in which vehicles are tested in a decentralized network of approximately 300 inspection stations. The new program instituted OBDII testing for 1996 and newer vehicles. Additionally, enforcement in the new program was improved by moving from a window sticker enforcement to registration denial for non-complying vehicles. Connecticut's I/M program performance statistics for the 2008 calendar year confirm that the program continues to perform at the levels established under the centralized program. This evaluation demonstrates that Connecticut's I/M program is well managed and effectively achieves the expected air quality benefits.

- Over 96% of the vehicles subject to the testing were in compliance with I/M program requirements for 2008. The overall compliance rate in Connecticut exceeds the compliance rate assumed in Connecticut's State Implementation Plan. Connecticut actively investigates non-compliance and assesses a large number of fines for late registration.

- Approximately 9% of vehicles failed their initial emissions test. Failure rates under the decentralized I/M program are equal to or higher than failure rates recorded under centralized I/M programs.
- DMV performs extensive quality assurance checks on the program. Evaluation of this quality assurance data demonstrates that the program performs accurate inspections.
- Overt and covert audits were conducted at all stations as part of an extensive anti-fraud program Less than 0.1% of the inspections in Connecticut are suspect. Connecticut's anti-fraud efforts are models for other I/M programs.

Connecticut has consistently conducted a thoughtful analysis of its vehicle inspection and maintenance program and has made numerous enhancements since its initiation. Analysis has repeatedly demonstrated that the program is well managed and produces the expected air pollutant reductions. Opportunities to improve the program through maximizing the air quality benefits in a cost effective manner will be evaluated in the coming year. As part of Connecticut's planning, areas where additional outreach efforts, such as explaining the significance of the malfunction indicator light, may contribute to the effectiveness of the program will be considered.

1.0 Introduction

This report presents an analysis of data collected in Connecticut's vehicle Inspection and Maintenance (I/M) program in 2008 to meet the United States Environmental Protection Agency's (EPA) annual reporting requirements of 40 CFR Part 51.366. In an I/M program, vehicles are periodically inspected, and those with evidence that they exceed design emission standards must be repaired. I/M programs were mandated by the Clean Air Act for areas such as Connecticut that were designated as serious or severe non-attainment for ozone. Connecticut's program, which dates back to 1983, has a long history of effectively reducing vehicle emissions and is an important part of the strategy to ensure that Connecticut is positioned to attain the National Ambient Air Quality Standard for Ozone. Connecticut's I/M program results in more emission reductions than any other state implemented reduction strategy. Current estimates indicate that in 2010, this program will result in approximately 19 of the 200 tons per day of air pollutant reductions that are included in Connecticut's 2007 Ozone Attainment Plan. The emission reductions resulting from this program are an integral part of our air quality attainment efforts and important as part of a balanced strategy that includes reductions from stationary, area and mobile source sectors.

Connecticut's I/M program identifies vehicles that have been tampered with or have received improper maintenance. These vehicles must be repaired until they comply with emission standards. The Connecticut Department of Motor Vehicles (DMV) manages the I/M program; the Connecticut Department of Environmental Protection (DEP) ensures that the program achieves the air quality benefits as outlined in Connecticut's State Implementation Plan (SIP).

The original program implemented in 1983 subjected vehicles to two inspections – an idle test where exhaust concentrations of hydrocarbons (HC) and carbon monoxide (CO) were measured while the vehicle was idling and a visual inspection for the presence of emission control devices, such as the catalytic converter. Vehicles with gross vehicle weight ratings (GVWR) of 10,000 lbs or less are included in the program. In 1998, Connecticut substantially enhanced its existing I/M program to meet new SIP requirements as well as federal requirements for I/M improvements. The emission test was changed from an unloaded idle emission test to a loaded-mode test (ASM2525[1]). With this change, Connecticut began evaluating emissions of oxides of nitrogen[2] (NO_x) along with HC and CO. A loaded-mode test uses a chassis dynamometer to simulate on-road driving. If the vehicle could not be safely tested on a dynamometer, it received a pre-conditioned two-speed idle (PCTSI) test. In addition, the inspection included a gas cap pressure test to check to see if the gas cap holds pressure. Leaking gas caps are a major source of evaporative HC emissions. The inspection continued to include a visual emission control component check.

In 2003, DMV again made substantial revisions to the program. The inspection network

1 The ASM2525 or Acceleration Simulation Mode test measures HC, CO and NO emissions while the vehicle is driven at a constant speed (25 MPH) on a treadmill-like device termed a dynamometer.
2 Nitric oxide (NO) is measured as a surrogate for oxides of nitrogen (NO_x). NOx along with HC emissions are considered to be the major ozone pre-cursors.

was changed from a centralized system with about 25 inspection stations to a decentralized system with a contractor equipped limit of 300 stations[3]. The goals of these changes were to improve customer convenience to the public by decreasing the waiting time for emissions testing, directly involve the repair industry with emissions testing and enhance opportunities for small business development. In addition, 1996 and newer models started receiving on-board diagnostic equipment (OBD) inspections[4], instead of ASM2525 or PCTSI exhaust emissions tests. All 1996 and later model year light-duty vehicles sold in the United States contain the second generation of OBD, termed OBDII. OBDII systems can detect malfunctions or deterioration of emission control components, often well before the motorist becomes aware of any problem. Inspecting vehicles by reading the OBDII system codes can identify vehicles with serious emission control malfunctions more accurately and cost-effectively than traditional tailpipe tests, and help technicians diagnose and repair them. Diesel powered vehicles 10,000 lbs GVWR or less receive tests for excessive exhaust smoke, if they cannot receive OBDII tests.

Evaluating OBDII test results presents special challenges since tailpipe emission results are not available for each vehicle. The methodology for this evaluation has instead utilized data on different inspection components to determine if the appropriate number of vehicles are being failed and repaired. This approach is consistent with the purpose of OBDII system, since it assures that Connecticut is identifying and requiring the repair of vehicles that exceed design emission standards by more than 50%, as required by the EPA.

Evaluating decentralized inspections requires a comprehensive assessment of how well stations comply with mandated inspection procedures. Generally, there are greater opportunities for fraud in decentralized facilities, because there are more stations that need policing. Using data and procedures provided by the DMV, de la Torre Klausmeier Consulting, Inc**.** (dKC) assessed effectiveness and enforcement of Connecticut's program.

3 This number has dropped from 300 stations to 252 stations by the end of 2008.
4 1997 and newer light-duty diesels (<8500 lbs GVWR) also get OBD inspections.

2.0 Observed Failure Rates for Gasoline Powered Vehicles

Failure rates for gasoline powered vehicles were calculated using test results from I/M test stations. Below is a brief description of the criteria used to determine if a vehicle passes or fails inspection.

Pass Fail Criteria

ASM2525 or Pre-Conditioned Two-Speed Idle (PCTSI) Inspection (pre-1996 vehicles): Vehicles fail if they exceed Connecticut's cutpoints (emissions standards). For the ASM2525 test, HC, CO and NOx emissions are evaluated. For the PCTSI test, HC and CO emissions are evaluated. A vehicle fails if it exceeds cutpoints that are recommended by EPA.

Gas Cap Test: Vehicles fail if their gas cap cannot hold pressure. Beginning in November 2004, only pre-1996 light-duty vehicles receive gas cap tests. The OBDII system adequately tests the gas cap on most 1996 and newer vehicles.

OBDII Inspection: 1996 and newer light-duty vehicles get an OBDII inspection. The emissions test system is plugged into the OBDII connector and information on the status of the vehicle's OBD system is downloaded. Vehicles fail the OBDII inspection if they have the following problems:

- Malfunction Indicator Lamp (MIL[5]) is commanded-on
- MIL not working (Termed Key-On Engine-Off, KOEO, failure[6])
- OBD diagnostic link connector damaged
- Numbers of monitors that can be not ready exceeds EPA's limits[7]
- Vehicle fails to communicate with Connecticut's test equipment

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5 MIL is a term used for the light on the instrument panel, which notifies the vehicle operator of an emission related problem. The MIL is required to display the phrase "check engine" or "service engine soon" or the ISO engine symbol. The MIL is required to illuminate when a problem has been identified that could cause emissions to exceed a specific multiple of the standards the vehicle was certified to meet.

6 The Key-On Engine-Off (KOEO) determines if the MIL bulb is working. The bulb should illuminate when the vehicle is turned on but not started.

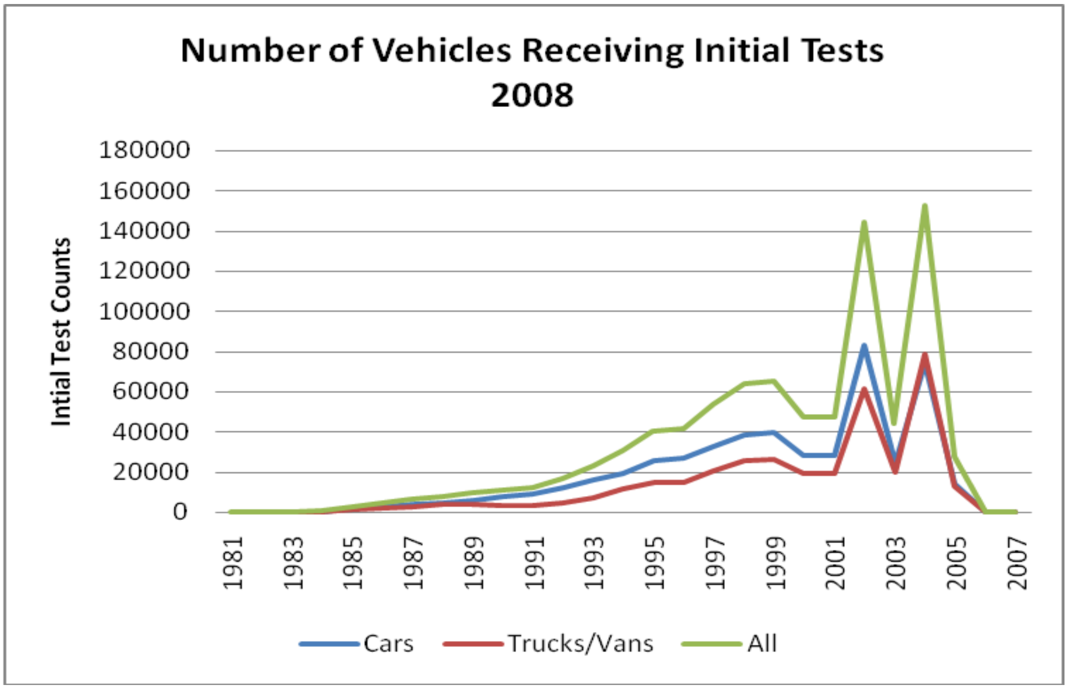
7 For 1996-2000 models, two non-continuous monitors can be not ready; for 2001 and newer models, one non-continuous monitor can be not ready. Prior to July 1, 2008, vehicles that only failed for readiness were subject to a back-up tailpipe test, which determined if they passed or failed. After July 1, 2008, these vehicles would fail inspection.

Summary of Fail Rates

Following is a summary of test results for the January 1, 2008 to December 31, 2008 period. During this period 846,390 gasoline powered vehicles received initial tests.

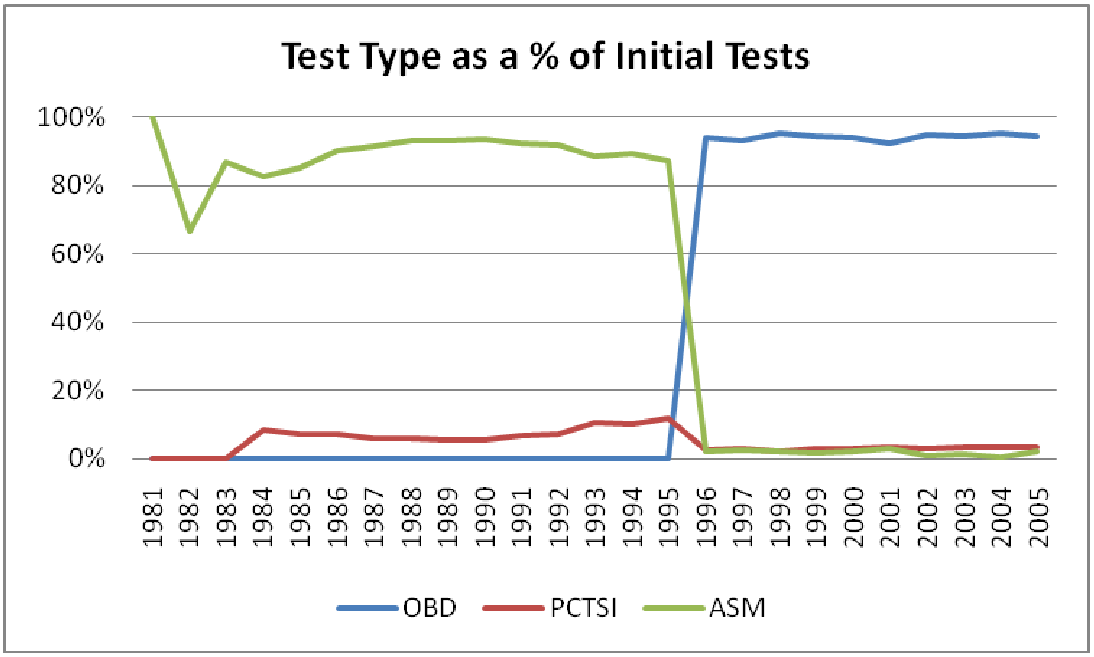
- Overall, 79,473 vehicles (9.3%) failed the initial inspection. The overall initial failure rate was around 8% in both 2006 and 2007. The increase is attributed to revised readiness requirements.
  - 14.6% of the vehicles failed their first retest.
  - Vehicles can fail for more than one reason.
- 58,272 (9.0%) vehicles failed the OBD test. The initial OBD test failure rate was around 7% in both 2006 and 2007. Again, the increase is attributed to revised readiness requirements.
  - 6.1% of the vehicles failed the test because the MIL was commanded-on.
  - 2.6% of the vehicles failed the test because the vehicle was not ready.
  - 11.0% of the vehicles failed the first OBD retest.
- 17,512 (10.9%) vehicles failed the ASM2525 test. The initial ASM2525 test failure rate was around 10% in both 2006 and 2007.
  - 25% of the vehicles failed the first ASM2525 retest.
- 3,537 (10.0%) vehicles failed the PCTSI test. The initial PCTSI test failure rate was around 9% in both 2006 and 2007.
  - 14% of the vehicles failed the first PCTSI retest.

Conclusion: Failure rates in Connecticut's test-and-repair program are in line with failure rates reported in other I/M programs, both test-and-repair and test-only.

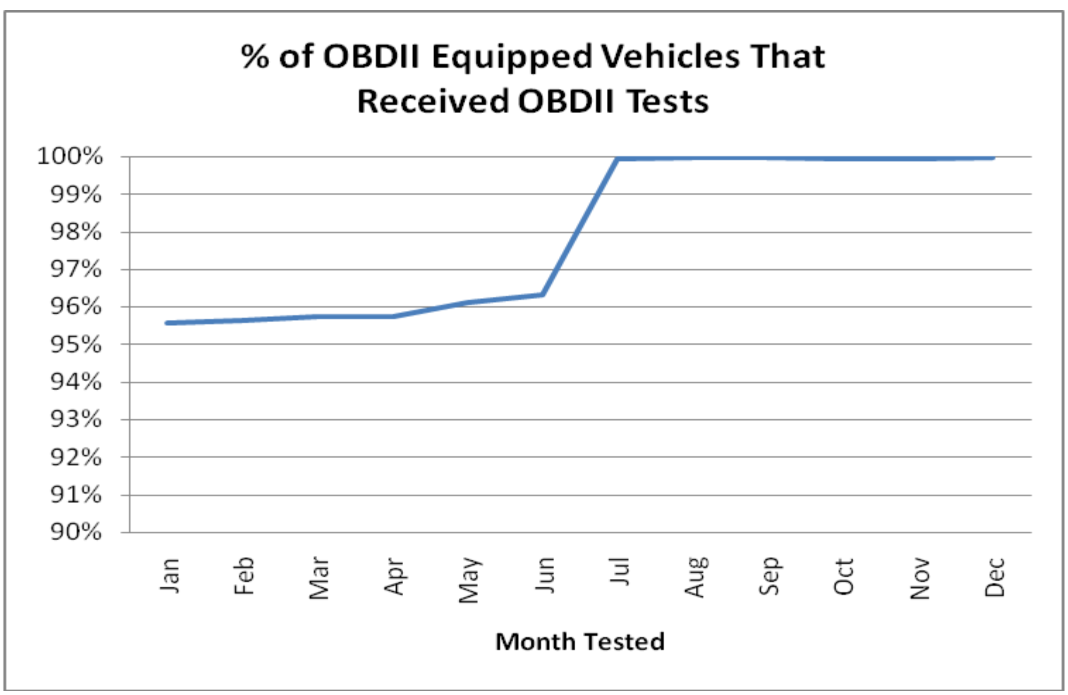


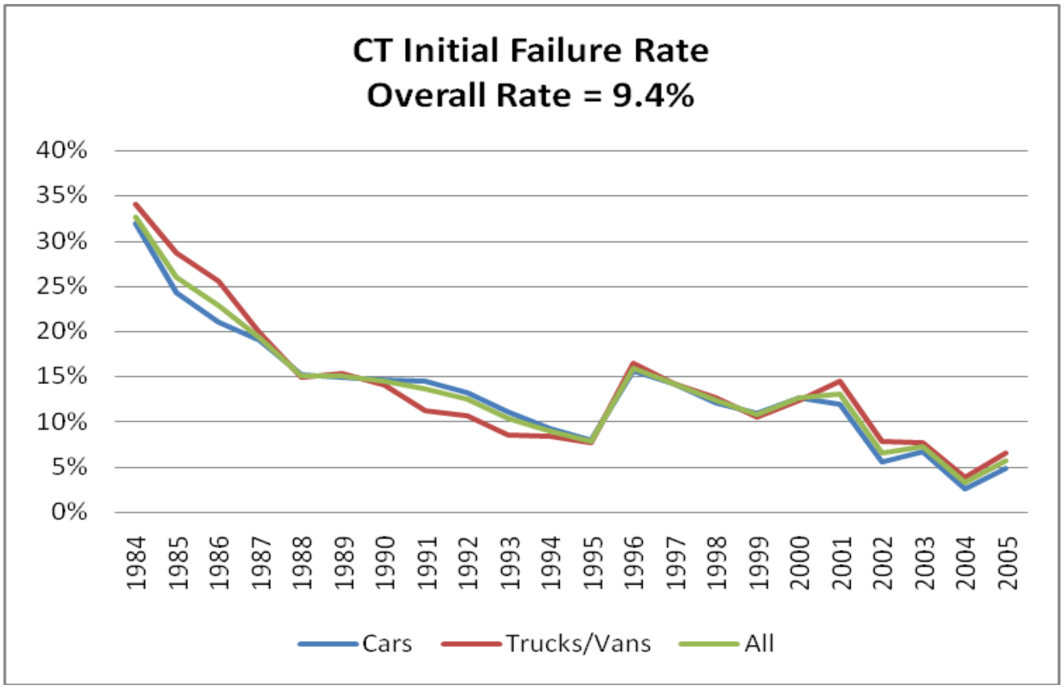
This chart shows the total number of inspections by model year and vehicle type. The first four model years are exempted from testing, so the number drops sharply for 2005 and newer model years.

Note: All vehicles are 10,000 lbs or less GVWR.

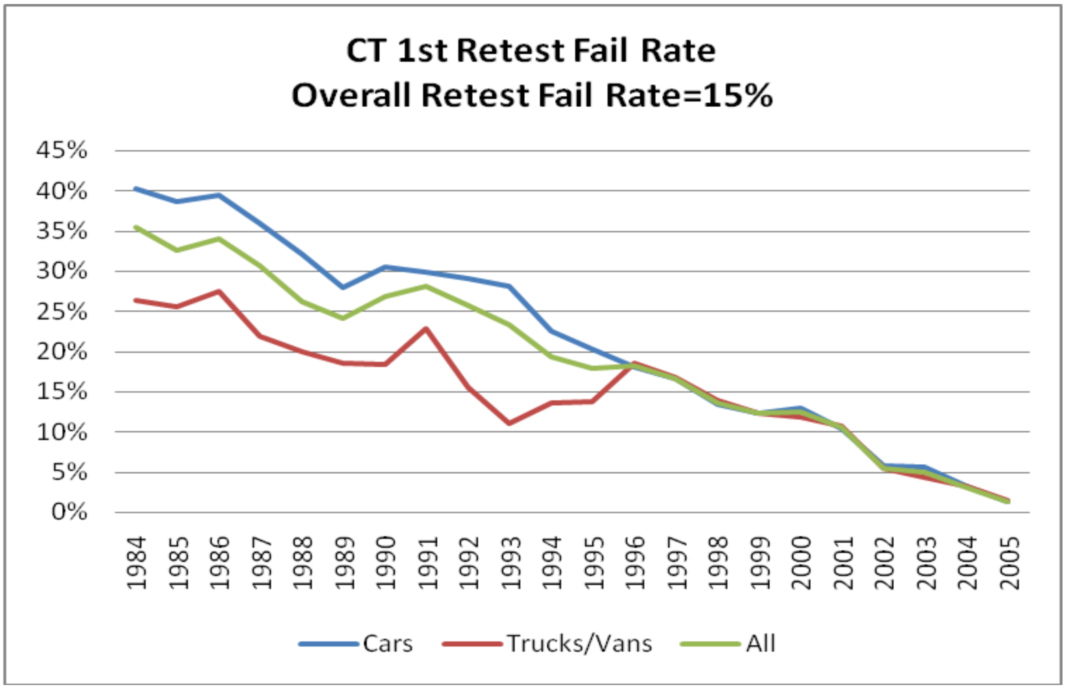


This chart shows the total number of inspections by model year and final inspection type. Most 1996+ vehicles received OBDII tests. A small percentage of the 1996 and newer vehicles were heavy-duty models without OBD systems. Also, prior to July 1, 2008, vehicles with OBDII systems that were not ready or failed to communicate with CDAS received PCTSI or ASM tests. This is shown on the chart below that indicates the percent of OBDII equipped vehicles that received OBDII tests. After July 1, 100% of the vehicles received OBDII tests.

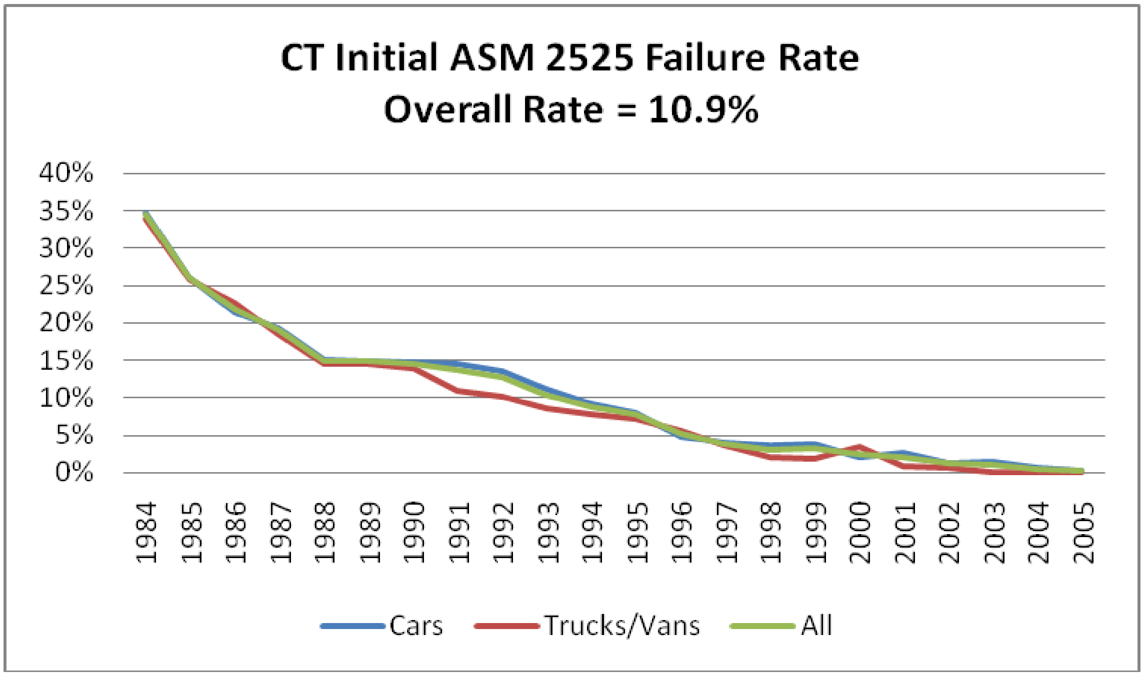




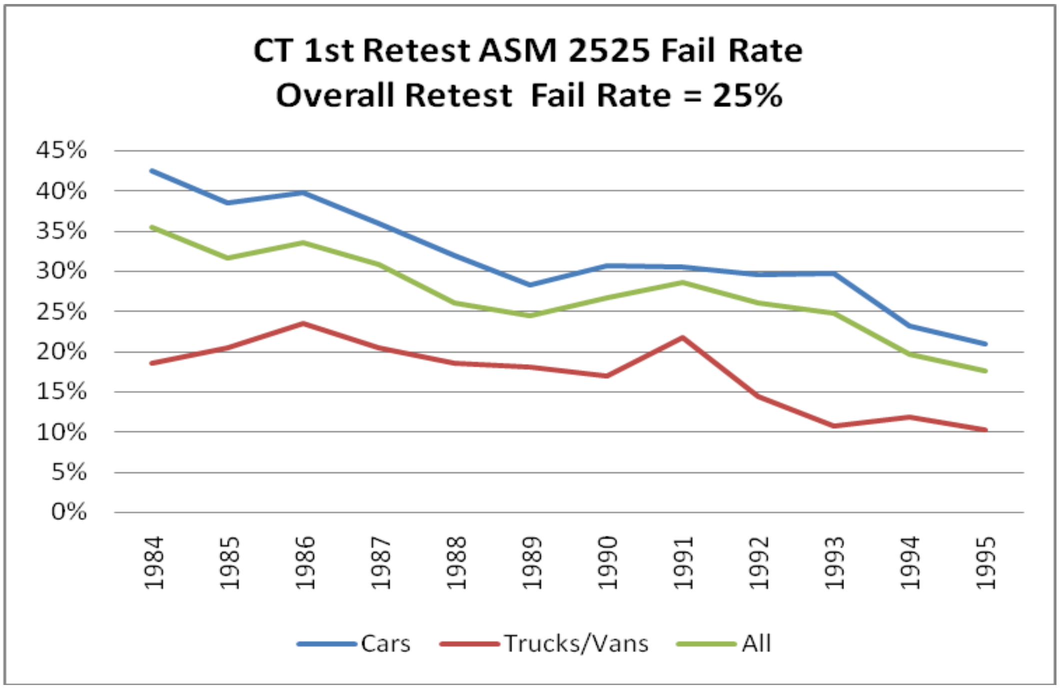
This chart shows the overall percent of vehicles that fail the tailpipe test, gas cap test, visual emission control component inspection, or the OBD test. Some vehicles fail more than one inspection component. As expected, the failure rate is lowest for new vehicles. The failure rate for cars and trucks spikes up for 1996 model year vehicles, because these vehicles are subject to the OBDII test. Compliance with the OBDII test is considered to be more difficult than compliance with the ASM2525 or PCTSI test. The failure rate is consistent with failure rates reported in test-only programs in other jurisdictions.



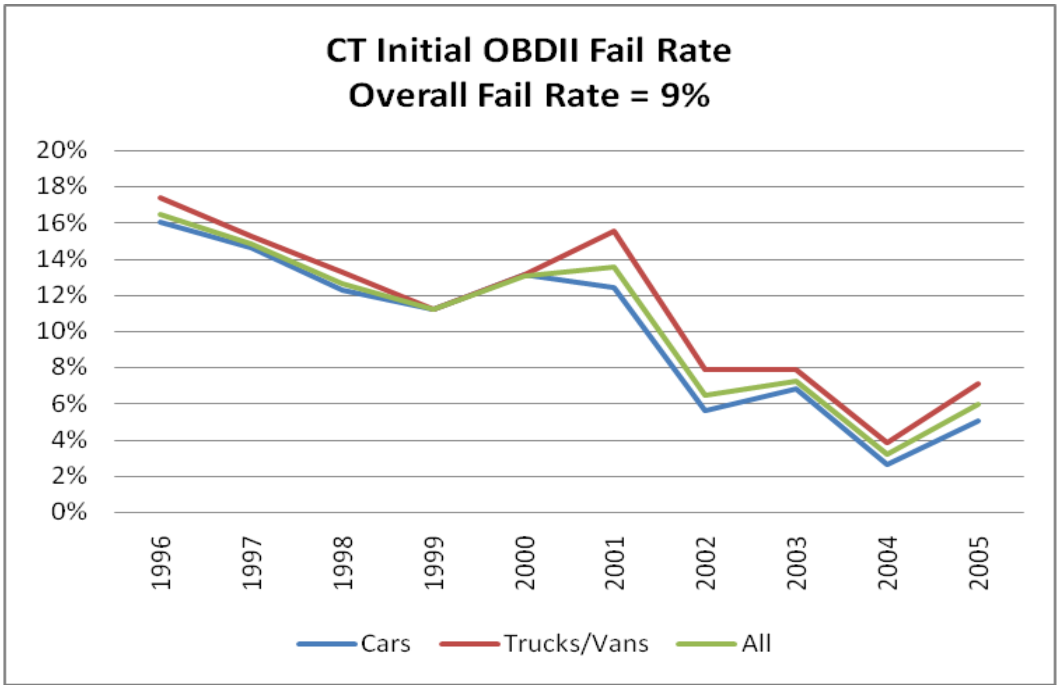
This chart shows the percent of vehicles by model year that fail their first retest. The failure rate is highest for the older vehicles, which is typical of most programs. Overall, about 15% of the vehicles fail their first retest.



This chart shows failure rates by model year for the ASM2525 test. The average ASM2525 test failure rate for all vehicles was 10.9%. Typically, a higher failure rate for older model year vehicles is expected.

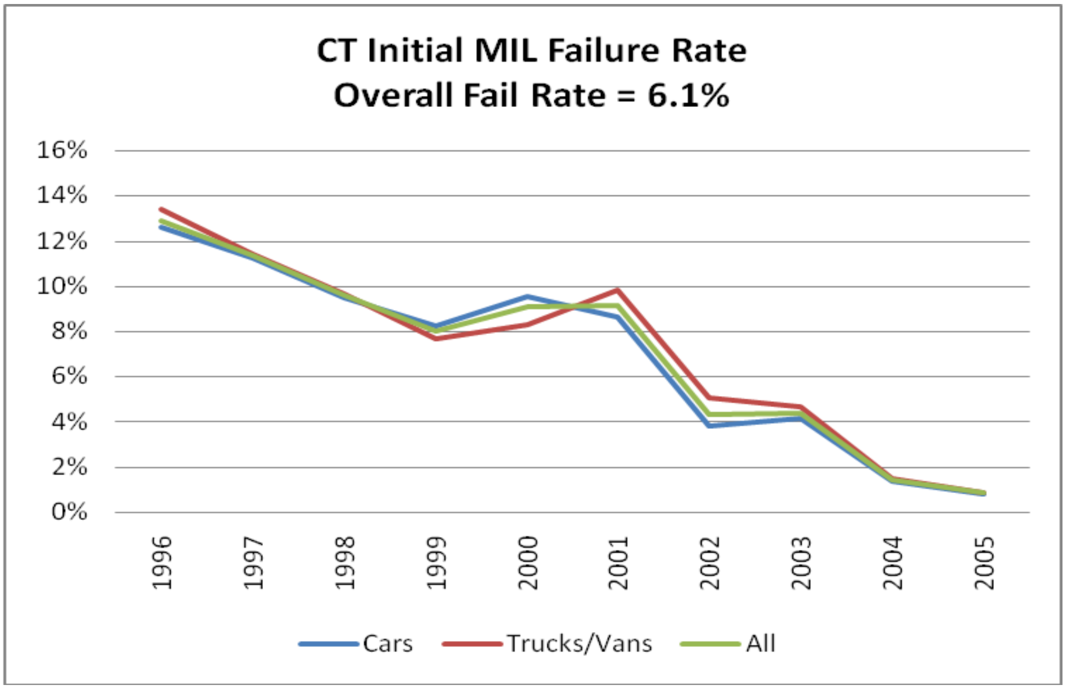


This chart shows the percent of vehicles by model year that fail their first ASM2525 retest. The retest failure rate generally is highest for the older vehicles. Overall, 25% of the vehicles fail the first ASM2525 retest. There were too few 1996+ vehicles receiving ASM2525 retests for a meaningful analysis.

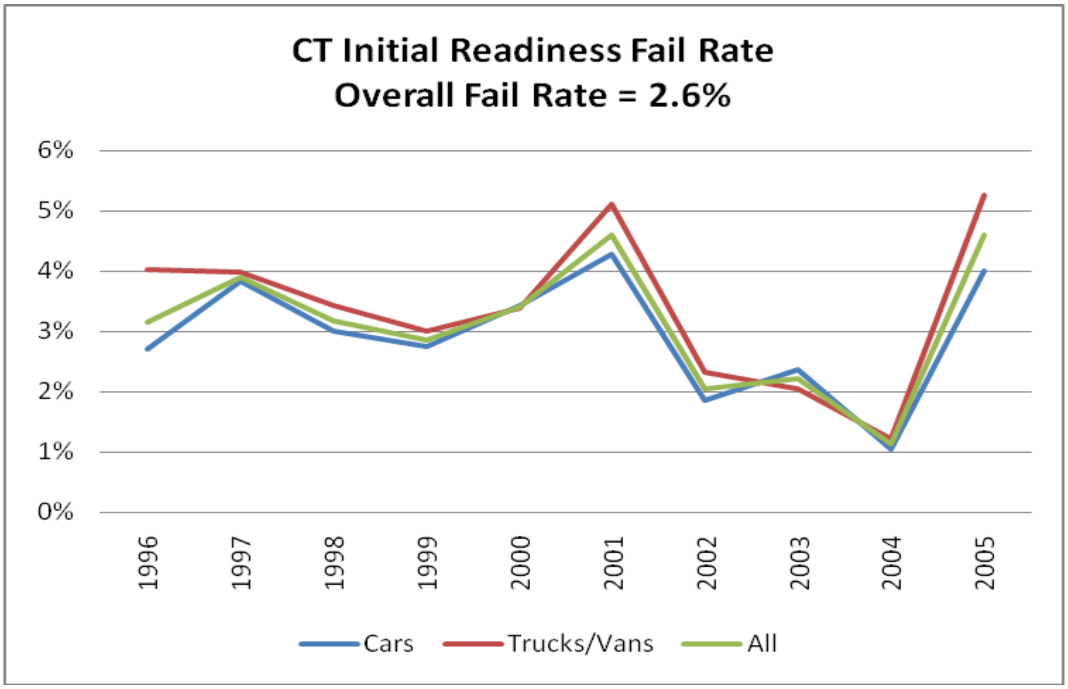


This chart shows failure rates by model year for the OBD test. The average OBD test failure rate for all vehicles was 9.0%. The initial OBD test failure rate was around 7% in both 2006 and 2007. The increase is attributed to the fact that Connecticut now fails for readiness, while previously, vehicles that only failed for readiness received a back-up tailpipe test. The bump in the failure rate for 2001 models reflects more stringent readiness criteria for 2001 and newer models. The increase for 2005 models reflects the fact that a high percentage of these models were owned by dealers. Vehicles owned by dealers typically have high not ready rates, because their batteries often are dead or had been disconnected during dealer prep[8].

8 Readiness status for all monitors usually sets to not ready when a vehicle's battery is disconnected.



This chart shows the percentage of vehicles that fail the MIL Command check that's part of the OBD test. Most OBDII failures are for the MIL Command check. The average MIL failure rate for all vehicles was 6.1%. This graph shows that older vehicles have a higher failure rate, as expected.



This chart shows the percentage of vehicles that exceed EPA's readiness criteria. OBDII systems have up to 11 diagnostic monitors, which run periodic tests on specific systems and components to ensure that they are performing within their prescribed range. OBDII systems must indicate whether or not the onboard diagnostic system has monitored each component. Components that have been diagnosed are termed "ready", meaning they were tested by the OBDII system. Overall, 2.6% of the vehicles fail EPA's readiness criteria.

The bump in the failure rate for 2001 models reflects more stringent readiness criteria for 2001 and newer models. The increase for 2005 models reflects the fact that a high percentage of these models were owned by dealers. Vehicles owned by dealers typically have high not ready rates, because their batteries often are dead or had been disconnected during dealer prep[9].

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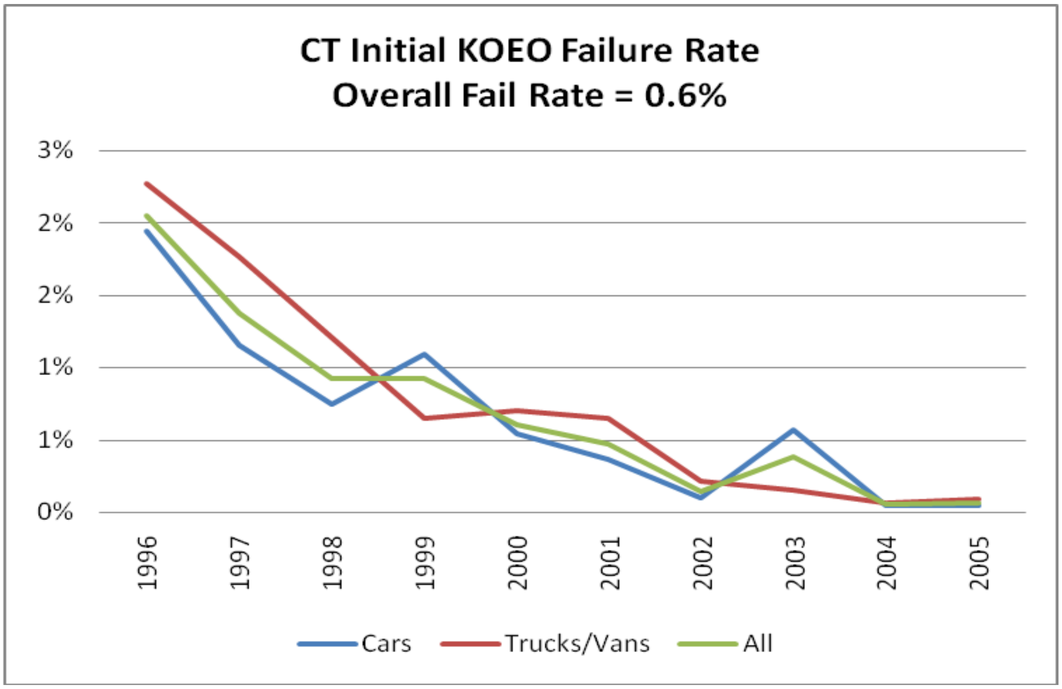
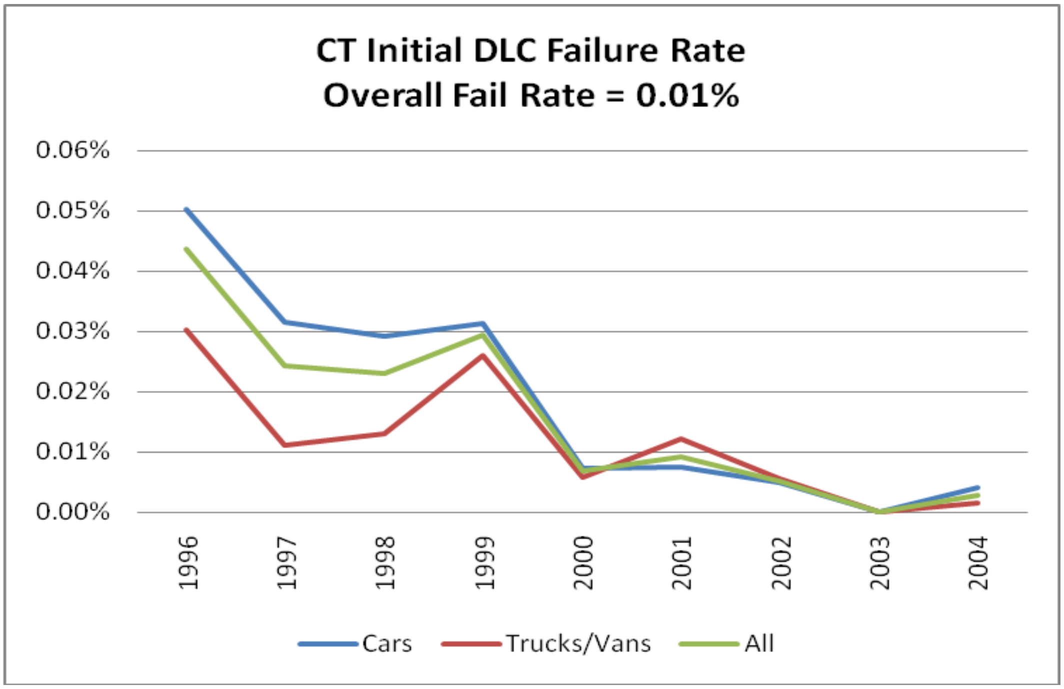
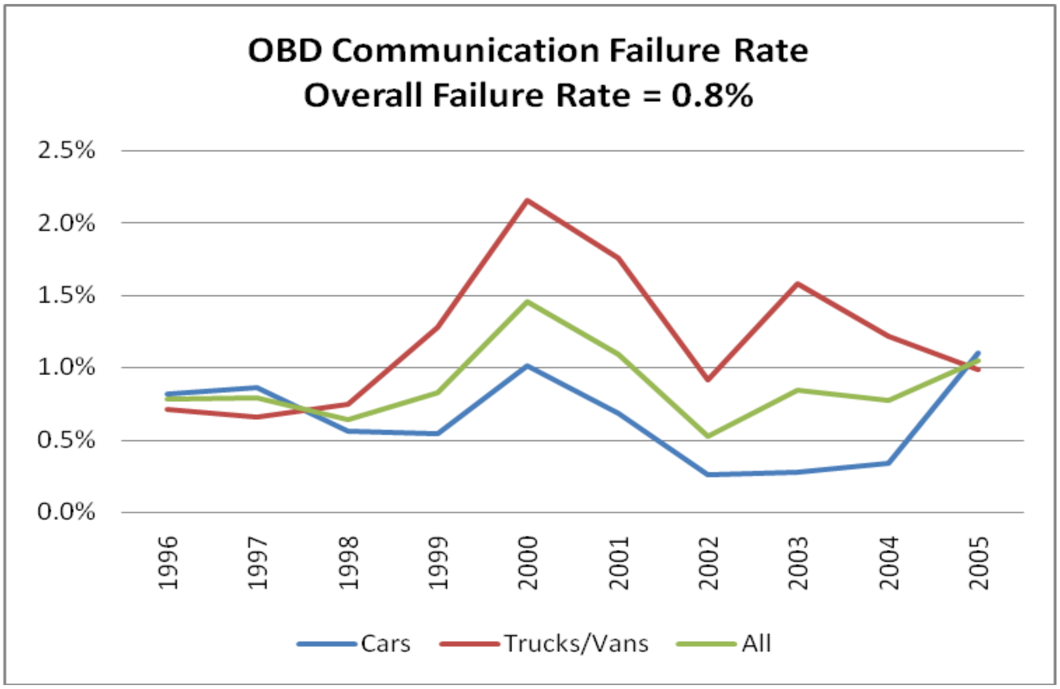


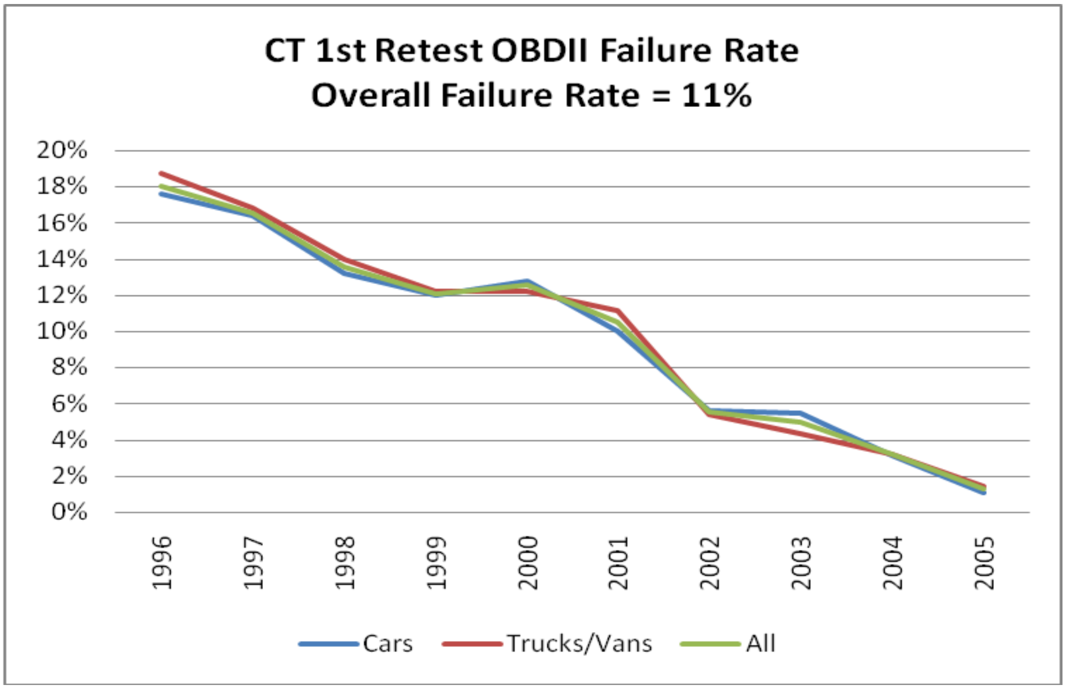
This chart shows failure rates by model year for the Key-On Engine Off (KOEO) test, which is part of the OBD test. The average KOEO failure rate for all vehicles was 0.6%. The KOEO determines if the MIL bulb is working. The bulb should illuminate when the key is turned to the on position but the engine is not started.



This chart shows the percentage of vehicles that fail because the OBDII connector, termed DLC, is missing, damaged or obstructed. Overall, 0.01% of the vehicles fail for this reason.



This chart shows the percentage of vehicles that fail to communicate with the OBDII test equipment. Overall, 0.8% of the vehicles fail for this reason. Vehicles with known communication problems receive ASM tests instead of OBDII tests.



This chart shows failure rates by model year for the first OBD retest. The average failure rate for all vehicles in the first OBD retest was 11.0%. Note that Connecticut requires OBD failures to meet readiness requirements when retested. If a vehicle does not meet readiness requirements when retested, the inspection is aborted. Vehicles that are not ready on retest are not included in the above fail percentage.

3.0 Observed Failure Rates for Diesel Powered Vehicles

Diesel powered vehicles 10,000 lbs or less GVWR also are tested in the I/M program in Connecticut. If the vehicle is equipped with an OBDII system, an OBDII test is performed. Otherwise the vehicle receives a test for excessive exhaust smoke opacity.

Failure rates for diesel powered vehicles were calculated using test results from I/M test stations. Below is a brief description of the criteria used to determine if a vehicle passes or fails inspection.

Pass Fail Criteria

Modified Snap Acceleration (MSA) Test: With this test, the throttle is snapped and exhaust smoke opacity is measured. Test is done in "neutral". The average of three snaps is calculated and compared to the standard.

Loaded Mode Diesel (LMD) Test: Vehicles are tested using a dynamometer to simulate driving at 30 mph. Exhaust smoke opacity is measured.

OBDII Inspection: 1997 and newer diesels less than 8500 lbs GVWR get an OBDII inspection. The emissions test system is plugged into the OBDII connector and information on the status of the vehicle's OBD system is downloaded. Diesel vehicles fail the OBDII inspection if they have the following problems:

- Malfunction Indicator Lamp (MIL) is commanded-on
- MIL not working (Termed Key-On Engine-Off, KOEO, failure)
- OBD diagnostic link connector damaged
- Numbers of monitors that can be not ready exceeds EPA's limits
- Vehicles fails to communicate with Connecticut's test equipment

Summary of Fail Rates of Diesel Powered Vehicles

Following is a summary of test results for the January 1, 2008 to December 31, 2008 period. During this period, 9,054 diesel powered vehicles received opacity tests and an additional 1,742 vehicles received OBD tests.

- 67 (4.9%) vehicles failed the Modified Snap Acceleration (MSA) test.
  - 31% of the vehicles failed the first MSA retest.
- 86 (1.1%) vehicles failed the Loaded Mode Diesel (LMD) test.
  - 28% of the vehicles failed the first LMD retest.
- 182 (10.4%) vehicles failed the OBD test.
  - 8.8% of the vehicles failed the first OBD retest.

Conclusion: Outside of Connecticut, few states perform periodic tests on diesel powered vehicles, so there's little basis for a comparison of Connecticut's diesel fail rates with other States.

4.0 Enforcement of Connecticut's I/M Program

Connecticut's program uses both registration denial and late fee assessment to enforce emission testing compliance. This section presents an analysis of data relevant to the enforcement of Connecticut's I/M program. Statistics required by 40 CFR 51.366 are presented below and in the Appendix B, with exception of 51.366(d)(1)(iv) and (v) which are not applicable to Connecticut's program.

Overall Compliance Rate

In 2008, 96.9% of the vehicles complied with inspection requirements, based upon a comparison of the number of valid final passing tests with the number of subject vehicles.

Connecticut I/M SIP assumes that 96% of the vehicles subject to I/M requirements actually comply.

Late Fees

- In 2007, 84,217 late fees were assessed.
- In 2008, 111,077 late fees were assessed.

The increase in 2008 due to late fee program refinements and expiration of vehicles' re-scheduled due dates caused by the program's hiatus in 2004.

Registration Audits

In 2008, 915,984 vehicle registrations were audited, which found a compliance rate of 96%. Of the 4% that were found to be out of compliance, 92.8% became compliant later.

Preventing Circumvention of Connecticut's I/M Requirement

EPA requires states to prevent motorists from avoiding I/M requirements by falsely registering vehicles out of the program area or falsely changing fuel type or weight class on the vehicle registration. EPA also requires states to report on results of special studies to investigate the frequency of such activity.

- **Circumventing I/M Tests in Connecticut –** Connecticut tests all fuel types, including hybrids, so motorists cannot avoid inspection by changing fuel type. It may be possible to avoid inspection by registering the vehicle with a GVWR greater than 10,000 lbs. However, the majority of vehicles registered with an incorrect GVWR are those where the vehicle owner registers the vehicle at a lower weight to avoid the added expense and would not be emission eligible (>10,000 lbs) with their corrected weight.
- **Detection and Enforcement Against Motorists That Falsely Change Vehicle Classifications To Circumvent Program Requirements –** 98.7% of emission eligible vehicles in Connecticut are in the Passenger, Commercial or Combination classifications. Because of the added expense, documentation and inspection requirements needed to change a vehicle's registration classification to a non-emission eligible class, incidents of such modifications are rare.

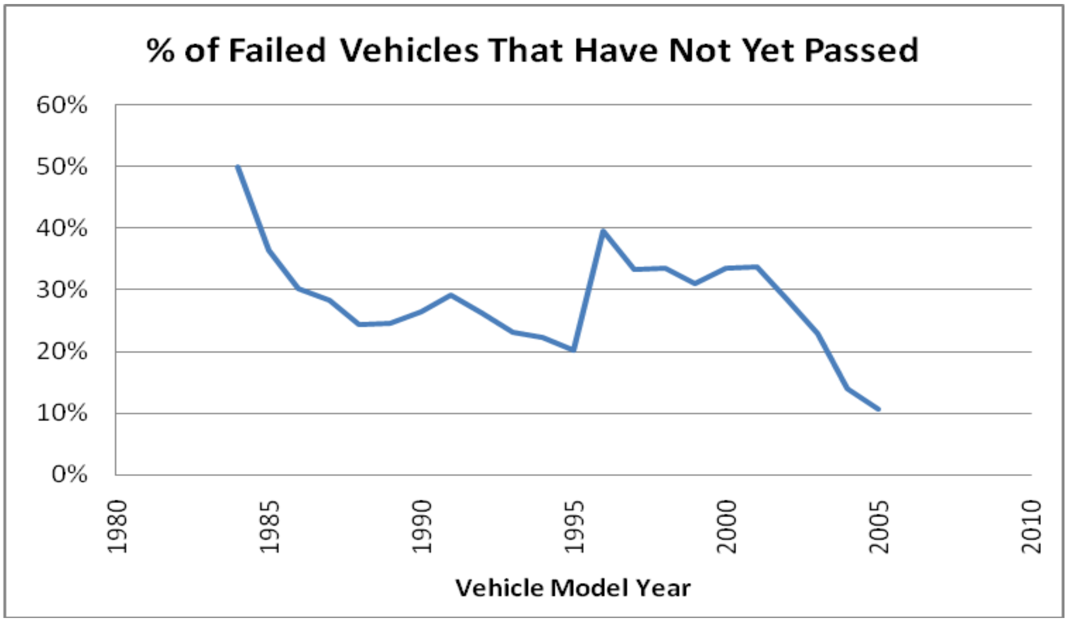
Percent of Failed Vehicles That Ultimately Pass

To determine whether vehicles that fail, ultimately pass the test, the fate of vehicles failing the I/M test in 2008 was evaluated. Failures for the first three months of 2008 were tracked through 12/31/08. Results are shown in the table and figure below.

Overall, 30% of the failures during this three month period had not yet received a passing result or waiver. Ultimately, these vehicles must comply or they cannot be registered in Connecticut, since DMV makes I/M compliance a prerequisite for vehicle registration.

Vehicles Tested from 1/1/08 to 3/31/08
with No Known Outcome

Model Year	Initial Fail	Final Retest Pass	No Retest	% No Final Pass
1984	34	17	17	50%
1985	197	125	72	37%
1986	275	192	83	30%
1987	334	239	95	28%
1988	337	255	82	24%
1989	464	350	114	25%
1990	453	333	120	26%
1991	483	342	141	29%
1992	624	460	164	26%
1993	708	544	164	23%
1994	713	554	159	22%
1995	1018	812	206	20%
1996	1634	987	647	40%
1997	2212	1473	739	33%
1998	1867	1242	625	33%
1999	1863	1285	578	31%
2000	1281	851	430	34%
2001	1359	901	458	34%
2002	1004	717	287	29%
2003	550	424	126	23%
2004	751	645	106	14%
2005	112	100	12	11%
TOTAL	**18273**	**12848**	**5425**	**30%**



This chart shows the percentage of vehicles that fail the emission test in the first three months of 2008 that never ultimately passed in 2008. The increase from 1995 to 1996 indicates that compliance with the OBD test may be more difficult than the tailpipe test used for pre-1996 vehicles.

Waivers Issued

Another issue related to enforcement is the number of waivers issued. Program effectiveness is inversely proportional to the waiver rate. As the following table shows, less than 0.6% of the failed vehicles receive waivers, indicating that the program is effective. This is much lower than the waiver rates in many other programs. Connecticut's I/M SIP assumes a waiver rate of 1%.

Conclusions regarding motorist compliance enforcement:

Connecticut exceeds SIP requirements for enforcement of motorist compliance. The overall compliance rate in Connecticut exceeds 96%, which is the compliance rate assumed in Connecticut's SIP. Connecticut actively investigates non-compliance and assesses a large number of fines for late registrations. Connecticut issues fewer waivers than assumed in the I/M SIP.

% of Failed Vehicles Receiving Waivers in 2008

Model Year	Passenger car (P)	Truck (T)	Total # of Waivers	# of Failed Vehicles	% of Failed Vehicles Receiving Waivers
1984	2	0	2	138	1.45%
1985	7	1	8	709	1.13%
1986	9	3	12	997	1.20%
1987	10	2	12	1230	0.98%
1988	8	3	11	1193	0.92%
1989	7	1	8	1463	0.55%
1990	3	2	5	1534	0.33%
1991	6	2	8	1678	0.48%
1992	9	0	9	2089	0.43%
1993	13	0	13	2383	0.55%
1994	8	3	11	2741	0.40%
1995	15	0	15	3146	0.48%
1996	36	17	53	6624	0.80%
1997	49	23	72	7581	0.95%
1998	40	28	68	7837	0.87%
1999	23	12	35	7039	0.50%
2000	33	8	41	5981	0.69%
2001	24	24	48	6138	0.78%
2002	19	11	30	9370	0.32%
2003	4	4	8	3139	0.25%
2004	0	3	3	4914	0.06%
2005	0	0	0	1546	0.00%
Total	**325**	**147**	**472**	**79470**	**0.59%**

Enforcement of Proper Test Procedures Through Trigger Reports and Video Audits

- DMV runs extensive trigger reports to assure that inspection stations follow proper test procedures. DMV has developed a comprehensive set of triggers to verify and enforce compliance with proper test procedures.
    - Trigger reports look for anomalies in data recorded during inspection. They help DMV identify stations performing fraudulent or inaccurate inspections.
    - Triggers focus on finding the following types of fraud:
        - Clean Scanning: Performing an OBDII test on a fault-free vehicle instead of the vehicle that should be tested.
        - Clean Piping: Performing a tailpipe test on a passing vehicle instead of the vehicle that should be tested.
    - These reports are generated daily to identify stations performing improper inspections. Connecticut promptly investigates all significant cases of possible inspection fraud.
- DMV employs two full-time video auditors who are constantly monitoring inspections during station operating hours via digital web cameras. Video audits have the following features:
    - Real time monitoring/control of vehicle inspections
    - Video auditors can selectively view inspections
    - If anomalies are detected – inspection can be halted
- No other state does more thorough trigger or video audits and follow-up actions.

Triggers for Clean Scanning/Clean Piping

DMV runs several trigger reports to identify clean scanning and clean piping:

- **Mismatch between entered VIN and OBDII VIN** – Inspectors may be attempting to pass vehicles with OBDII faults by scanning problem free vehicles instead of vehicles that should be inspected.
  - If the vehicle has an electronic VIN available through the vehicle's OBDII system, clean scanning cases can be identified by comparing entered VIN with VIN provided by vehicle's OBDII system.
  - In 2008, there were 194 incidences of OBD VIN mismatches out of 180,906 tests with OBD VINs (0.11%). Most mismatches were vehicles owned by the same person.
- **Questionable Retests** – Mismatches between initial tests and retests could indicate that the inspector clean-scanned vehicles on retests. DMV checks the following parameters:
  - Supported readiness monitors – different vehicles have different monitors
  - OBD computer identifiers
  - In 2008, out of about 43,658 passing OBD retests, 27 tests (0.06%) have been flagged by this trigger.
- **Short Time Between Initial OBD Test Fail And Retest Pass** –Stations that often show short time periods between initial test failures and retest passes could be performing fraudulent inspections. (Short = ½ hour)
  - It is difficult to repair OBD failures and get failing vehicles to pass in a short time period:
    - MIL-On Fails – It takes time for the MIL to go off or readiness monitors to reset if codes are cleared.
    - Readiness Fails – It takes time for readiness monitors to set to ready, especially the evaporative monitor.
  - In 2008, out of about 43,658 OBD retest passes, only 16 tests (0.04%) have been flagged by this trigger.
- **Large Emission Reductions In A Short Time Period (1981-1995 Vehicles) –** Stations reporting large emission reductions in a short time period are more likely to be clean piping the retests. (Short = ½ hour)
  - In 2008, out of about 13,931 ASM2525 retest passes, 13 tests (0.09%) have been flagged by this trigger.

Summaries of Clean Scanning/Clean Piping Triggers

- DMV tabulates potential clean scanning and clean piping triggers by station.
- Stations with more than one minor trigger or any major trigger, e.g. large emission reductions in a short time period, are immediately investigated.
- Overall, less than 0.1% of the inspections were flagged by trigger reports, which indicates that inspection fraud is not a serious problem in Connecticut.

Example Report – Stations with the Most Trigger Hits

Station	<1hr OBD pass	<1hr>50%	Looser ASM2525 Cutpoints	OBD Parameter Mismatch	OBD VIN Mismatch	Total
A		1		12		13
B		1		9		10
C		3	1	1	3	8
D	1	1	1	4		7
E	1		1		3	5
F		2		1	2	5
G		2	1		2	5
H			1	1	3	5
I				1	3	4
J	1	2	1			4
K		1	1		2	4
L			1	1	2	4
M			4			4

5.0 Quality Assurance Audits

The State and its contractor, Applus, perform all the Quality Assurance (QA) audits required by EPA. Following is an overview of Connecticut's audits and other State QA activities.

Overt Audits

DMV meets EPA's Overt Audit requirements through the Emission Test Monitoring Report (ETMR). Connecticut prepares ETMRs more frequently than required by EPA. Each month, at least two ETMRs are prepared on each station. In addition, Applus also performs overt audits. Connecticut also checks far more items than required by EPA. Connecticut conducted 1,978 audits in 2008, on approximately 250 stations. The number of stations that have reached operational capacity varied during the year. Both OBD and tailpipe audits occurred. Results of an overt audit will not shut down a station unless fraud is identified. In 2008, no stations were shut down due to overt audits.

Equipment Audits

DMV meets EPA's Equipment Audit requirements through the QA Audits. Connecticut conducts equipment audits much more frequently than required by EPA. High volume stations are checked monthly, while low volume stations are checked twice per year. In addition, Applus also performs equipment audits. Connecticut checks more equipment items than required by EPA. While an audit may require a station to discontinue tailpipe testing, it can continue OBD testing. Therefore, no stations were totally shut down due to a failed gas equipment audit. Results are presented below

Results of Equipment Audits

Parameter	2008
Total Equipment Audits	701
Total Stations that Failed Equipment Audit	90
Percentage of stations that failed an equipment (gas) audit[10]	30.5%
Number of stations totally shut down as a result of a failed equipment (gas) audit[10]	0
Percentage of stations shut down as a result of failed equipment (gas) audit[10]	0.0%

10 Stations were prohibited from performing tailpipe emission testing only until the equipment problem is resolved. Stations continue to perform OBD testing.

Covert Audits

DMV meets EPA's requirement for covert audits through its covert audit team. Connecticut exceeds EPA requirements for covert audit frequency. In 2008, Connecticut conducted 1,025 covert audits on the inspection stations. Warnings are routinely issued for false passes and suspensions are associated with violations found from trigger reports and data audits. The statutory and regulatory basis of the program does not allow Connecticut to issue fines or hold hearings to inspectors that falsely pass vehicles in covert audits. Instead, these inspectors are suspended from testing. Whether or not to suspend a station depends on DMV's assessment of the severity of the infraction.

Results of Covert Audits

Parameter	2008
# Stations receiving covert audits	252
The number of covert audits:	1025
Conducted with the vehicle set to fail	932
Resulting in a false pass	209
Total number of covert vehicles available for undercover audits over the year	8
Total number of covert auditors available for undercover audits over the year	16
Stations suspended as a result of covert audits	4
Stations suspended for other causes	3

Contractor QA Activities

Fraud Prevention Systems

- Secure IRIS recognition system – use of biometrics
- Trend analysis monitoring –
  - Test time duration
  - Initial and retest pass/fail rate
  - Repair costs
  - Waivers
  - Speed variability check
  - Gas cap failure analysis
  - After hours inspection analysis
  - Aborted inspection analysis

Analyzer QA Functions

- Sample system leak check
- Analyzer gas calibrations – Every 72 hours or system will lock out testing
- CDAS units require a two point calibration with BAR 97 high gas followed by BAR 97 low gas blend
- CDAS units have passed BAR 97 certification tests
- Dynamometer undergo a coast down every 72 hours
- Raw transport time verification
- Various other hardware checks are done every 72 hours
- Low sample flow, sample dilution checks etc.

Contractor QA Activities (cont.)

Inspection Results Analysis Audits – monitoring of performance indicators

- # of offline inspections
- Gas cap failures
- OBD failures
- After hours testing

Digital Audits – monitoring of equipment service and repair

- Leak check failures
- NO cell age
- Gas cap calibration failure
- NO response time
- CO response time
- O2 response time
- NO low calibration gas drift
- Bench low calibration failure rate
- Parasitic loss changes

Conclusion: Connecticut exceeds EPA's recommended levels of QA. The program performs accurate inspections.

6.0 Future Program Enhancements

DEP and DMV evaluate Connecticut's I/M program to ensure that it continues to operate accurately and effectively while guaranteeing the air quality benefits are achieved. Following are preliminary findings of an assessment by DEP and DMV of future options for Connecticut's program:

- Even though some states are dropping tailpipe tests, continuing tailpipe tests on pre-1996 vehicles in its I/M program maintains the air quality benefits necessary due to Clean Air Act requirements and statutory restrictions.
- Remote sensing devices (RSD) cannot be used as an alternative to periodic I/M tests. Use of RSD has been proposed as an alternative to tailpipe tests. However, RSD have severe drawbacks that limit their potential as an alternative to traditional tailpipe or OBDII emissions tests. Use of RSD is not a reliable method to identify individual high emitting vehicles. In addition, obtaining RSD emission measurements on a majority of the fleet by will cost much more than performing periodic I/M tests.
- Customer convenience can be enhanced by implementing innovative OBDII inspection strategies. Self service kiosks, wireless OBD and other innovative ways to perform OBDII inspections could be incorporated into Connecticut's next I/M program on a trial or pilot basis after analysis of pilot programs in other jurisdictions demonstrate the feasibility and success of these strategies. However, traditional inspection stations will likely be used to inspect most vehicles.
- Connecticut is also considering additional outreach efforts in other areas that may contribute to the effectiveness of the program, such as explaining the significance of the malfunction indicator light.

7.0 Conclusions

Following are the key conclusions from this analysis:

- ❖ Connecticut is failing the expected fraction of vehicles because they have evidence of being high emitters. Overall, 79,473 vehicles failed the initial inspection in 2008. This equates to 9.3% of the vehicles tested.
- ❖ Over 96% of the vehicles subject to I/M requirements comply with standards. 30% of the failures during the first quarter of 2008 test period did not receive a passing result or waiver by the end of 2008. Ultimately these vehicles must comply, since compliance with I/M standards is now a prerequisite to vehicle registration. The enforcement of Connecticut's I/M program exceeds the enforcement levels assumed in emissions modeling for the SIP.
- ❖ The State and its contractor, Applus, perform all the Quality Assurance (QA) audits required by EPA at frequencies that greatly exceed EPA's requirements. Connecticut exceeds EPA's recommended levels of QA. Evaluation of the data demonstrates that the program performs accurate inspections.
- ❖ Connecticut conducts extensive enforcement activities on the I/M program. Connecticut is a national model for these types of enforcement activities. Consequently, Connecticut's I/M program has little fraud.

Appendix A
EPA Checklist

Appendix A:
40 CFR Part 51 - Subpart S Inspection/Maintenance Program Requirements
51.366 - Data Analysis and Reporting Requirements

Reporting Requirement	**Reviewer Comments / Location in State Report**	**Has the State Met the Requirement?**
(a) Test Data Report The program shall submit to EPA by July of each year a report providing basic statistics on the testing program for January through December of the previous year, including:		
(1) The number of vehicles tested by model year and vehicle type;		
(2) By model year and vehicle type, the number and percentage of vehicles:		
(i) Failing initially, per test type;		
(ii) Failing the first retest per test type;		
(iii) Passing the first retest per test type;		
(iv) Initially failed vehicles passing the second or subsequent retest per test type;		
(v) Initially failed vehicles receiving a waiver; and		

Reporting Requirement	**Reviewer Comments / Location in State Report**	**Has the State Met the Requirement?**
(vi) Vehicles with no known final outcome (regardless of reason). *(vii)-(x) [Reserved]*		
(xi) Passing the on-board diagnostic check;		
(xii) Failing the on-board diagnostic check;		
(xiii) Failing the on-board diagnostic check and passing the tailpipe test (if applicable);		
(xiv) Failing the on-board diagnostic check and failing the tailpipe test (if applicable);		
(xv) Passing the on-board diagnostic check and failing the I/M gas cap evaporative system test (if applicable);		
(xvi) Failing the on-board diagnostic check and passing the I/M gas cap evaporative system test (if applicable);		
(xvii) Passing both the on-board diagnostic check and I/M gas cap evaporative system test (if applicable);		
(xviii) Failing both the on-board diagnostic check and I/M gas cap evaporative system test (if applicable);		
(xix) MIL is commanded on and no codes are stored;		
(xx) MIL is not commanded on and codes are stored;		

Reporting Requirement	Reviewer Comments / Location in State Report	Has the State Met the Requirement?
(xxi) MIL is commanded on and codes are stored;		
(xxii) MIL is not commanded on and codes are not stored;		
(xxiii) Readiness status indicates that the evaluation is not complete for any module supported by on-board diagnostic systems;		
(3) The initial test volume by model year and test station;		
(4) The initial test failure rate by model year and test station; and		
(5) The average increase or decrease in tailpipe emission levels for HC, CO, and NOX (if applicable) after repairs by model year and vehicle type for vehicles receiving a mass emissions test.		
(b) Quality assurance report. The program shall submit to EPA by July of each year a report providing basic statistics on the quality assurance program for January through December of the previous year, including:		
(1) The number of inspection stations and lanes:		

Reporting Requirement	**Reviewer Comments / Location in State Report**	**Has the State Met the Requirement?**
(i) Operating throughout the year; and		
(2) The number of inspection stations and lanes operating throughout the year:		
(i) Receiving overt performance audits in the year;		
(ii) Not receiving overt performance audits in the year;		
(iii) Receiving covert performance audits in the year;		
(iv) Not receiving covert performance audits in the year; and		
(v) That have been shut down as a result of overt performance audits;		
(3) The number of covert audits:		
(i) Conducted with the vehicle set to fail per test type;		
(ii) Conducted with the vehicle set to fail any combination of two or more test types;		
(iii) Resulting in a false pass per test type;		
(iv) Resulting in a false pass for any combination of two or more test types;		
(4) The number of inspectors and stations:		

Reporting Requirement	**Reviewer Comments / Location in State Report**	**Has the State Met the Requirement?**
(i) That were suspended, fired, or otherwise prohibited from testing as a result of covert audits;		
(ii) That were suspended, fired, or otherwise prohibited from testing for other causes; and		
(iii) That received fines;		
(5) The number of inspectors licensed or certified to conduct testing;		
(6) The number of hearings:		
(i) Held to consider adverse actions against inspectors and stations; and		
(ii) Resulting in adverse actions against inspectors and stations;		
(7) The total amount collected in fines from inspectors and stations by type of violation;		
(8) The total number of covert vehicles available for undercover audits over the year; and		
(9) The number of covert auditors available for undercover audits.		

Reporting Requirement	Reviewer Comments / Location in State Report	Has the State Met the Requirement?
(c) Quality control report The program shall submit to EPA by July of each year a report providing basic statistics on the quality control program for January through December of the previous year, including:		
(1) The number of emission testing sites and lanes in use in the program;		
(2) The number of equipment audits by station and lane;		
(3) The number and percentage of stations that have failed equipment audits; and		
(4) Number and percentage of stations and lanes shut down as a result of equipment audits.		
(d) Enforcement report. (1) All varieties of enforcement programs shall, at a minimum, submit to EPA by July of each year a report providing basic statistics on the enforcement program for January through December of the previous year, including:		
(i) An estimate of the number of vehicles subject to the inspection program, including the results of an analysis of the registration data base;		

Reporting Requirement	Reviewer Comments / Location in State Report	Has the State Met the Requirement?
(ii) The percentage of motorist compliance based upon a comparison of the number of valid final tests with the number of subject vehicles;		
(iii) The total number of compliance documents issued to inspection stations;		
(iv) The number of missing compliance documents;		
(v) The number of time extensions and other exemptions granted to motorists; and		
(vi) The number of compliance surveys conducted, number of vehicles surveyed in each, and the compliance rates found.		
(2) Registration denial based enforcement programs shall provide the following additional information:		
(i) A report of the program's efforts and actions to prevent motorists from falsely registering vehicles out of the program area or falsely changing fuel type or weight class on the vehicle registration, and the results of special studies to investigate the frequency of such activity; and		
(ii) The number of registration file audits, number of registrations reviewed, and compliance rates found in such audits.		

Reporting Requirement	Reviewer Comments / Location in State Report	Has the State Met the Requirement?
(3) Computer-matching based enforcement programs shall provide the following additional information:		
(i) The number and percentage of subject vehicles that were tested by the initial deadline, and by other milestones in the cycle;		
(ii) A report on the program's efforts to detect and enforce against motorists falsely changing vehicle classifications to circumvent program requirements, and the frequency of this type of activity; and		
(iii) The number of enforcement system audits, and the error rate found during those audits.		
(4) Sticker-based enforcement systems shall provide the following additional information:		
(i) A report on the program's efforts to prevent, detect, and enforce against sticker theft and counterfeiting, and the frequency of this type of activity;		
(ii) A report on the program's efforts to detect and enforce against motorists falsely changing vehicle classifications to circumvent program requirements, and the frequency of this type of activity; and		
(iii) The number of parking lot sticker audits conducted, the number of vehicles surveyed in each, and the		

Reporting Requirement	**Reviewer Comments / Location in State Report**	**Has the State Met the Requirement?**
noncompliance rate found during those audits.		
(e) Additional reporting requirements. In addition to the annual reports in paragraphs (a) through (d) of this section, programs shall submit to EPA by July of every other year, biennial reports addressing:		
(1) Any changes made in program design, funding, personnel levels, procedures, regulations, and legal authority, with detailed discussion and evaluation of the impact on the program of all such changes; and		
(2) Any weaknesses or problems identified in the program within the two-year reporting period, what steps have already been taken to correct those problems, the results of those steps, and any future efforts planned.		

Appendix B

2008 CT I/M Program Data

Appendix B
2008 CT I/M Program Data

Table of Contents

Table (a) (1). Number of Vehicles Tested by Model Year and Vehicle Type (Network Testing)			
Model Year	**Passenger Car (P)**	**Truck (T)**	**Total**
1981	0	1	1
1982	3	0	3
1983	14	6	20
1984	382	194	576
1985	2144	1450	3594
1986	3,284	2,346	5,630
1987	4,948	2,932	7,880
1988	5,045	4,290	9,335
1989	6,920	4,477	11,397
1990	8,666	3,673	12,339
1991	10,528	3,666	14,194
1992	13,919	5,089	19,008
1993	17,810	7,956	25,766
1994	21,172	12,507	33,679
1995	27,820	15,629	43,449
1996	30,275	17,200	47,475
1997	36,837	23,394	60,231
1998	42,626	27,986	70,612
1999	43,011	28,359	71,370
2000	31,613	21,420	53,033
2001	31,018	21,701	52,719
2002	86,853	65,107	151,960
2003	25,332	21,186	46,518
2004	75,794	80,701	156,495
2005	14,885	13,636	28,521
2006	16	3	19
2007	4	2	6
Grand Total	**540,919**	**384,911**	**925,830**

Table (a) (1). Number of Vehicles Tested by Model Year and Vehicle Type (Fleet Testing)			
Model Year	**Passenger Car (P)**	**Truck (T)**	**Total**
1981			
1982			
1983			
1984			
1985			
1986			
1987			
1988			
1989	1		1
1990			
1991		2	2
1992	2	1	3
1993		4	4
1994			
1995	13	2	15
1996	6	24	30
1997	78	72	150
1998	33	23	56
1999	177	345	522
2000	232	168	400
2001	156	188	344
2002	341	196	537
2003	13	15	28
2004	32	79	111
2005	84	21	105
2006			
2007			
Grand Total	**1,168**	**1,140**	**2,308**

Table (a) (2)(i). Initial Test Results (Network Testing)						
Test Type	Vehicle Type	Model Year	# Fail	# Pass	Total	% Fail
OBD	P	1995	1	2	3	33%
		1996	4141	21698	25839	16%
		1997	4625	27040	31665	15%
		1998	4622	32982	37604	12%
		1999	4304	34058	38362	11%
		2000	3592	23852	27444	13%
		2001	3342	23526	26868	12%
		2002	4611	77526	82137	6%
		2003	1606	21898	23504	7%
		2004	1934	71399	73333	3%
		2005	695	13065	13760	5%
	P Total		**33,473**	**347,046**	**380,519**	**9%**
	T	1996	2297	10914	13211	17%
		1997	2760	15299	18059	15%
		1998	3065	20097	23162	13%
		1999	2592	20556	23148	11%
		2000	2251	14944	17195	13%
		2001	2567	13983	16550	16%
		2002	4308	50623	54931	8%
		2003	1404	16488	17892	8%
		2004	2716	68762	71478	4%
		2005	839	11026	11865	7%
		2006		2	2	0%
	T Total		**24,799**	**242,694**	**267,493**	**9%**
OBD Total			**58,272**	**589,740**	**648,012**	**9%**

Table (a) (2)(i). Initial Test Results (Network Testing)						
Test Type	**Vehicle Type**	**Model Year**	**# Fail**	**# Pass**	**Total**	**% Fail**
PCTSI	P	1984	1	4	5	20%
		1985	6	15	21	29%
		1986	4	20	24	17%
		1987	16	33	49	33%
		1988	9	43	52	17%
		1989	8	76	84	10%
		1990	32	234	266	12%
		1991	64	386	450	14%
		1992	73	709	782	9%
		1993	143	1188	1331	11%
		1994	124	1089	1213	10%
		1995	159	1998	2157	7%
		1996	4	76	80	5%
		1997	6	106	112	5%
		1998	4	102	106	4%
		1999	4	163	167	2%
		2000		74	74	0%
		2001	5	122	127	4%
		2002	5	223	228	2%
		2003	4	61	65	6%
		2004	2	218	220	1%
		2005	2	174	176	1%
	P Total		**675**	**7,114**	**7,789**	**9%**
	T	1984	13	18	31	42%
		1985	87	94	181	48%
		1986	135	155	290	47%
		1987	96	229	325	30%
		1988	86	317	403	21%
		1989	111	356	467	24%
		1990	59	260	319	18%
		1991	56	320	376	15%
		1992	73	375	448	16%
		1993	112	1040	1152	10%
		1994	227	1712	1939	12%
		1995	296	2313	2609	11%
		1996	120	813	933	13%
		1997	129	1328	1457	9%
		1998	93	1158	1251	7%
		1999	93	1550	1643	6%
		2000	107	1194	1301	8%
		2001	189	1362	1551	12%
		2002	410	3642	4052	10%
		2003	111	1230	1341	8%
		2004	250	4595	4845	5%
		2005	9	698	707	1%
	T Total		**2,862**	**24,759**	**27,621**	**10%**
PCTSI Total			**3,537**	**31,873**	**35,410**	**10%**

Table (a) (2)(i). Initial Test Results (Network Testing)						
Test Type	**Vehicle Type**	**Model Year**	**# Fail**	**# Pass**	**Total**	**% Fail**
ASM	P	1982		2	2	0%
		1983	2	7	9	22%
		1984	82	154	236	35%
		1985	384	1097	1481	26%
		1986	532	1952	2484	21%
		1987	730	3056	3786	19%
		1988	643	3588	4231	15%
		1989	866	4899	5765	15%
		1990	1056	6109	7165	15%
		1991	1248	7294	8542	15%
		1992	1531	9742	11273	14%
		1993	1616	12857	14473	11%
		1994	1655	16406	18061	9%
		1995	1875	21572	23447	8%
		1996	34	670	704	5%
		1997	38	921	959	4%
		1998	33	874	907	4%
		1999	34	841	875	4%
		2000	15	746	761	2%
		2001	26	983	1009	3%
		2002	12	887	899	1%
		2003	7	464	471	1%
		2004	4	706	710	1%
		2005	1	380	381	0%
	P Total		**12,424**	**96,207**	**108,631**	**11%**
	T	1981		1	1	0%
		1983	2	2	4	50%
		1984	38	74	112	34%
		1985	215	620	835	26%
		1986	321	1102	1423	23%
		1987	374	1649	2023	18%
		1988	453	2679	3132	14%
		1989	475	2787	3262	15%
		1990	385	2381	2766	14%
		1991	307	2497	2804	11%
		1992	407	3596	4003	10%
		1993	507	5471	5978	8%
		1994	724	8630	9354	8%
		1995	805	10612	11417	7%
		1996	20	339	359	6%
		1997	17	462	479	4%
		1998	10	509	519	2%
		1999	8	450	458	2%
		2000	12	347	359	3%
		2001	4	531	535	1%
		2002	4	583	587	1%
		2003		253	253	0%
		2004		385	385	0%
		2005		215	215	0%
	T Total		**5,088**	**46,175**	**51,263**	**10%**
ASM Total			**17,512**	**142,382**	**159,894**	**11%**

Table (a) (2)(i). Initial Test Results (Network Testing)						
Test Type	**Vehicle Type**	**Model Year**	**# Fail**	**# Pass**	**Total**	**% Fail**
MSA	P	1985	0	4	4	0%
		1986	0	3	3	0%
		1987	0	4	4	0%
		1989	0	3	3	0%
		1990	0	1	1	0%
		1991	0	5	5	0%
		1992	0	1	1	0%
		1996	0	8	8	0%
		1997	0	5	5	0%
		1999	0	3	3	0%
		2000	0	1	1	0%
		2001	0	2	2	0%
		2002	0	7	7	0%
		2003	0	2	2	0%
		2004	0	7	7	0%
	P Total		**0**	**56**	**56**	**0%**
	T	1984	0	2	2	0%
		1985	2	12	14	14%
		1986	1	18	19	5%
		1987	1	15	16	6%
		1988	1	22	23	4%
		1989	1	15	16	6%
		1990	0	19	19	0%
		1991	2	24	26	8%
		1992	2	14	16	13%
		1993	3	34	37	8%
		1994	9	35	44	20%
		1995	5	63	68	7%
		1996	4	52	56	7%
		1997	4	100	104	4%
		1998	9	66	75	12%
		1999	3	115	118	3%
		2000	2	62	64	3%
		2001	3	51	54	6%
		2002	12	227	239	5%
		2003	2	56	58	3%
		2004	1	234	235	0%
		2005	0	18	18	0%
	T Total		**67**	**1,254**	**1,321**	**5%**
MSA Total			**67**	**1,310**	**1,377**	**5%**

Table (a) (2)(i). Initial Test Results (Network Testing)						
Test Type	Vehicle Type	Model Year	# Fail	# Pass	Total	% Fail
LMD	P	1982	0	1	1	0%
		1983	0	2	2	0%
		1984	4	27	31	13%
		1985	11	134	145	8%
		1986	2	40	42	5%
		1987	5	93	98	5%
		1988	0	3	3	0%
		1989	1	14	15	7%
		1990	1	19	20	5%
		1991	1	61	62	2%
		1992	3	35	38	8%
		1993	1	24	25	4%
		1994	0	11	11	0%
		1995	0	39	39	0%
		1996	1	60	61	2%
		1997	0	9	9	0%
		1998	1	6	7	14%
		1999	0	13	13	0%
		2000	0	5	5	0%
		2001	0	6	6	0%
		2002	0	26	26	0%
		2003	0	8	8	0%
		2004	0	39	39	0%
		2005	0	2	2	0%
	P Total		**31**	**677**	**708**	**4%**
	T	1984	0	5	5	0%
		1985	4	43	47	9%
		1986	2	64	66	3%
		1987	8	47	55	15%
		1988	1	77	78	1%
		1989	1	97	98	1%
		1990	1	64	65	2%
		1991	0	53	53	0%
		1992	0	106	106	0%
		1993	1	139	140	1%
		1994	2	200	202	1%
		1995	5	342	347	1%
		1996	3	381	384	1%
		1997	2	575	577	0%
		1998	0	257	257	0%
		1999	1	574	575	0%
		2000	2	338	340	1%
		2001	2	408	410	0%
		2002	8	1354	1362	1%
		2003	5	359	364	1%
		2004	7	1315	1322	1%
		2005	0	117	117	0%
	T Total		**55**	**6,915**	**6,970**	**1%**
LMD Total			**86**	**7,592**	**7,678**	**1%**
Grand Total			**79,474**	**772,897**	**852,371**	**9%**

Table (a) (2)(i). Initial Test Results (Fleet Testing)						
Test Type	**Vehicle Type**	**Model Year**	**# Fail**	**# Pass**	**Total**	**% Fail**
OBD	P	1995	0	0	0	
		1996	1	4	5	20%
		1997	3	73	76	4%
		1998	0	33	33	0%
		1999	3	172	175	2%
		2000	0	232	232	0%
		2001	1	153	154	1%
		2002	2	336	338	1%
		2003	0	13	13	0%
		2004	1	31	32	3%
		2005	3	79	82	4%
	P Total		**14**	**1,126**	**1,140**	**1%**
	T	1996	0	18	18	0%
		1997	0	70	70	0%
		1998	1	16	17	6%
		1999	12	291	303	4%
		2000	3	125	128	2%
		2001	3	142	145	2%
		2002	5	146	151	3%
		2003	0	11	11	0%
		2004	0	55	55	0%
		2005	0	16	16	0%
		2006				
	T Total		**24**	**890**	**914**	**3%**
OBD Total			**38**	**2,016**	**2,054**	**2%**

Table (a) (2)(i). Initial Test Results (Fleet Testing)						
Test Type	**Vehicle Type**	**Model Year**	**# Fail**	**# Pass**	**Total**	**% Fail**
PCTSI	P	1984	0	0	0	
		1985	0	0	0	
		1986	0	0	0	
		1987	0	0	0	
		1988	0	0	0	
		1989	0	1	1	0%
		1990	0	0	0	
		1991	0	0	0	
		1992	0	2	2	0%
		1993	0	0	0	
		1994	0	0	0	
		1995	1	11	12	8%
		1996	0	0	0	
		1997	0	0	0	
		1998	0	0	0	
		1999	0	0	0	
		2000	0	0	0	
		2001	0	1	1	0%
		2002	0	2	2	0%
		2003	0	0	0	
		2004	0	0	0	
		2005	0	0	0	
	P Total		**1**	**17**	**18**	**6%**
	T	1984	0	0	0	
		1985	0	0	0	
		1986	0	0	0	
		1987	0	0	0	
		1988	0	0	0	
		1989	0	0	0	
		1990	0	0	0	
		1991	0	2	2	0%
		1992	0	1	1	0%
		1993	1	2	3	33%
		1994	0	0	0	
		1995	0	2	2	0%
		1996	0	6	6	0%
		1997	0	2	2	0%
		1998	1	4	5	20%
		1999	1	30	31	3%
		2000	2	33	35	6%
		2001	1	39	40	3%
		2002	1	39	40	3%
		2003	0	4	4	0%
		2004	0	24	24	0%
		2005	0	5	5	0%
	T Total		**7**	**193**	**200**	**4%**
PCTSI Total			**8**	**210**	**218**	**4%**

Table (a) (2)(ii, iii). First Retest Results (Network Tests)							
Test Type	**Vehicle Type**	**Model Year**	**# Fail**	**# Pass**	**Total**	**% Fail**	**% Pass**
OBD	P	1996	544	2,543	3,087	18%	82%
		1997	578	2,947	3,525	16%	84%
		1998	476	3,119	3,595	13%	87%
		1999	387	2,839	3,226	12%	88%
		2000	381	2,604	2,985	13%	87%
		2001	274	2,463	2,737	10%	90%
		2002	192	3,216	3,408	6%	94%
		2003	67	1,148	1,215	6%	94%
		2004	45	1,403	1,448	3%	97%
		2005	6	550	556	1%	99%
		2006	0	1	1	0%	100%
	P Total		**2,950**	**22,833**	**25,783**	**11%**	**89%**
	T	1996	334	1,450	1,784	19%	81%
		1997	374	1,855	2,229	17%	83%
		1998	324	1,998	2,322	14%	86%
		1999	257	1,845	2,102	12%	88%
		2000	226	1,629	1,855	12%	88%
		2001	247	1,969	2,216	11%	89%
		2002	182	3,186	3,368	5%	95%
		2003	49	1,072	1,121	4%	96%
		2004	69	2,069	2,138	3%	97%
		2005	10	685	695	1%	99%
		2006	0	0	0	0%	100%
	T Total		**2,072**	**17,758**	**19,830**	**10%**	**90%**
OBD Total			**5,022**	**40,591**	**45,613**	**11%**	**89%**

Table (a) (2)(ii, iii). First Retest Results (Network Tests)							
Test Type	**Vehicle Type**	**Model Year**	**# Fail**	**# Pass**	**Total**	**% Fail**	**% Pass**
PCTSI	P	1985	0	4	4	0%	100%
		1986	2	3	5	40%	60%
		1987	3	11	14	21%	79%
		1988	5	6	11	45%	55%
		1989	0	7	7	0%	100%
		1990	7	19	26	27%	73%
		1991	10	48	58	17%	83%
		1992	15	50	65	23%	77%
		1993	14	113	127	11%	89%
		1994	16	96	112	14%	86%
		1995	19	124	143	13%	87%
		1996	1	4	5	20%	80%
		1997	3	3	6	50%	50%
		1998	0	2	2	0%	100%
		1999	1	2	3	33%	67%
		2000	0	0	0	0%	100%
		2001	0	3	3	0%	100%
		2002	0	4	4	0%	100%
		2003	1	1	2	50%	50%
		2004	1	1	2	50%	50%
		2005	1	1	2	50%	50%
	P Total		**99**	**502**	**601**	**16%**	**84%**
	T	1984	5	6	11	45%	55%
		1985	28	48	76	37%	63%
		1986	40	68	108	37%	63%
		1987	23	62	85	27%	73%
		1988	22	64	86	26%	74%
		1989	19	73	92	21%	79%
		1990	15	39	54	28%	72%
		1991	14	39	53	26%	74%
		1992	14	48	62	23%	77%
		1993	13	89	102	13%	87%
		1994	34	156	190	18%	82%
		1995	63	216	279	23%	77%
		1996	14	98	112	13%	88%
		1997	14	99	113	12%	88%
		1998	7	82	89	8%	92%
		1999	7	75	82	9%	91%
		2000	3	97	100	3%	97%
		2001	6	174	180	3%	97%
		2002	12	374	386	3%	97%
		2003	3	101	104	3%	97%
		2004	6	233	239	3%	97%
		2005	0	9	9	0%	100%
	T Total		**362**	**2,250**	**2,612**	**14%**	**86%**
PCTSI Total			**461**	**2,752**	**3,213**	**14%**	**86%**

Table (a) (2)(ii, iii). First Retest Results (Network Tests)							
Test Type	Vehicle Type	Model Year	# Fail	# Pass	Total	% Fail	% Pass
ASM	P	1983	1	2	3	33%	67%
		1984	28	38	66	42%	58%
		1985	120	192	312	38%	62%
		1986	188	286	474	40%	60%
		1987	232	415	647	36%	64%
		1988	170	363	533	32%	68%
		1989	209	530	739	28%	72%
		1990	269	608	877	31%	69%
		1991	312	709	1,021	31%	69%
		1992	373	892	1,265	29%	71%
		1993	402	953	1,355	30%	70%
		1994	323	1,065	1,388	23%	77%
		1995	335	1,262	1,597	21%	79%
		1996	19	27	46	41%	59%
		1997	9	22	31	29%	71%
		1998	9	20	29	31%	69%
		1999	12	17	29	41%	59%
		2000	6	11	17	35%	65%
		2001	13	13	26	50%	50%
		2002	3	10	13	23%	77%
		2003	1	7	8	13%	88%
		2004	1	3	4	25%	75%
	P Total		**3,035**	**7,445**	**10,480**	**29%**	**71%**
	T	1983	0	2	2	0%	100%
		1984	5	22	27	19%	81%
		1985	39	152	191	20%	80%
		1986	67	219	286	23%	77%
		1987	64	249	313	20%	80%
		1988	77	338	415	19%	81%
		1989	78	354	432	18%	82%
		1990	59	289	348	17%	83%
		1991	59	213	272	22%	78%
		1992	54	323	377	14%	86%
		1993	50	415	465	11%	89%
		1994	77	571	648	12%	88%
		1995	75	659	734	10%	90%
		1996	5	12	17	29%	71%
		1997	6	10	16	38%	63%
		1998	2	5	7	29%	71%
		1999	6	3	9	67%	33%
		2000	3	14	17	18%	82%
		2001	2	4	6	33%	67%
		2002	1	2	3	33%	67%
		2003	0	1	1	0%	100%
	T Total		**729**	**3,857**	**4,586**	**16%**	**84%**
ASM Total			**3,764**	**11,302**	**15,066**	**25%**	**75%**

Table (a) (2)(ii, iii). First Retest Results (Network Tests)							
Test Type	**Vehicle Type**	**Model Year**	**# Fail**	**# Pass**	**Total**	**% Fail**	**% Pass**
MSA	T	1985	0	1	1	0%	100%
		1986	0	1	1	0%	100%
		1987	0	1	1	0%	100%
		1988	1	1	2	50%	50%
		1990	0	1	1	0%	100%
		1991	1	0	1	100%	0%
		1993	0	2	2	0%	100%
		1994	4	5	9	44%	56%
		1995	0	6	6	0%	100%
		1996	2	2	4	50%	50%
		1997	2	4	6	33%	67%
		1998	2	3	5	40%	60%
		1999	0	1	1	0%	100%
		2000	0	3	3	0%	100%
		2001	1	3	4	25%	75%
		2002	7	5	12	58%	42%
		2003	0	3	3	0%	100%
		2004	0	2	2	0%	100%
	T Total		**20**	**44**	**64**	**31%**	**69%**
MSA Total			**20**	**44**	**64**	**31%**	**69%**
LMD	P	1984	1	5	6	17%	83%
		1985	6	4	10	60%	40%
		1986	0	3	3	0%	100%
		1987	4	0	4	100%	0%
		1989	0	1	1	0%	100%
		1990	0	1	1	0%	100%
		1991	0	1	1	0%	100%
		1992	0	1	1	0%	100%
		1998	0	1	1	0%	100%
	P Total		**11**	**17**	**28**	**39%**	**61%**
	T	1985	2	1	3	67%	33%
		1986	2	1	3	67%	33%
		1987	1	3	4	25%	75%
		1993	0	1	1	0%	100%
		1994	0	3	3	0%	100%
		1995	3	3	6	50%	50%
		1996	0	3	3	0%	100%
		1997	0	1	1	0%	100%
		1999	0	1	1	0%	100%
		2000	0	2	2	0%	100%
		2001	1	2	3	33%	67%
		2002	0	6	6	0%	100%
		2003	1	5	6	17%	83%
		2004	0	6	6	0%	100%
	T Total		**10**	**38**	**48**	**21%**	**79%**
LMD Total			**21**	**55**	**76**	**28%**	**72%**
Grand Total			**9,372**	**54,758**	**64,130**	**15%**	**85%**

Table (a) (2)(iv). Second and Later Retest Results (Network Tests)							
Test Type	**Vehicle Type**	**Model Year**	**# Fail**	**# Pass**	**Total**	**% Fail**	**% Pass**
OBD	P	1996	136	283	419	32%	68%
		1997	169	340	509	33%	67%
		1998	91	277	368	25%	75%
		1999	63	244	307	21%	79%
		2000	53	258	311	17%	83%
		2001	30	193	223	13%	87%
		2002	19	108	127	15%	85%
		2003	10	44	54	19%	81%
		2004	4	26	30	13%	87%
		2005	2	4	6	33%	67%
	P Total		**577**	**1,777**	**2,354**	**25%**	**75%**
	T	1996	97	206	303	32%	68%
		1997	90	228	318	28%	72%
		1998	68	211	279	24%	76%
		1999	44	160	204	22%	78%
		2000	29	143	172	17%	83%
		2001	35	144	179	20%	80%
		2002	18	115	133	14%	86%
		2003	4	36	40	10%	90%
		2004	5	41	46	11%	89%
		2005	4	6	10	40%	60%
	T Total		**394**	**1,290**	**1,684**	**23%**	**77%**
OBD Total			**971**	**3,067**	**4,038**	**24%**	**76%**

Table (a) (2)(iv). Second and Later Retest Results (Network Tests)							
Test Type	**Vehicle Type**	**Model Year**	**# Fail**	**# Pass**	**Total**	**% Fail**	**% Pass**
PCTSI	P	1985	0	1	1	0%	100%
		1987	0	1	1	0%	100%
		1988	3	3	6	50%	50%
		1990	4	4	8	50%	50%
		1991	0	10	10	0%	100%
		1992	11	12	23	48%	52%
		1993	10	11	21	48%	52%
		1994	2	9	11	18%	82%
		1995	3	14	17	18%	82%
		1996	0	3	3	0%	100%
		1997	2	0	2	100%	0%
		1999	0	1	1	0%	100%
		2003	2	0	2	100%	0%
		2004	0	1	1	0%	100%
		2005	1	1	2	50%	50%
	P Total		**38**	**71**	**109**	**35%**	**65%**
	T	1984	0	1	1	0%	100%
		1985	23	28	51	45%	55%
		1986	22	26	48	46%	54%
		1987	7	20	27	26%	74%
		1988	14	17	31	45%	55%
		1989	12	10	22	55%	45%
		1990	11	13	24	46%	54%
		1991	9	8	17	53%	47%
		1992	4	8	12	33%	67%
		1993	3	9	12	25%	75%
		1994	12	23	35	34%	66%
		1995	36	50	86	42%	58%
		1996	6	14	20	30%	70%
		1997	4	15	19	21%	79%
		1998	3	4	7	43%	57%
		1999	5	6	11	45%	55%
		2000	2	3	5	40%	60%
		2001	0	3	3	0%	100%
		2002	3	12	15	20%	80%
		2003	0	3	3	0%	100%
		2004	0	5	5	0%	100%
	T Total		**176**	**278**	**454**	**39%**	**61%**
PCTSI Total			**214**	**349**	**563**	**38%**	**62%**

Table (a) (2)(iv). Second and Later Retest Results (Network Tests)							
Test Type	**Vehicle Type**	**Model Year**	**# Fail**	**# Pass**	**Total**	**% Fail**	**% Pass**
ASM	P	1984	22	16	38	58%	42%
		1985	81	82	163	50%	50%
		1986	120	129	249	48%	52%
		1987	173	167	340	51%	49%
		1988	83	126	209	40%	60%
		1989	138	168	306	45%	55%
		1990	136	166	302	45%	55%
		1991	168	211	379	44%	56%
		1992	230	241	471	49%	51%
		1993	211	267	478	44%	56%
		1994	163	213	376	43%	57%
		1995	185	232	417	44%	56%
		1996	11	12	23	48%	52%
		1997	6	7	13	46%	54%
		1998	0	7	7	0%	100%
		1999	15	10	25	60%	40%
		2000	8	7	15	53%	47%
		2001	7	10	17	41%	59%
		2002	1	3	4	25%	75%
		2003	0	1	1	0%	100%
	P Total		**1,758**	**2,075**	**3,833**	**46%**	**54%**
	T	1984	1	4	5	20%	80%
		1985	22	25	47	47%	53%
		1986	42	57	99	42%	58%
		1987	34	47	81	42%	58%
		1988	49	70	119	41%	59%
		1989	37	51	88	42%	58%
		1990	30	47	77	39%	61%
		1991	19	44	63	30%	70%
		1992	28	37	65	43%	57%
		1993	25	41	66	38%	62%
		1994	20	58	78	26%	74%
		1995	25	50	75	33%	67%
		1996	8	3	11	73%	27%
		1997	5	7	12	42%	58%
		1998	3	5	8	38%	63%
		1999	4	3	7	57%	43%
		2000	3	3	6	50%	50%
		2001	1	2	3	33%	67%
	T Total		**356**	**554**	**910**	**39%**	**61%**
ASM Total			**2,114**	**2,629**	**4,743**	**45%**	**55%**

Table (a) (2)(iv). Second and Later Retest Results (Network Tests)							
Test Type	**Vehicle Type**	**Model Year**	**# Fail**	**# Pass**	**Total**	**% Fail**	**% Pass**
MSA	**P**	1997	0	1	1	0%	100%
	P Total			**1**	**1**	**0%**	**100%**
	T	1988	0	1	1	0%	100%
		1991	0	1	1	0%	100%
		1993	0	1	1	0%	100%
		1994	4	1	5	80%	20%
		1996	0	3	3	0%	100%
		1997	1	3	4	25%	75%
		1998	3	2	5	60%	40%
		2000	0	1	1	0%	100%
		2001	5	1	6	83%	17%
		2002	5	8	13	38%	62%
	T Total		**18**	**22**	**40**	**45%**	**55%**
MSA Total			**18**	**23**	**41**	**44%**	**56%**
LMD	**P**	1985	2	1	3	67%	33%
		1987	2	3	5	40%	60%
	P Total		**4**	**4**	**8**	**50%**	**50%**
	T	1985	3	1	4	75%	25%
		1986	2	1	3	67%	33%
		1987	2	0	2	100%	0%
		1995	1	1	2	50%	50%
		2001	1	0	1	100%	0%
	T Total		**9**	**3**	**12**	**75%**	**25%**
LMD Total			**13**	**7**	**20**	**65%**	**35%**
Grand Total			**3,330**	**6,075**	**9,405**	**35%**	**65%**

Table (a)(2)(v) Waivers Issued			
Model Year	**Passenger Car (P)**	**Truck (T)**	**Grand Total**
1984	2	0	**2**
1985	7	1	**8**
1986	9	3	**12**
1987	10	2	**12**
1988	8	3	**11**
1989	7	1	**8**
1990	3	2	**5**
1991	6	2	**8**
1992	9	0	**9**
1993	13	0	**13**
1994	8	3	**11**
1995	15	0	**15**
1996	36	17	**53**
1997	49	23	**72**
1998	40	28	**68**
1999	23	12	**35**
2000	33	8	**41**
2001	24	24	**48**
2002	19	11	**30**
2003	4	4	**8**
2004	0	3	**3**
Total	**325**	**147**	**472**

Table (a) (2)(vi). Vehicles with No Final Pass								
Vehicle Type	Model Year	# of Initial Tests	Fail Initial Test	Pass 1st Retest	Pass 2nd+ Retest	Pass/Fail Total 2007	# That do not Pass	% No Final Pass
P	1981	0	0	0	0	0	0	0.0%
	1982	3	0	0	0	0	0	0.0%
	1983	11	2	2	0	2	0	0.0%
	1984	272	87	43	16	59	28	10.3%
	1985	1,651	401	200	84	284	117	7.1%
	1986	2,553	538	292	129	421	117	4.6%
	1987	3,937	751	426	171	597	154	3.9%
	1988	4,286	652	369	129	498	154	3.6%
	1989	5,867	875	538	168	706	169	2.9%
	1990	7,452	1,089	628	170	798	291	3.9%
	1991	9,059	1,313	758	221	979	334	3.7%
	1992	12,094	1,607	943	253	1,196	411	3.4%
	1993	15,829	1,760	1,066	278	1,344	416	2.6%
	1994	19,285	1,779	1,161	222	1,383	396	2.1%
	1995	25,646	2,035	1,386	246	1,632	403	1.6%
	1996	26,692	4,180	2,574	298	2,872	1,308	4.9%
	1997	32,750	4,669	2,972	348	3,320	1,349	4.1%
	1998	38,624	4,660	3,142	284	3,426	1,234	3.2%
	1999	39,420	4,342	2,858	255	3,113	1,229	3.1%
	2000	28,285	3,607	2,615	265	2,880	727	2.6%
	2001	28,012	3,373	2,479	203	2,682	691	2.5%
	2002	83,297	4,628	3,230	111	3,341	1,287	1.5%
	2003	24,050	1,617	1,156	45	1,201	416	1.7%
	2004	74,309	1,940	1,407	27	1,434	506	0.7%
	2005	14,319	698	551	5	556	142	1.0%
	2006	15	1	1	0	1	0	0.0%
	2007	4	1	0	0	0	1	25.0%
P Total		**497,722**	**46,605**	**30,797**	**3,928**	**34,725**	**11,880**	**2.4%**

Table (a) (2)(vi). Vehicles with No Final Pass								
Vehicle Type	**Model Year**	**# of Initial Tests**	**Fail Initial Test**	**Pass 1st Retest**	**Pass 2nd+ Retest**	**Pass/Fail Total 2007**	**# That do not Pass**	**% No Final Pass**
T	1981	1	0	0	0	0	0	0.0%
	1982	0	0	0	0	0	0	#DIV/0!
	1983	4	2	2	0	2	0	0.0%
	1984	150	51	28	5	33	18	12.0%
	1985	1,077	308	202	54	256	52	4.8%
	1986	1,798	459	289	84	373	86	4.8%
	1987	2,419	479	315	67	382	97	4.0%
	1988	3,636	541	403	88	491	50	1.4%
	1989	3,843	588	427	61	488	100	2.6%
	1990	3,169	445	329	60	389	56	1.8%
	1991	3,259	365	252	53	305	60	1.8%
	1992	4,573	482	371	45	416	66	1.4%
	1993	7,307	623	507	51	558	65	0.9%
	1994	11,539	962	735	82	817	145	1.3%
	1995	14,441	1,111	884	101	985	126	0.9%
	1996	14,943	2,444	1,565	226	1,791	653	4.4%
	1997	20,676	2,912	1,969	253	2,222	690	3.3%
	1998	25,264	3,177	2,088	222	2,310	867	3.4%
	1999	25,942	2,697	1,925	169	2,094	603	2.3%
	2000	19,259	2,374	1,745	150	1,895	479	2.5%
	2001	19,100	2,765	2,152	150	2,302	463	2.4%
	2002	61,171	4,742	3,573	135	3,708	1,034	1.7%
	2003	19,908	1,522	1,182	39	1,221	301	1.5%
	2004	78,265	2,974	2,310	46	2,356	618	0.8%
	2005	12,922	848	694	6	700	0	0.0%
	2006	3	0	0	0	0	0	0.0%
	2007	2	0	0	0	0	0	0.0%
T Total		**354,671**	**32,871**	**23,947**	**2,147**	**26,094**	**6,777**	**1.9%**
Grand Total		**852,393**	**79,476**	**54,744**	**6,075**	**60,819**	**18,657**	**2.2%**

Table (a) (2)(xi, xii). Passing and Failing OBD Tests (Network Tests)					
Vehicle Type	**Model Year**	**Fail OBD**	**Pass OBD**	**Grand Total**	**% Fail**
P	1996	4,821	24,524	29,345	16%
	1997	5,372	30,327	35,699	15%
	1998	5,189	36,378	41,567	12%
	1999	4,754	37,141	41,895	11%
	2000	4,026	26,714	30,740	13%
	2001	3,646	26,182	29,828	12%
	2002	4,822	80,850	85,672	6%
	2003	1,683	23,090	24,773	7%
	2004	1,983	72,828	74,811	3%
	2005	703	13,619	14,322	5%
	2006	1	8	9	11%
	2007	1	2	3	33%
P Total		**37,001**	**371,663**	**408,664**	**9%**
T	1996	2,728	12,570	15,298	18%
	1997	3,224	17,382	20,606	16%
	1998	3,457	22,306	25,763	13%
	1999	2,893	22,561	25,454	11%
	2000	2,506	16,716	19,222	13%
	2001	2,849	16,096	18,945	15%
	2002	4,508	53,924	58,432	8%
	2003	1,457	17,596	19,053	8%
	2004	2,790	70,872	73,662	4%
	2005	853	11,717	12,570	7%
	2006	0	2	2	0%
T Total		**27,265**	**261,742**	**289,007**	**9%**
Grand Total		**64,266**	**633,405**	**697,671**	**9%**

Table (a) (2) (xix, xxi, xxii). # and % Fail for MIL Commanded On (Network Tests)

Vehicle Type	Model Year	MIL Command On Result (#)				Total
		MIL Not Commanded-On	No Communication	MIL Commanded-On with codes	MIL Commanded-On without codes	
P	1996	25,230	242	3,833	40	29,345
	1997	31,148	322	4,207	22	35,699
	1998	37,234	236	4,081	16	41,567
	1999	38,097	243	3,529	26	41,895
	2000	27,422	333	2,968	17	30,740
	2001	27,026	202	2,578	22	29,828
	2002	82,117	227	3,304	24	85,672
	2003	23,652	75	1,032	14	24,773
	2004	73,492	275	1,033	11	74,811
	2005	14,038	171	113	0	14,322
	2006	9	0	0	0	9
	2007	2	1	0	0	3
P Total		**379,467**	**2,327**	**26,678**	**192**	**408,664**
T	1996	13,036	114	2,127	21	15,298
	1997	17,993	137	2,469	7	20,606
	1998	22,993	203	2,556	11	25,763
	1999	23,092	342	1,989	31	25,454
	2000	17,182	415	1,610	15	19,222
	2001	16,757	327	1,843	18	18,945
	2002	54,969	539	2,888	36	58,432
	2003	17,889	301	851	12	19,053
	2004	71,683	904	1,067	8	73,662
	2005	12,339	126	105	0	12,570
	2006	2	0	0	0	2
T Total		**267,935**	**3,408**	**17,505**	**159**	**289,007**
Grand Total		**647,402**	**5,735**	**44,183**	**351**	**697,671**

Table (a) (2) (xix, xxi, xxii). # and % Fail for MIL Commanded On

		MIL Command On Result (%)			
Vehicle Type	**Model Year**	**MIL Not Commanded-On**	**No Communication**	**MIL Commanded-On with codes**	**MIL Commanded-On without codes**
P	1996	86.0%	0.8%	13.1%	0.1%
	1997	87.3%	0.9%	11.8%	0.1%
	1998	89.6%	0.6%	9.8%	0.0%
	1999	90.9%	0.6%	8.4%	0.1%
	2000	89.2%	1.1%	9.7%	0.1%
	2001	90.6%	0.7%	8.6%	0.1%
	2002	95.9%	0.3%	3.9%	0.0%
	2003	95.5%	0.3%	4.2%	0.1%
	2004	98.2%	0.4%	1.4%	0.0%
	2005	98.0%	1.2%	0.8%	0.0%
	2006	100.0%	0.0%	0.0%	0.0%
	2007	66.7%	33.3%	0.0%	0.0%
P Total		**92.9%**	**0.6%**	**6.5%**	**0.0%**
T	1996	85.2%	0.7%	13.9%	0.1%
	1997	87.3%	0.7%	12.0%	0.0%
	1998	89.2%	0.8%	9.9%	0.0%
	1999	90.7%	1.3%	7.8%	0.1%
	2000	89.4%	2.2%	8.4%	0.1%
	2001	88.5%	1.7%	9.7%	0.1%
	2002	94.1%	0.9%	4.9%	0.1%
	2003	97.3%	1.2%	1.4%	0.0%
	2004	98.2%	1.0%	0.8%	0.0%
	2005	100.0%	0.0%	0.0%	0.0%
	2006	92.7%	1.2%	6.1%	0.1%
T Total		**92.7%**	**1.2%**	**6.1%**	**0.1%**
Grand Total		**92.8%**	**0.8%**	**6.3%**	**0.1%**

Table (a) (2)(xxiii). # and % Not Ready (Network Tests)						
Vehicle Type	**Model Year**	**Fail Readiness**	**Exempted from Readiness**	**Pass Readiness**	**Total**	**% Fail Readiness**
P	1996	799	6,606	21,698	29,103	2.7%
	1997	1,407	2,244	31,726	35,377	4.0%
	1998	1,243	2,866	37,222	41,331	3.0%
	1999	1,140	203	40,309	41,652	2.7%
	2000	1,017	419	28,971	30,407	3.3%
	2001	1,213	391	28,022	29,626	4.1%
	2002	1,573	3	83,869	85,445	1.8%
	2003	570	809	23,319	24,698	2.3%
	2004	767	0	73,769	74,536	1.0%
	2005	552	0	13,599	14,151	3.9%
	2006	1	0	8	9	11.1%
	2007	0	0	2	2	0.0%
P Total		**10,282**	**13,541**	**382,514**	**406,337**	**2.5%**
T	1996	617	1,148	13,419	15,184	4.1%
	1997	818	457	19,194	20,469	4.0%
	1998	879	364	24,317	25,560	3.4%
	1999	755	209	24,148	25,112	3.0%
	2000	628	23	18,156	18,807	3.3%
	2001	921	761	16,936	18,618	4.9%
	2002	1,320	284	56,289	57,893	2.3%
	2003	372	1,099	17,281	18,752	2.0%
	2004	881	109	71,768	72,758	1.2%
	2005	624	0	11,820	12,444	5.0%
	2006	0	0	2	2	0.0%
T Total		**7,815**	**4,454**	**273,330**	**285,599**	**2.7%**
Grand Total		**18,097**	**17,995**	**655,844**	**691,936**	**2.6%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000001	1984		1	1	0%
	1985	3	4	7	43%
	1986		5	5	0%
	1987	2	11	13	15%
	1988	1	13	14	7%
	1989	2	13	15	13%
	1990		18	18	0%
	1991	2	16	18	11%
	1992	2	19	21	10%
	1993		49	49	0%
	1994	1	35	36	3%
	1995	1	73	74	1%
	1996	5	58	63	8%
	1997	12	92	104	12%
	1998	11	115	126	9%
	1999	10	119	129	8%
	2000	3	74	77	4%
	2001	8	74	82	10%
	2002	16	296	312	5%
	2003	3	74	77	4%
	2004	9	303	312	3%
	2005		20	20	0%
ST0000001 Total		**91**	**1482**	**1573**	**6%**
ST0000014	1986		3	3	0%
	1987	1	4	5	20%
	1988	1	6	7	14%
	1989		10	10	0%
	1990	1	4	5	20%
	1991	1	5	6	17%
	1992	2	7	9	22%
	1993	2	12	14	14%
	1994		17	17	0%
	1995	2	20	22	9%
	1996	3	27	30	10%
	1997	4	26	30	13%
	1998	7	39	46	15%
	1999	1	34	35	3%
	2000	3	25	28	11%
	2001	6	20	26	23%
	2002	6	142	148	4%
	2003	4	30	34	12%
	2004		149	149	0%
	2005	6	47	53	11%
ST0000014 Total		**50**	**627**	**677**	**7%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000015	1986		3	3	0%
	1987		4	4	0%
	1988	1	2	3	33%
	1989		7	7	0%
	1990		6	6	0%
	1991	1	4	5	20%
	1992	1	11	12	8%
	1993		8	8	0%
	1994	1	13	14	7%
	1995	2	17	19	11%
	1996	1	23	24	4%
	1997	3	22	25	12%
	1998	1	35	36	3%
	1999	2	34	36	6%
	2000	1	30	31	3%
	2001	3	31	34	9%
	2002	3	47	50	6%
	2003	1	25	26	4%
	2004	1	75	76	1%
	2005		10	10	0%
ST0000015 Total		**22**	**407**	**429**	**5%**
ST0000017	1984	1		1	100%
	1985	1	6	7	14%
	1986	4	10	14	29%
	1987		8	8	0%
	1988	3	9	12	25%
	1989	2	18	20	10%
	1990	1	20	21	5%
	1991	2	18	20	10%
	1992		31	31	0%
	1993	6	36	42	14%
	1994	4	47	51	8%
	1995	5	64	69	7%
	1996	3	68	71	4%
	1997	10	97	107	9%
	1998	8	101	109	7%
	1999	10	150	160	6%
	2000	4	106	110	4%
	2001	13	107	120	11%
	2002	19	406	425	4%
	2003	3	109	112	3%
	2004	7	448	455	2%
	2005	2	72	74	3%
ST0000017 Total		**108**	**1931**	**2039**	**5%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000020	1984	1		1	100%
	1985	1	12	13	8%
	1986	4	19	23	17%
	1987	10	18	28	36%
	1988	6	38	44	14%
	1989	7	46	53	13%
	1990	10	41	51	20%
	1991	13	54	67	19%
	1992	6	71	77	8%
	1993	11	120	131	8%
	1994	17	156	173	10%
	1995	16	208	224	7%
	1996	40	196	236	17%
	1997	48	256	304	16%
	1998	53	306	359	15%
	1999	64	352	416	15%
	2000	30	285	315	10%
	2001	47	296	343	14%
	2002	60	753	813	7%
	2003	19	316	335	6%
	2004	52	932	984	5%
	2005	10	264	274	4%
ST0000020 Total		**525**	**4739**	**5264**	**10%**
ST0000023	1984	1		1	100%
	1985	5	10	15	33%
	1986	6	26	32	19%
	1987	9	27	36	25%
	1988	13	38	51	25%
	1989	13	48	61	21%
	1990	10	52	62	16%
	1991	16	72	88	18%
	1992	17	85	102	17%
	1993	12	148	160	8%
	1994	24	177	201	12%
	1995	32	246	278	12%
	1996	33	250	283	12%
	1997	45	280	325	14%
	1998	55	331	386	14%
	1999	45	355	400	11%
	2000	37	237	274	14%
	2001	30	249	279	11%
	2002	49	833	882	6%
	2003	25	245	270	9%
	2004	34	899	933	4%
	2005	10	123	133	8%
	2006	1		1	100%
ST0000023 Total		**522**	**4731**	**5253**	**10%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000034	1984		1	1	0%
	1985	3	10	13	23%
	1986	1	14	15	7%
	1987	6	21	27	22%
	1988	2	30	32	6%
	1989	2	29	31	6%
	1990	2	22	24	8%
	1991	11	35	46	24%
	1992	6	40	46	13%
	1993	11	56	67	16%
	1994	8	97	105	8%
	1995	7	124	131	5%
	1996	11	137	148	7%
	1997	21	188	209	10%
	1998	20	230	250	8%
	1999	15	249	264	6%
	2000	20	140	160	13%
	2001	19	176	195	10%
	2002	45	701	746	6%
	2003	14	196	210	7%
	2004	33	764	797	4%
	2005	5	137	142	4%
ST0000034 Total		**262**	**3397**	**3659**	**7%**
ST0000036	1985		3	3	0%
	1986	1	6	7	14%
	1987	3	8	11	27%
	1988	1	5	6	17%
	1989		4	4	0%
	1990		15	15	0%
	1991	2	12	14	14%
	1992	5	22	27	19%
	1993	2	26	28	7%
	1994	3	31	34	9%
	1995	4	80	84	5%
	1996	9	71	80	11%
	1997	9	73	82	11%
	1998	4	108	112	4%
	1999	9	118	127	7%
	2000	4	83	87	5%
	2001	7	102	109	6%
	2002	18	401	419	4%
	2003	5	134	139	4%
	2004	12	535	547	2%
	2005	5	146	151	3%
ST0000036 Total		**103**	**1983**	**2086**	**5%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000060	1985	1	2	3	33%
	1986		2	2	0%
	1987		3	3	0%
	1988		1	1	0%
	1989		3	3	0%
	1990		2	2	0%
	1991		5	5	0%
	1992		11	11	0%
	1993	1	14	15	7%
	1994	1	18	19	5%
	1995	1	31	32	3%
	1996	2	21	23	9%
	1997	2	39	41	5%
	1998	4	48	52	8%
	1999	2	47	49	4%
	2000	3	40	43	7%
	2001	1	55	56	2%
	2002	4	166	170	2%
	2003	2	51	53	4%
	2004	9	301	310	3%
	2005	2	105	107	2%
ST0000060 Total		**35**	**965**	**1000**	**4%**
ST0000065	1985		1	1	0%
	1986		5	5	0%
	1987		4	4	0%
	1988		4	4	0%
	1989	4	7	11	36%
	1990		5	5	0%
	1991		4	4	0%
	1992	1	8	9	11%
	1993	1	19	20	5%
	1994	3	20	23	13%
	1995		21	21	0%
	1996	3	34	37	8%
	1997	2	40	42	5%
	1998	2	43	45	4%
	1999	10	56	66	15%
	2000	4	43	47	9%
	2001	3	40	43	7%
	2002	13	246	259	5%
	2003	5	60	65	8%
	2004	17	239	256	7%
	2005	5	56	61	8%
	2006		4	4	0%
ST0000065 Total		**73**	**959**	**1032**	**7%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000107	1984		1	1	0%
	1985	3	10	13	23%
	1986	7	22	29	24%
	1987	5	29	34	15%
	1988	5	34	39	13%
	1989	6	44	50	12%
	1990	6	43	49	12%
	1991	10	41	51	20%
	1992	8	69	77	10%
	1993	15	97	112	13%
	1994	16	117	133	12%
	1995	16	188	204	8%
	1996	28	175	203	14%
	1997	38	202	240	16%
	1998	39	275	314	12%
	1999	36	279	315	11%
	2000	32	177	209	15%
	2001	16	204	220	7%
	2002	40	638	678	6%
	2003	19	212	231	8%
	2004	26	805	831	3%
	2005	7	152	159	4%
ST0000107 Total		**378**	**3814**	**4192**	**9%**
ST0000112	1984	1	3	4	25%
	1985	3	8	11	27%
	1986	6	15	21	29%
	1987	5	19	24	21%
	1988	6	25	31	19%
	1989	6	42	48	13%
	1990	6	41	47	13%
	1991	7	61	68	10%
	1992	9	60	69	13%
	1993	13	84	97	13%
	1994	10	108	118	8%
	1995	10	137	147	7%
	1996	21	150	171	12%
	1997	26	163	189	14%
	1998	20	217	237	8%
	1999	20	223	243	8%
	2000	18	148	166	11%
	2001	17	147	164	10%
	2002	25	607	632	4%
	2003	6	173	179	3%
	2004	14	611	625	2%
	2005	2	75	77	3%
ST0000112 Total		**251**	**3117**	**3368**	**7%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000120	1984	1	2	3	33%
	1985	1	9	10	10%
	1986	1	14	15	7%
	1987	7	13	20	35%
	1988	2	17	19	11%
	1989	4	29	33	12%
	1990	10	19	29	34%
	1991	2	32	34	6%
	1992	14	59	73	19%
	1993	10	64	74	14%
	1994	14	89	103	14%
	1995	12	104	116	10%
	1996	23	138	161	14%
	1997	19	178	197	10%
	1998	24	178	202	12%
	1999	32	226	258	12%
	2000	35	202	237	15%
	2001	27	178	205	13%
	2002	35	477	512	7%
	2003	10	221	231	4%
	2004	33	745	778	4%
	2005	15	262	277	5%
ST0000120 Total		**331**	**3256**	**3587**	**9%**
ST0000125	1985		1	1	0%
	1986	1		1	100%
	1988	1	1	2	50%
	1989		1	1	0%
	1991		3	3	0%
	1993		3	3	0%
	1994		5	5	0%
	1995	2	2	4	50%
	1996	2	5	7	29%
	1997	1	5	6	17%
	1998		6	6	0%
	1999	4	13	17	24%
	2000	2	9	11	18%
	2001	1	7	8	13%
	2002	1	25	26	4%
	2003		10	10	0%
	2004	6	22	28	21%
	2005		21	21	0%
ST0000125 Total		**21**	**139**	**160**	**13%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000128	1987		2	2	0%
	1988		3	3	0%
	1989		1	1	0%
	1990		3	3	0%
	1991	1		1	100%
	1992		3	3	0%
	1993		2	2	0%
	1994		3	3	0%
	1995		7	7	0%
	1996		4	4	0%
	1997	1	3	4	25%
	1998	2	6	8	25%
	1999		16	16	0%
	2000		2	2	0%
	2001	1	4	5	20%
	2002		4	4	0%
	2003		6	6	0%
	2004		17	17	0%
	2005		1	1	0%
ST0000128 Total		**5**	**87**	**92**	**5%**
ST0000129	1984		2	2	0%
	1985	3	15	18	17%
	1986	15	27	42	36%
	1987	9	28	37	24%
	1988	3	37	40	8%
	1989	14	65	79	18%
	1990	6	50	56	11%
	1991	7	86	93	8%
	1992	12	98	110	11%
	1993	12	152	164	7%
	1994	7	173	180	4%
	1995	16	260	276	6%
	1996	41	251	292	14%
	1997	32	329	361	9%
	1998	48	433	481	10%
	1999	60	394	454	13%
	2000	32	269	301	11%
	2001	32	292	324	10%
	2002	70	1062	1132	6%
	2003	23	282	305	8%
	2004	40	1191	1231	3%
	2005	8	168	176	5%
ST0000129 Total		**490**	**5664**	**6154**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000132	1984		1	1	0%
	1985	3	2	5	60%
	1986		8	8	0%
	1987	4	4	8	50%
	1988	1	11	12	8%
	1989	3	22	25	12%
	1990	3	21	24	13%
	1991	4	31	35	11%
	1992	5	32	37	14%
	1993	4	39	43	9%
	1994	2	57	59	3%
	1995	7	89	96	7%
	1996	11	101	112	10%
	1997	12	117	129	9%
	1998	12	160	172	7%
	1999	11	148	159	7%
	2000	6	82	88	7%
	2001	9	104	113	8%
	2002	14	410	424	3%
	2003	5	126	131	4%
	2004	4	681	685	1%
	2005	3	126	129	2%
ST0000132 Total		**123**	**2372**	**2495**	**5%**
ST0000171	1983		1	1	0%
	1984		1	1	0%
	1985	1	9	10	10%
	1986	2	17	19	11%
	1987		18	18	0%
	1988	4	22	26	15%
	1989	1	36	37	3%
	1990	1	37	38	3%
	1991	6	42	48	13%
	1992	3	36	39	8%
	1993	4	66	70	6%
	1994	5	80	85	6%
	1995	3	122	125	2%
	1996	12	124	136	9%
	1997	11	191	202	5%
	1998	23	243	266	9%
	1999	26	247	273	10%
	2000	17	161	178	10%
	2001	18	205	223	8%
	2002	46	868	914	5%
	2003	11	200	211	5%
	2004	29	987	1016	3%
	2005	7	101	108	6%
ST0000171 Total		**230**	**3814**	**4044**	**6%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000193	1982		1	1	0%
	1984		1	1	0%
	1985	3	10	13	23%
	1986	2	14	16	13%
	1987	3	13	16	19%
	1988	4	31	35	11%
	1989	3	39	42	7%
	1990	6	57	63	10%
	1991	8	52	60	13%
	1992	9	55	64	14%
	1993	9	112	121	7%
	1994	12	111	123	10%
	1995	10	180	190	5%
	1996	17	146	163	10%
	1997	19	215	234	8%
	1998	33	295	328	10%
	1999	25	270	295	8%
	2000	15	187	202	7%
	2001	23	173	196	12%
	2002	47	930	977	5%
	2003	17	201	218	8%
	2004	23	1083	1106	2%
	2005	7	159	166	4%
ST0000193 Total		**295**	**4335**	**4630**	**6%**
ST0000229	1985		1	1	0%
	1986		1	1	0%
	1987	1	4	5	20%
	1988		5	5	0%
	1989		9	9	0%
	1990	1	6	7	14%
	1991	4	5	9	44%
	1992	1	13	14	7%
	1993		16	16	0%
	1994	2	25	27	7%
	1995	3	30	33	9%
	1996	6	39	45	13%
	1997	3	48	51	6%
	1998	4	62	66	6%
	1999	8	49	57	14%
	2000	4	57	61	7%
	2001	7	70	77	9%
	2002	7	191	198	4%
	2003	11	111	122	9%
	2004	13	326	339	4%
	2005	13	181	194	7%
	2006		2	2	0%
ST0000229 Total		**88**	**1251**	**1339**	**7%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000315	1984		2	2	0%
	1985	4	6	10	40%
	1986	1	20	21	5%
	1987	5	22	27	19%
	1988	6	22	28	21%
	1989	7	33	40	18%
	1990	6	46	52	12%
	1991	7	52	59	12%
	1992	5	68	73	7%
	1993	12	91	103	12%
	1994	17	143	160	11%
	1995	18	174	192	9%
	1996	38	156	194	20%
	1997	33	186	219	15%
	1998	42	186	228	18%
	1999	26	241	267	10%
	2000	32	147	179	18%
	2001	29	140	169	17%
	2002	42	424	466	9%
	2003	11	136	147	7%
	2004	14	415	429	3%
	2005	1	25	26	4%
ST0000315 Total		**356**	**2735**	**3091**	**12%**
ST0000326	1984	1	2	3	33%
	1985	3	15	18	17%
	1986	2	23	25	8%
	1987	5	34	39	13%
	1988	12	39	51	24%
	1989	15	39	54	28%
	1990	9	60	69	13%
	1991	13	46	59	22%
	1992	16	98	114	14%
	1993	12	149	161	7%
	1994	25	172	197	13%
	1995	26	242	268	10%
	1996	41	244	285	14%
	1997	60	329	389	15%
	1998	57	422	479	12%
	1999	41	396	437	9%
	2000	53	250	303	17%
	2001	43	285	328	13%
	2002	65	948	1013	6%
	2003	14	275	289	5%
	2004	33	1032	1065	3%
	2005	15	224	239	6%
ST0000326 Total		**561**	**5324**	**5885**	**10%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000328	1984	2	4	6	33%
	1985	3	23	26	12%
	1986	14	26	40	35%
	1987	6	26	32	19%
	1988	7	56	63	11%
	1989	5	65	70	7%
	1990	8	62	70	11%
	1991	9	72	81	11%
	1992	8	102	110	7%
	1993	17	118	135	13%
	1994	20	224	244	8%
	1995	16	252	268	6%
	1996	45	262	307	15%
	1997	52	310	362	14%
	1998	48	361	409	12%
	1999	38	353	391	10%
	2000	35	237	272	13%
	2001	39	208	247	16%
	2002	56	757	813	7%
	2003	31	211	242	13%
	2004	33	815	848	4%
	2005	4	120	124	3%
ST0000328 Total		**496**	**4664**	**5160**	**10%**
ST0000359	1985	1	8	9	11%
	1986	1	12	13	8%
	1987	6	13	19	32%
	1988	2	17	19	11%
	1989	1	22	23	4%
	1990	3	18	21	14%
	1991	5	22	27	19%
	1992	3	29	32	9%
	1993	7	49	56	13%
	1994	5	48	53	9%
	1995	9	84	93	10%
	1996	12	110	122	10%
	1997	24	139	163	15%
	1998	29	170	199	15%
	1999	20	180	200	10%
	2000	11	150	161	7%
	2001	16	150	166	10%
	2002	18	403	421	4%
	2003	11	125	136	8%
	2004	12	606	618	2%
	2005	6	123	129	5%
ST0000359 Total		**202**	**2478**	**2680**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000386	1984	1	4	5	20%
	1985	6	18	24	25%
	1986	6	32	38	16%
	1987	10	41	51	20%
	1988	5	78	83	6%
	1989	18	118	136	13%
	1990	13	93	106	12%
	1991	17	99	116	15%
	1992	13	164	177	7%
	1993	18	217	235	8%
	1994	24	301	325	7%
	1995	16	408	424	4%
	1996	53	433	486	11%
	1997	81	429	510	16%
	1998	62	602	664	9%
	1999	52	531	583	9%
	2000	49	346	395	12%
	2001	57	370	427	13%
	2002	104	1458	1562	7%
	2003	24	319	343	7%
	2004	52	1486	1538	3%
	2005	17	220	237	7%
ST0000386 Total		**698**	**7767**	**8465**	**8%**
ST0000412	1984	1		1	100%
	1985	6	19	25	24%
	1986	4	23	27	15%
	1987	7	31	38	18%
	1988	13	33	46	28%
	1989	6	50	56	11%
	1990	11	67	78	14%
	1991	15	57	72	21%
	1992	7	89	96	7%
	1993	5	114	119	4%
	1994	12	135	147	8%
	1995	17	174	191	9%
	1996	30	182	212	14%
	1997	28	210	238	12%
	1998	37	301	338	11%
	1999	25	258	283	9%
	2000	19	195	214	9%
	2001	24	191	215	11%
	2002	32	539	571	6%
	2003	16	169	185	9%
	2004	22	621	643	3%
	2005	2	87	89	2%
ST0000412 Total		**339**	**3545**	**3884**	**9%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000434	1983		1	1	0%
	1985	3	9	12	25%
	1986	11	21	32	34%
	1987	9	24	33	27%
	1988	8	38	46	17%
	1989	3	40	43	7%
	1990	6	56	62	10%
	1991	9	48	57	16%
	1992	12	92	104	12%
	1993	14	117	131	11%
	1994	11	158	169	7%
	1995	21	235	256	8%
	1996	48	286	334	14%
	1997	46	339	385	12%
	1998	43	472	515	8%
	1999	45	500	545	8%
	2000	26	287	313	8%
	2001	32	349	381	8%
	2002	66	1350	1416	5%
	2003	30	406	436	7%
	2004	46	1680	1726	3%
	2005	20	342	362	6%
ST0000434 Total		**509**	**6850**	**7359**	**7%**
ST0000469	1984	1	1	2	50%
	1985	2	8	10	20%
	1986	2	15	17	12%
	1987	2	24	26	8%
	1988	2	36	38	5%
	1989	7	35	42	17%
	1990	1	26	27	4%
	1991	3	26	29	10%
	1992	8	43	51	16%
	1993	5	70	75	7%
	1994	8	117	125	6%
	1995	7	138	145	5%
	1996	16	123	139	12%
	1997	24	192	216	11%
	1998	22	207	229	10%
	1999	23	250	273	8%
	2000	12	179	191	6%
	2001	13	176	189	7%
	2002	39	644	683	6%
	2003	13	167	180	7%
	2004	14	702	716	2%
	2005	4	101	105	4%
ST0000469 Total		**228**	**3280**	**3508**	**6%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000493	1984	1		1	100%
	1985	5	7	12	42%
	1986	3	12	15	20%
	1987	5	11	16	31%
	1988	1	15	16	6%
	1989	3	18	21	14%
	1990	3	15	18	17%
	1991	3	26	29	10%
	1992	4	25	29	14%
	1993	6	54	60	10%
	1994	7	53	60	12%
	1995	4	88	92	4%
	1996	12	85	97	12%
	1997	23	119	142	16%
	1998	14	163	177	8%
	1999	24	162	186	13%
	2000	12	110	122	10%
	2001	12	107	119	10%
	2002	28	453	481	6%
	2003	9	100	109	8%
	2004	14	520	534	3%
	2005		33	33	0%
ST0000493 Total		**193**	**2176**	**2369**	**8%**
ST0000516	1985	5	15	20	25%
	1986	7	20	27	26%
	1987	6	47	53	11%
	1988	5	46	51	10%
	1989	4	34	38	11%
	1990	12	44	56	21%
	1991	7	67	74	9%
	1992	6	92	98	6%
	1993	7	97	104	7%
	1994	5	164	169	3%
	1995	15	200	215	7%
	1996	23	182	205	11%
	1997	30	286	316	9%
	1998	43	346	389	11%
	1999	29	404	433	7%
	2000	23	204	227	10%
	2001	28	220	248	11%
	2002	64	1069	1133	6%
	2003	22	228	250	9%
	2004	24	1129	1153	2%
	2005	3	106	109	3%
ST0000516 Total		**368**	**5000**	**5368**	**7%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000520	1985	3	7	10	30%
	1986		8	8	0%
	1987	2	17	19	11%
	1988	2	18	20	10%
	1989		24	24	0%
	1990	2	19	21	10%
	1991	5	26	31	16%
	1992	2	33	35	6%
	1993	3	52	55	5%
	1994	4	61	65	6%
	1995	6	85	91	7%
	1996	4	106	110	4%
	1997	3	142	145	2%
	1998	4	163	167	2%
	1999	14	174	188	7%
	2000	4	94	98	4%
	2001	4	101	105	4%
	2002	11	521	532	2%
	2003	6	118	124	5%
	2004	10	615	625	2%
	2005	2	72	74	3%
ST0000520 Total		**91**	**2456**	**2547**	**4%**
ST0000525	1985		2	2	0%
	1986	4	5	9	44%
	1987	2	7	9	22%
	1988	2	9	11	18%
	1989	3	19	22	14%
	1990	3	23	26	12%
	1991		12	12	0%
	1992	6	20	26	23%
	1993	3	41	44	7%
	1994	8	62	70	11%
	1995	10	89	99	10%
	1996	9	90	99	9%
	1997	15	125	140	11%
	1998	25	175	200	13%
	1999	19	197	216	9%
	2000	15	165	180	8%
	2001	19	168	187	10%
	2002	47	750	797	6%
	2003	8	197	205	4%
	2004	23	810	833	3%
	2005	6	67	73	8%
ST0000525 Total		**227**	**3033**	**3260**	**7%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000549	1984		1	1	0%
	1985	4	3	7	57%
	1986	2	14	16	13%
	1987	5	14	19	26%
	1988	3	26	29	10%
	1989		21	21	0%
	1990	6	11	17	35%
	1991	6	29	35	17%
	1992	4	32	36	11%
	1993	3	54	57	5%
	1994	6	82	88	7%
	1995	7	80	87	8%
	1996	11	83	94	12%
	1997	19	125	144	13%
	1998	9	162	171	5%
	1999	11	176	187	6%
	2000	13	97	110	12%
	2001	13	97	110	12%
	2002	19	494	513	4%
	2003	3	109	112	3%
	2004	11	534	545	2%
	2005		70	70	0%
ST0000549 Total		**155**	**2314**	**2469**	**6%**
ST0000557	1984		1	1	0%
	1985		6	6	0%
	1986	2	6	8	25%
	1987	1	24	25	4%
	1988	1	25	26	4%
	1989	4	16	20	20%
	1990	4	16	20	20%
	1991	10	18	28	36%
	1992	2	41	43	5%
	1993	4	52	56	7%
	1994	9	68	77	12%
	1995	4	91	95	4%
	1996	17	112	129	13%
	1997	19	115	134	14%
	1998	14	150	164	9%
	1999	8	156	164	5%
	2000	11	94	105	10%
	2001	10	91	101	10%
	2002	32	403	435	7%
	2003	6	104	110	5%
	2004	10	419	429	2%
	2005		33	33	0%
ST0000557 Total		**168**	**2041**	**2209**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000581	1984	3	3	6	50%
	1985	5	16	21	24%
	1986	10	32	42	24%
	1987	14	43	57	25%
	1988	7	48	55	13%
	1989	12	69	81	15%
	1990	10	63	73	14%
	1991	3	67	70	4%
	1992	25	93	118	21%
	1993	12	139	151	8%
	1994	27	187	214	13%
	1995	22	224	246	9%
	1996	41	247	288	14%
	1997	55	306	361	15%
	1998	47	357	404	12%
	1999	40	359	399	10%
	2000	39	287	326	12%
	2001	39	285	324	12%
	2002	53	751	804	7%
	2003	19	235	254	7%
	2004	21	798	819	3%
	2005	44	207	251	18%
ST0000581 Total		**548**	**4816**	**5364**	**10%**
ST0000616	1984		2	2	0%
	1985	1	2	3	33%
	1986	2	7	9	22%
	1987	3	13	16	19%
	1988	1	16	17	6%
	1989	5	17	22	23%
	1990	3	23	26	12%
	1991	6	29	35	17%
	1992	6	32	38	16%
	1993	6	74	80	8%
	1994	11	96	107	10%
	1995	21	124	145	14%
	1996	14	116	130	11%
	1997	25	179	204	12%
	1998	31	238	269	12%
	1999	27	251	278	10%
	2000	22	211	233	9%
	2001	20	206	226	9%
	2002	37	701	738	5%
	2003	12	197	209	6%
	2004	18	768	786	2%
	2005	2	76	78	3%
ST0000616 Total		**273**	**3378**	**3651**	**7%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000618	1985		3	3	0%
	1986	1	6	7	14%
	1987	3	7	10	30%
	1988		13	13	0%
	1989	6	7	13	46%
	1990	6	13	19	32%
	1991	4	23	27	15%
	1992	3	36	39	8%
	1993	4	37	41	10%
	1994	6	56	62	10%
	1995	7	72	79	9%
	1996	13	82	95	14%
	1997	15	116	131	11%
	1998	15	149	164	9%
	1999	12	168	180	7%
	2000	19	100	119	16%
	2001	16	110	126	13%
	2002	22	417	439	5%
	2003	7	89	96	7%
	2004	15	453	468	3%
	2005	6	46	52	12%
ST0000618 Total		**180**	**2003**	**2183**	**8%**
ST0000621	1984		2	2	0%
	1985	1	8	9	11%
	1986	2	8	10	20%
	1987	9	14	23	39%
	1988	4	25	29	14%
	1989	6	22	28	21%
	1990	5	37	42	12%
	1991	12	32	44	27%
	1992	6	57	63	10%
	1993	13	64	77	17%
	1994	10	100	110	9%
	1995	16	135	151	11%
	1996	16	129	145	11%
	1997	28	150	178	16%
	1998	30	187	217	14%
	1999	25	171	196	13%
	2000	16	105	121	13%
	2001	17	128	145	12%
	2002	33	377	410	8%
	2003	9	115	124	7%
	2004	17	345	362	5%
	2005	3	36	39	8%
ST0000621 Total		**278**	**2247**	**2525**	**11%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000648	1985	3	5	8	38%
	1986	1	7	8	13%
	1987	2	6	8	25%
	1988	5	14	19	26%
	1989		22	22	0%
	1990	3	26	29	10%
	1991	4	27	31	13%
	1992	2	29	31	6%
	1993	4	61	65	6%
	1994	8	88	96	8%
	1995	4	98	102	4%
	1996	10	100	110	9%
	1997	21	119	140	15%
	1998	14	170	184	8%
	1999	12	155	167	7%
	2000	8	74	82	10%
	2001	20	109	129	16%
	2002	21	477	498	4%
	2003	7	76	83	8%
	2004	11	452	463	2%
	2005		16	16	0%
ST0000648 Total		**160**	**2131**	**2291**	**7%**
ST0000697	1984		1	1	0%
	1985	3	3	6	50%
	1986	1	5	6	17%
	1987	9	12	21	43%
	1988	6	22	28	21%
	1989	5	25	30	17%
	1990	10	31	41	24%
	1991	4	23	27	15%
	1992	10	57	67	15%
	1993	11	65	76	14%
	1994	17	101	118	14%
	1995	14	110	124	11%
	1996	33	119	152	22%
	1997	41	157	198	21%
	1998	36	176	212	17%
	1999	25	207	232	11%
	2000	21	132	153	14%
	2001	24	129	153	16%
	2002	38	374	412	9%
	2003	11	118	129	9%
	2004	15	406	421	4%
	2005	1	37	38	3%
ST0000697 Total		**335**	**2310**	**2645**	**13%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000718	1983		1	1	0%
	1984	2		2	100%
	1985	1	4	5	20%
	1986	3	14	17	18%
	1987	4	17	21	19%
	1988	6	22	28	21%
	1989	7	26	33	21%
	1990	6	25	31	19%
	1991	7	41	48	15%
	1992	10	54	64	16%
	1993	12	77	89	13%
	1994	17	101	118	14%
	1995	18	140	158	11%
	1996	32	92	124	26%
	1997	32	142	174	18%
	1998	25	154	179	14%
	1999	27	148	175	15%
	2000	27	95	122	22%
	2001	24	108	132	18%
	2002	27	254	281	10%
	2003	9	79	88	10%
	2004	10	252	262	4%
	2005	2	35	37	5%
	2006		4	4	0%
ST0000718 Total		**308**	**1885**	**2193**	**14%**
ST0000725	1984	1	3	4	25%
	1985	1	7	8	13%
	1986	3	17	20	15%
	1987	1	27	28	4%
	1988	5	37	42	12%
	1989	11	47	58	19%
	1990	10	37	47	21%
	1991	11	60	71	15%
	1992	19	77	96	20%
	1993	12	78	90	13%
	1994	13	132	145	9%
	1995	15	176	191	8%
	1996	32	170	202	16%
	1997	34	193	227	15%
	1998	35	185	220	16%
	1999	28	229	257	11%
	2000	22	151	173	13%
	2001	19	148	167	11%
	2002	30	430	460	7%
	2003	10	121	131	8%
	2004	11	375	386	3%
	2005	1	42	43	2%
ST0000725 Total		**324**	**2742**	**3066**	**11%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000730	1985	11	17	28	39%
	1986	15	30	45	33%
	1987	13	46	59	22%
	1988	10	50	60	17%
	1989	13	71	84	15%
	1990	35	110	145	24%
	1991	33	127	160	21%
	1992	30	173	203	15%
	1993	41	253	294	14%
	1994	36	293	329	11%
	1995	40	349	389	10%
	1996	109	313	422	26%
	1997	100	444	544	18%
	1998	88	496	584	15%
	1999	85	524	609	14%
	2000	96	440	536	18%
	2001	96	408	504	19%
	2002	100	896	996	10%
	2003	36	362	398	9%
	2004	41	766	807	5%
	2005	9	169	178	5%
	2006		1	1	0%
	2007		1	1	0%
ST0000730 Total		**1037**	**6339**	**7376**	**14%**
ST0000776	1984		3	3	0%
	1985	8	8	16	50%
	1986	9	21	30	30%
	1987	8	28	36	22%
	1988	4	52	56	7%
	1989	9	58	67	13%
	1990	12	55	67	18%
	1991	9	49	58	16%
	1992	10	83	93	11%
	1993	12	119	131	9%
	1994	18	159	177	10%
	1995	15	221	236	6%
	1996	39	237	276	14%
	1997	43	297	340	13%
	1998	51	379	430	12%
	1999	52	379	431	12%
	2000	33	287	320	10%
	2001	33	282	315	10%
	2002	62	951	1013	6%
	2003	27	258	285	9%
	2004	34	943	977	3%
	2005	3	101	104	3%
ST0000776 Total		**491**	**4970**	**5461**	**9%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000779	1985		8	8	0%
	1986	1	14	15	7%
	1987	2	13	15	13%
	1988	2	17	19	11%
	1989	4	22	26	15%
	1990	6	30	36	17%
	1991	2	23	25	8%
	1992	7	39	46	15%
	1993	5	54	59	8%
	1994	4	83	87	5%
	1995	8	89	97	8%
	1996	14	85	99	14%
	1997	14	115	129	11%
	1998	18	178	196	9%
	1999	10	130	140	7%
	2000	11	96	107	10%
	2001	13	94	107	12%
	2002	27	343	370	7%
	2003	9	71	80	11%
	2004	12	297	309	4%
	2005	2	48	50	4%
ST0000779 Total		**171**	**1849**	**2020**	**8%**
ST0000790	1984	1	1	2	50%
	1985	6	13	19	32%
	1986	2	28	30	7%
	1987	7	45	52	13%
	1988	13	50	63	21%
	1989	14	53	67	21%
	1990	8	56	64	13%
	1991	11	68	79	14%
	1992	11	80	91	12%
	1993	10	128	138	7%
	1994	12	173	185	6%
	1995	19	210	229	8%
	1996	50	198	248	20%
	1997	51	256	307	17%
	1998	47	285	332	14%
	1999	43	342	385	11%
	2000	40	215	255	16%
	2001	49	239	288	17%
	2002	63	594	657	10%
	2003	19	201	220	9%
	2004	22	617	639	3%
	2005	6	87	93	6%
ST0000790 Total		**504**	**3939**	**4443**	**11%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000809	1984		1	1	0%
	1985	1	5	6	17%
	1986	1	10	11	9%
	1987	4	14	18	22%
	1988	4	21	25	16%
	1989	2	19	21	10%
	1990	6	19	25	24%
	1991	6	25	31	19%
	1992	6	34	40	15%
	1993	2	50	52	4%
	1994	5	72	77	6%
	1995	5	86	91	5%
	1996	8	95	103	8%
	1997	19	133	152	13%
	1998	13	150	163	8%
	1999	19	148	167	11%
	2000	9	104	113	8%
	2001	7	103	110	6%
	2002	17	354	371	5%
	2003	12	125	137	9%
	2004	15	382	397	4%
	2005	8	95	103	8%
ST0000809 Total		**169**	**2045**	**2214**	**8%**
ST0000825	1984		3	3	0%
	1985	1	7	8	13%
	1986	3	10	13	23%
	1987	1	17	18	6%
	1988	2	23	25	8%
	1989	6	30	36	17%
	1990	4	33	37	11%
	1991	3	38	41	7%
	1992	3	47	50	6%
	1993	5	76	81	6%
	1994	6	79	85	7%
	1995	13	136	149	9%
	1996	15	117	132	11%
	1997	22	173	195	11%
	1998	29	265	294	10%
	1999	18	242	260	7%
	2000	23	158	181	13%
	2001	21	172	193	11%
	2002	50	627	677	7%
	2003	6	182	188	3%
	2004	19	692	711	3%
	2005		93	93	0%
ST0000825 Total		**250**	**3220**	**3470**	**7%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000915	1984		2	2	0%
	1985	4	12	16	25%
	1986	4	5	9	44%
	1987	5	22	27	19%
	1988	6	26	32	19%
	1989	5	33	38	13%
	1990	8	39	47	17%
	1991	5	26	31	16%
	1992	13	50	63	21%
	1993	5	72	77	6%
	1994	8	111	119	7%
	1995	16	133	149	11%
	1996	22	125	147	15%
	1997	25	149	174	14%
	1998	29	200	229	13%
	1999	20	173	193	10%
	2000	8	161	169	5%
	2001	16	131	147	11%
	2002	30	423	453	7%
	2003	5	120	125	4%
	2004	11	505	516	2%
	2005	5	73	78	6%
ST0000915 Total		**250**	**2591**	**2841**	**9%**
ST0000951	1984		1	1	0%
	1985	1	2	3	33%
	1986	1	8	9	11%
	1987		10	10	0%
	1988	6	14	20	30%
	1989	4	20	24	17%
	1990	1	21	22	5%
	1991	3	19	22	14%
	1992	8	33	41	20%
	1993	4	44	48	8%
	1994	7	77	84	8%
	1995	7	102	109	6%
	1996	12	94	106	11%
	1997	28	117	145	19%
	1998	18	199	217	8%
	1999	20	181	201	10%
	2000	21	192	213	10%
	2001	28	197	225	12%
	2002	26	407	433	6%
	2003	16	230	246	7%
	2004	21	485	506	4%
	2005	17	363	380	4%
ST0000951 Total		**249**	**2816**	**3065**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000963	1984	1	1	2	50%
	1985		10	10	0%
	1986	3	12	15	20%
	1987	1	24	25	4%
	1988	4	21	25	16%
	1989	3	30	33	9%
	1990	7	34	41	17%
	1991	8	37	45	18%
	1992	5	39	44	11%
	1993	9	71	80	11%
	1994	14	106	120	12%
	1995	7	124	131	5%
	1996	28	149	177	16%
	1997	30	166	196	15%
	1998	22	234	256	9%
	1999	26	245	271	10%
	2000	23	190	213	11%
	2001	34	186	220	15%
	2002	38	606	644	6%
	2003	15	244	259	6%
	2004	25	753	778	3%
	2005	12	237	249	5%
ST0000963 Total		**315**	**3519**	**3834**	**8%**
ST0000969	1984		1	1	0%
	1985		6	6	0%
	1986	2	5	7	29%
	1987	1	10	11	9%
	1988	3	14	17	18%
	1989	4	22	26	15%
	1990	2	25	27	7%
	1991	3	16	19	16%
	1992	4	25	29	14%
	1993	5	46	51	10%
	1994	4	59	63	6%
	1995	8	83	91	9%
	1996	13	68	81	16%
	1997	18	86	104	17%
	1998	16	111	127	13%
	1999	7	143	150	5%
	2000	5	107	112	4%
	2001	12	75	87	14%
	2002	17	193	210	8%
	2003	10	68	78	13%
	2004	4	238	242	2%
	2005	5	51	56	9%
ST0000969 Total		**143**	**1452**	**1595**	**9%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000971	1985	3	3	6	50%
	1986		5	5	0%
	1987	1	5	6	17%
	1988	1	4	5	20%
	1989	3	15	18	17%
	1990	1	16	17	6%
	1991	4	6	10	40%
	1992		20	20	0%
	1993	2	34	36	6%
	1994	1	50	51	2%
	1995	3	80	83	4%
	1996	10	77	87	11%
	1997	14	97	111	13%
	1998	14	116	130	11%
	1999	8	133	141	6%
	2000	13	86	99	13%
	2001	14	88	102	14%
	2002	15	335	350	4%
	2003	6	84	90	7%
	2004	16	379	395	4%
	2005	1	18	19	5%
ST0000971 Total		**130**	**1651**	**1781**	**7%**
ST0000972	1985	6	13	19	32%
	1986	8	11	19	42%
	1987	4	26	30	13%
	1988	7	39	46	15%
	1989	10	37	47	21%
	1990	10	42	52	19%
	1991	8	52	60	13%
	1992	10	70	80	13%
	1993	11	89	100	11%
	1994	17	146	163	10%
	1995	22	190	212	10%
	1996	25	188	213	12%
	1997	32	227	259	12%
	1998	34	231	265	13%
	1999	33	292	325	10%
	2000	34	218	252	13%
	2001	28	222	250	11%
	2002	43	523	566	8%
	2003	22	241	263	8%
	2004	25	627	652	4%
	2005	12	229	241	5%
ST0000972 Total		**401**	**3713**	**4114**	**10%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000976	1984	1		1	100%
	1985	1	3	4	25%
	1986	1	5	6	17%
	1987	1	7	8	13%
	1988	3	10	13	23%
	1989	1	12	13	8%
	1990	1	10	11	9%
	1991	2	19	21	10%
	1992	3	17	20	15%
	1993	2	31	33	6%
	1994	2	47	49	4%
	1995	16	72	88	18%
	1996	8	45	53	15%
	1997	17	83	100	17%
	1998	10	82	92	11%
	1999	8	102	110	7%
	2000	9	68	77	12%
	2001	7	66	73	10%
	2002	5	116	121	4%
	2003	3	92	95	3%
	2004	3	217	220	1%
	2005	2	71	73	3%
ST0000976 Total		**106**	**1175**	**1281**	**8%**
ST0000986	1984	1		1	100%
	1985	3	8	11	27%
	1986	3	15	18	17%
	1987	4	21	25	16%
	1988	3	26	29	10%
	1989	2	35	37	5%
	1990	7	29	36	19%
	1991	4	37	41	10%
	1992	5	50	55	9%
	1993	5	77	82	6%
	1994	7	110	117	6%
	1995	11	130	141	8%
	1996	23	128	151	15%
	1997	21	153	174	12%
	1998	31	221	252	12%
	1999	23	241	264	9%
	2000	17	162	179	9%
	2001	21	167	188	11%
	2002	38	544	582	7%
	2003	12	173	185	6%
	2004	23	656	679	3%
	2005	8	106	114	7%
ST0000986 Total		**272**	**3089**	**3361**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0000994	1983	1		1	100%
	1984		1	1	0%
	1985	1	10	11	9%
	1986	4	7	11	36%
	1987	8	24	32	25%
	1988	7	35	42	17%
	1989	6	41	47	13%
	1990	3	43	46	7%
	1991	4	32	36	11%
	1992	7	60	67	10%
	1993	11	97	108	10%
	1994	5	114	119	4%
	1995	9	149	158	6%
	1996	20	155	175	11%
	1997	29	206	235	12%
	1998	38	265	303	13%
	1999	24	308	332	7%
	2000	25	177	202	12%
	2001	24	163	187	13%
	2002	43	745	788	5%
	2003	8	173	181	4%
	2004	25	797	822	3%
	2005	1	53	54	2%
ST0000994 Total		**303**	**3655**	**3958**	**8%**
ST0001010	1984		1	1	0%
	1985	2	3	5	40%
	1986	3	5	8	38%
	1987	2	7	9	22%
	1988	3	18	21	14%
	1989	6	12	18	33%
	1990	3	14	17	18%
	1991	1	9	10	10%
	1992	4	20	24	17%
	1993	4	29	33	12%
	1994	2	36	38	5%
	1995	3	32	35	9%
	1996	13	51	64	20%
	1997	8	54	62	13%
	1998	10	66	76	13%
	1999	8	60	68	12%
	2000	12	51	63	19%
	2001	7	47	54	13%
	2002	12	125	137	9%
	2003	9	32	41	22%
	2004	9	123	132	7%
	2005	3	17	20	15%
ST0001010 Total		**124**	**812**	**936**	**13%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001051	1984		1	1	0%
	1985	1	7	8	13%
	1986	2	14	16	13%
	1987	6	17	23	26%
	1988	1	17	18	6%
	1989	1	30	31	3%
	1990	4	21	25	16%
	1991	2	33	35	6%
	1992	6	35	41	15%
	1993	12	68	80	15%
	1994	4	64	68	6%
	1995	11	86	97	11%
	1996	16	131	147	11%
	1997	21	161	182	12%
	1998	20	176	196	10%
	1999	25	191	216	12%
	2000	19	117	136	14%
	2001	14	114	128	11%
	2002	39	446	485	8%
	2003	10	132	142	7%
	2004	9	450	459	2%
	2005	1	52	53	2%
ST0001051 Total		**224**	**2363**	**2587**	**9%**
ST0001056	1984	3	3	6	50%
	1985	4	25	29	14%
	1986	9	28	37	24%
	1987	11	42	53	21%
	1988	9	59	68	13%
	1989	10	68	78	13%
	1990	4	59	63	6%
	1991	10	66	76	13%
	1992	13	117	130	10%
	1993	15	139	154	10%
	1994	16	177	193	8%
	1995	17	273	290	6%
	1996	35	270	305	11%
	1997	38	327	365	10%
	1998	39	414	453	9%
	1999	32	399	431	7%
	2000	34	254	288	12%
	2001	30	245	275	11%
	2002	80	988	1068	7%
	2003	12	209	221	5%
	2004	23	1086	1109	2%
	2005		77	77	0%
ST0001056 Total		**444**	**5325**	**5769**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001095	1983	1		1	100%
	1984		2	2	0%
	1985	1	8	9	11%
	1986	4	16	20	20%
	1987	3	19	22	14%
	1988	2	23	25	8%
	1989	2	30	32	6%
	1990	6	43	49	12%
	1991	9	46	55	16%
	1992	11	76	87	13%
	1993	9	95	104	9%
	1994	13	151	164	8%
	1995	13	156	169	8%
	1996	34	178	212	16%
	1997	39	198	237	16%
	1998	38	254	292	13%
	1999	35	276	311	11%
	2000	34	215	249	14%
	2001	28	166	194	14%
	2002	42	476	518	8%
	2003	10	163	173	6%
	2004	18	433	451	4%
	2005	6	74	80	8%
ST0001095 Total		**358**	**3098**	**3456**	**10%**
ST0001131	1985	1	3	4	25%
	1986		1	1	0%
	1987	3	9	12	25%
	1988	2	9	11	18%
	1989	4	13	17	24%
	1990	2	13	15	13%
	1991	1	12	13	8%
	1992	3	30	33	9%
	1993	3	42	45	7%
	1994	10	43	53	19%
	1995	4	62	66	6%
	1996	14	78	92	15%
	1997	21	109	130	16%
	1998	20	136	156	13%
	1999	25	169	194	13%
	2000	15	141	156	10%
	2001	16	129	145	11%
	2002	23	314	337	7%
	2003	9	114	123	7%
	2004	11	363	374	3%
	2005	7	40	47	15%
ST0001131 Total		**194**	**1830**	**2024**	**10%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001193	1984	2	4	6	33%
	1985	8	23	31	26%
	1986	11	33	44	25%
	1987	8	48	56	14%
	1988	17	73	90	19%
	1989	13	76	89	15%
	1990	12	90	102	12%
	1991	16	100	116	14%
	1992	19	133	152	13%
	1993	21	176	197	11%
	1994	21	276	297	7%
	1995	20	333	353	6%
	1996	85	310	395	22%
	1997	71	380	451	16%
	1998	75	414	489	15%
	1999	77	447	524	15%
	2000	50	307	357	14%
	2001	56	308	364	15%
	2002	60	747	807	7%
	2003	21	238	259	8%
	2004	22	705	727	3%
	2005	5	87	92	5%
ST0001193 Total		**690**	**5308**	**5998**	**12%**
ST0001216	1984	3		3	100%
	1985	1	9	10	10%
	1986	5	24	29	17%
	1987	4	46	50	8%
	1988	9	51	60	15%
	1989	9	54	63	14%
	1990	8	71	79	10%
	1991	7	87	94	7%
	1992	13	118	131	10%
	1993	20	152	172	12%
	1994	18	225	243	7%
	1995	22	289	311	7%
	1996	43	306	349	12%
	1997	68	349	417	16%
	1998	69	464	533	13%
	1999	57	447	504	11%
	2000	59	359	418	14%
	2001	56	323	379	15%
	2002	70	1163	1233	6%
	2003	30	387	417	7%
	2004	29	1052	1081	3%
	2005	5	179	184	3%
ST0001216 Total		**605**	**6155**	**6760**	**9%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001220	1984		1	1	0%
	1985	1	4	5	20%
	1986	6	7	13	46%
	1987	1	10	11	9%
	1988	1	16	17	6%
	1989	5	15	20	25%
	1990	3	21	24	13%
	1991	4	34	38	11%
	1992	4	52	56	7%
	1993	5	57	62	8%
	1994	10	86	96	10%
	1995	8	93	101	8%
	1996	18	125	143	13%
	1997	19	156	175	11%
	1998	26	198	224	12%
	1999	27	219	246	11%
	2000	23	146	169	14%
	2001	23	152	175	13%
	2002	47	611	658	7%
	2003	12	172	184	7%
	2004	24	728	752	3%
	2005		56	56	0%
ST0001220 Total		**267**	**2959**	**3226**	**8%**
ST0001235	1985		2	2	0%
	1986	1	6	7	14%
	1987		11	11	0%
	1988	1	16	17	6%
	1989	5	15	20	25%
	1990	3	17	20	15%
	1991	2	31	33	6%
	1992	6	33	39	15%
	1993	6	60	66	9%
	1994	5	71	76	7%
	1995	8	134	142	6%
	1996	18	98	116	16%
	1997	22	192	214	10%
	1998	19	238	257	7%
	1999	17	302	319	5%
	2000	12	209	221	5%
	2001	25	203	228	11%
	2002	55	896	951	6%
	2003	11	224	235	5%
	2004	12	964	976	1%
	2005	2	72	74	3%
ST0001235 Total		**230**	**3794**	**4024**	**6%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001253	1984		1	1	0%
	1985	5	8	13	38%
	1986	1	10	11	9%
	1987	7	30	37	19%
	1988	8	33	41	20%
	1989	9	47	56	16%
	1990	11	49	60	18%
	1991	18	61	79	23%
	1992	14	102	116	12%
	1993	14	126	140	10%
	1994	16	183	199	8%
	1995	22	245	267	8%
	1996	51	222	273	19%
	1997	57	291	348	16%
	1998	52	374	426	12%
	1999	60	358	418	14%
	2000	44	294	338	13%
	2001	39	258	297	13%
	2002	54	699	753	7%
	2003	27	236	263	10%
	2004	13	608	621	2%
	2005	2	72	74	3%
ST0001253 Total		**524**	**4307**	**4831**	**11%**
ST0001264	1984		2	2	0%
	1985	2	19	21	10%
	1986	7	15	22	32%
	1987	4	38	42	10%
	1988	5	41	46	11%
	1989	7	38	45	16%
	1990	5	39	44	11%
	1991	1	69	70	1%
	1992	9	66	75	12%
	1993	11	101	112	10%
	1994	11	126	137	8%
	1995	7	169	176	4%
	1996	27	143	170	16%
	1997	34	193	227	15%
	1998	21	233	254	8%
	1999	24	210	234	10%
	2000	21	188	209	10%
	2001	23	150	173	13%
	2002	38	599	637	6%
	2003	11	172	183	6%
	2004	24	642	666	4%
	2005	10	147	157	6%
ST0001264 Total		**302**	**3400**	**3702**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001267	1984		1	1	0%
	1985	1	7	8	13%
	1986	4	16	20	20%
	1987	2	15	17	12%
	1988	2	19	21	10%
	1989	2	31	33	6%
	1990	1	33	34	3%
	1991	5	32	37	14%
	1992	1	41	42	2%
	1993	5	42	47	11%
	1994	8	75	83	10%
	1995	7	93	100	7%
	1996	13	90	103	13%
	1997	19	136	155	12%
	1998	20	141	161	12%
	1999	12	168	180	7%
	2000	5	109	114	4%
	2001	15	101	116	13%
	2002	16	360	376	4%
	2003	7	84	91	8%
	2004	8	308	316	3%
	2005		28	28	0%
ST0001267 Total		**153**	**1930**	**2083**	**7%**
ST0001270	1984		2	2	0%
	1985	5	6	11	45%
	1986	2	10	12	17%
	1987	7	35	42	17%
	1988	2	24	26	8%
	1989	6	27	33	18%
	1990	5	28	33	15%
	1991	7	29	36	19%
	1992	8	40	48	17%
	1993	6	65	71	8%
	1994	15	118	133	11%
	1995	8	118	126	6%
	1996	23	108	131	18%
	1997	28	136	164	17%
	1998	20	161	181	11%
	1999	23	173	196	12%
	2000	12	114	126	10%
	2001	9	100	109	8%
	2002	33	423	456	7%
	2003	11	93	104	11%
	2004	14	351	365	4%
	2005	12	73	85	14%
ST0001270 Total		**256**	**2234**	**2490**	**10%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001274	1985	3	16	19	16%
	1986	7	9	16	44%
	1987	1	28	29	3%
	1988	1	25	26	4%
	1989	3	29	32	9%
	1990	4	39	43	9%
	1991	1	38	39	3%
	1992	6	68	74	8%
	1993	6	76	82	7%
	1994	9	109	118	8%
	1995	10	153	163	6%
	1996	9	141	150	6%
	1997	23	163	186	12%
	1998	22	226	248	9%
	1999	19	213	232	8%
	2000	24	130	154	16%
	2001	20	98	118	17%
	2002	28	492	520	5%
	2003		119	119	0%
	2004	12	466	478	3%
	2005		21	21	0%
ST0001274 Total		**208**	**2659**	**2867**	**7%**
ST0001284	1984		1	1	0%
	1985	4	6	10	40%
	1986	1	7	8	13%
	1987	5	15	20	25%
	1988		21	21	0%
	1989	3	28	31	10%
	1990	5	29	34	15%
	1991	5	23	28	18%
	1992	10	52	62	16%
	1993	10	77	87	11%
	1994	2	105	107	2%
	1995	13	144	157	8%
	1996	24	140	164	15%
	1997	18	210	228	8%
	1998	23	261	284	8%
	1999	23	271	294	8%
	2000	25	179	204	12%
	2001	17	179	196	9%
	2002	48	813	861	6%
	2003	17	182	199	9%
	2004	38	878	916	4%
	2005	3	43	46	7%
ST0001284 Total		**294**	**3664**	**3958**	**7%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001294	1985		3	3	0%
	1986		5	5	0%
	1987		5	5	0%
	1988		9	9	0%
	1989		8	8	0%
	1990		12	12	0%
	1991	1	10	11	9%
	1992		18	18	0%
	1993	3	27	30	10%
	1994	3	29	32	9%
	1995	1	52	53	2%
	1996	12	34	46	26%
	1997	12	67	79	15%
	1998	5	80	85	6%
	1999	11	82	93	12%
	2000	11	68	79	14%
	2001	6	77	83	7%
	2002	17	318	335	5%
	2003	6	92	98	6%
	2004	6	356	362	2%
	2005		31	31	0%
ST0001294 Total		**94**	**1383**	**1477**	**6%**
ST0001297	1985	7	9	16	44%
	1986	5	10	15	33%
	1987	6	21	27	22%
	1988	13	23	36	36%
	1989	3	32	35	9%
	1990	16	41	57	28%
	1991	12	67	79	15%
	1992	22	87	109	20%
	1993	21	144	165	13%
	1994	22	177	199	11%
	1995	22	189	211	10%
	1996	64	141	205	31%
	1997	64	146	210	30%
	1998	58	149	207	28%
	1999	55	136	191	29%
	2000	43	134	177	24%
	2001	17	91	108	16%
	2002	18	171	189	10%
	2003	10	77	87	11%
	2004	8	120	128	6%
	2005	1	15	16	6%
ST0001297 Total		**487**	**1980**	**2467**	**20%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001299	1984	2	1	3	67%
	1985	2	8	10	20%
	1986	4	12	16	25%
	1987	3	13	16	19%
	1988	8	21	29	28%
	1989	8	25	33	24%
	1990	6	32	38	16%
	1991	5	41	46	11%
	1992	7	45	52	13%
	1993	5	75	80	6%
	1994	13	99	112	12%
	1995	12	156	168	7%
	1996	30	113	143	21%
	1997	28	172	200	14%
	1998	29	163	192	15%
	1999	25	176	201	12%
	2000	17	159	176	10%
	2001	12	102	114	11%
	2002	17	188	205	8%
	2003	7	65	72	10%
	2004	7	172	179	4%
	2005	4	21	25	16%
ST0001299 Total		**251**	**1859**	**2110**	**12%**
ST0001303	1984	1		1	100%
	1985	2	8	10	20%
	1986	1	9	10	10%
	1987	4	7	11	36%
	1988	3	8	11	27%
	1989	1	16	17	6%
	1990	6	20	26	23%
	1991	6	20	26	23%
	1992	3	30	33	9%
	1993	3	40	43	7%
	1994	7	64	71	10%
	1995	9	88	97	9%
	1996	27	60	87	31%
	1997	23	87	110	21%
	1998	31	107	138	22%
	1999	28	124	152	18%
	2000	15	104	119	13%
	2001	22	104	126	17%
	2002	30	143	173	17%
	2003	9	57	66	14%
	2004	13	150	163	8%
	2005	3	31	34	9%
ST0001303 Total		**247**	**1277**	**1524**	**16%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001363	1984	2		2	100%
	1985	2	4	6	33%
	1986	6	3	9	67%
	1987	5	10	15	33%
	1988	2	14	16	13%
	1989	9	19	28	32%
	1990	12	44	56	21%
	1991	9	42	51	18%
	1992	20	53	73	27%
	1993	20	92	112	18%
	1994	15	119	134	11%
	1995	23	137	160	14%
	1996	34	129	163	21%
	1997	41	152	193	21%
	1998	35	152	187	19%
	1999	31	160	191	16%
	2000	34	139	173	20%
	2001	25	116	141	18%
	2002	18	230	248	7%
	2003	14	101	115	12%
	2004	10	211	221	5%
	2005	1	22	23	4%
ST0001363 Total		**368**	**1949**	**2317**	**16%**
ST0001368	1984		1	1	0%
	1985	1	1	2	50%
	1986	2	7	9	22%
	1987	2	15	17	12%
	1988	2	30	32	6%
	1989	6	27	33	18%
	1990	2	22	24	8%
	1991	1	34	35	3%
	1992	8	50	58	14%
	1993	6	58	64	9%
	1994	6	99	105	6%
	1995	8	136	144	6%
	1996	13	133	146	9%
	1997	14	191	205	7%
	1998	36	261	297	12%
	1999	22	293	315	7%
	2000	12	174	186	6%
	2001	20	172	192	10%
	2002	31	750	781	4%
	2003	8	181	189	4%
	2004	11	824	835	1%
	2005	6	63	69	9%
ST0001368 Total		**217**	**3522**	**3739**	**6%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001371	1984	1	2	3	33%
	1985	3	8	11	27%
	1986	2	18	20	10%
	1987	4	26	30	13%
	1988		34	34	0%
	1989	10	36	46	22%
	1990	7	45	52	13%
	1991	4	45	49	8%
	1992	13	78	91	14%
	1993	9	97	106	8%
	1994	11	136	147	7%
	1995	11	164	175	6%
	1996	30	173	203	15%
	1997	35	181	216	16%
	1998	31	246	277	11%
	1999	26	235	261	10%
	2000	21	149	170	12%
	2001	25	147	172	15%
	2002	33	494	527	6%
	2003	7	157	164	4%
	2004	21	586	607	3%
	2005	19	287	306	6%
	2007	1		1	100%
ST0001371 Total		**324**	**3344**	**3668**	**9%**
ST0001377	1984		1	1	0%
	1985	1	4	5	20%
	1986	3	12	15	20%
	1987	2	17	19	11%
	1988	3	27	30	10%
	1989	4	30	34	12%
	1990	4	43	47	9%
	1991	9	43	52	17%
	1992	11	67	78	14%
	1993	13	90	103	13%
	1994	14	119	133	11%
	1995	18	148	166	11%
	1996	34	136	170	20%
	1997	37	162	199	19%
	1998	22	196	218	10%
	1999	24	197	221	11%
	2000	18	149	167	11%
	2001	26	144	170	15%
	2002	27	374	401	7%
	2003	13	129	142	9%
	2004	18	417	435	4%
	2005	1	137	138	1%
ST0001377 Total		**302**	**2642**	**2944**	**10%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001401	1984		1	1	0%
	1985	3	4	7	43%
	1986	8	8	16	50%
	1987	7	22	29	24%
	1988	12	23	35	34%
	1989	10	33	43	23%
	1990	14	45	59	24%
	1991	17	46	63	27%
	1992	12	63	75	16%
	1993	22	97	119	18%
	1994	16	109	125	13%
	1995	24	134	158	15%
	1996	45	122	167	27%
	1997	39	145	184	21%
	1998	49	143	192	26%
	1999	34	155	189	18%
	2000	34	138	172	20%
	2001	20	128	148	14%
	2002	17	204	221	8%
	2003	15	108	123	12%
	2004	9	186	195	5%
	2005	5	28	33	15%
ST0001401 Total		**412**	**1942**	**2354**	**18%**
ST0001423	1984		1	1	0%
	1985	2	4	6	33%
	1986	2	10	12	17%
	1987	5	13	18	28%
	1988	8	20	28	29%
	1989	7	32	39	18%
	1990	4	33	37	11%
	1991	12	43	55	22%
	1992	20	73	93	22%
	1993	23	110	133	17%
	1994	13	142	155	8%
	1995	27	162	189	14%
	1996	50	163	213	23%
	1997	57	205	262	22%
	1998	55	194	249	22%
	1999	61	222	283	22%
	2000	68	204	272	25%
	2001	61	222	283	22%
	2002	59	466	525	11%
	2003	58	355	413	14%
	2004	113	1005	1118	10%
	2005	163	1147	1310	12%
ST0001423 Total		**868**	**4826**	**5694**	**15%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001470	1985		1	1	0%
	1986		2	2	0%
	1987	2	9	11	18%
	1988		8	8	0%
	1989		6	6	0%
	1990	3	11	14	21%
	1991		9	9	0%
	1992	1	15	16	6%
	1993	2	23	25	8%
	1994	3	12	15	20%
	1995	1	37	38	3%
	1996	2	27	29	7%
	1997	2	44	46	4%
	1998	1	33	34	3%
	1999	3	56	59	5%
	2000	6	17	23	26%
	2001	2	20	22	9%
	2002	2	40	42	5%
	2003	4	25	29	14%
	2004		84	84	0%
	2005	1	20	21	5%
ST0001470 Total		**35**	**499**	**534**	**7%**
ST0001511	1984		1	1	0%
	1985	7	6	13	54%
	1986	6	15	21	29%
	1987	7	23	30	23%
	1988	6	31	37	16%
	1989	8	40	48	17%
	1990	3	47	50	6%
	1991	4	44	48	8%
	1992	3	68	71	4%
	1993	7	121	128	5%
	1994	11	136	147	7%
	1995	9	183	192	5%
	1996	26	173	199	13%
	1997	16	203	219	7%
	1998	23	258	281	8%
	1999	36	287	323	11%
	2000	14	161	175	8%
	2001	14	177	191	7%
	2002	26	557	583	4%
	2003	8	160	168	5%
	2004	18	567	585	3%
	2005	7	117	124	6%
ST0001511 Total		**259**	**3375**	**3634**	**7%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001519	1984	1		1	100%
	1985	10	24	34	29%
	1986	10	47	57	18%
	1987	13	52	65	20%
	1988	13	80	93	14%
	1989	9	85	94	10%
	1990	5	72	77	6%
	1991	13	89	102	13%
	1992	10	84	94	11%
	1993	16	156	172	9%
	1994	13	210	223	6%
	1995	19	264	283	7%
	1996	23	227	250	9%
	1997	30	280	310	10%
	1998	30	350	380	8%
	1999	31	326	357	9%
	2000	26	192	218	12%
	2001	28	175	203	14%
	2002	32	672	704	5%
	2003	13	211	224	6%
	2004	22	711	733	3%
	2005	7	115	122	6%
ST0001519 Total		**374**	**4422**	**4796**	**8%**
ST0001594	1984	1		1	100%
	1985	2	10	12	17%
	1986		19	19	0%
	1987	1	17	18	6%
	1988	8	33	41	20%
	1989	6	31	37	16%
	1990	11	30	41	27%
	1991	9	45	54	17%
	1992	14	49	63	22%
	1993	15	84	99	15%
	1994	13	111	124	10%
	1995	10	118	128	8%
	1996	29	122	151	19%
	1997	32	169	201	16%
	1998	32	181	213	15%
	1999	24	194	218	11%
	2000	25	174	199	13%
	2001	26	120	146	18%
	2002	31	329	360	9%
	2003	15	144	159	9%
	2004	13	369	382	3%
	2005	13	128	141	9%
ST0001594 Total		**330**	**2477**	**2807**	**12%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001613	1984	1	3	4	25%
	1985	5	6	11	45%
	1986	2	19	21	10%
	1987	6	24	30	20%
	1988	6	32	38	16%
	1989	6	36	42	14%
	1990	8	40	48	17%
	1991	5	51	56	9%
	1992	11	60	71	15%
	1993	5	80	85	6%
	1994	13	125	138	9%
	1995	11	161	172	6%
	1996	23	145	168	14%
	1997	34	212	246	14%
	1998	43	213	256	17%
	1999	24	218	242	10%
	2000	29	172	201	14%
	2001	23	191	214	11%
	2002	49	444	493	10%
	2003	9	158	167	5%
	2004	16	541	557	3%
	2005	9	174	183	5%
ST0001613 Total		**338**	**3105**	**3443**	**10%**
ST0001615	1985	2	6	8	25%
	1986	5	12	17	29%
	1987	7	13	20	35%
	1988	6	16	22	27%
	1989	6	31	37	16%
	1990	5	20	25	20%
	1991	10	36	46	22%
	1992	9	39	48	19%
	1993	10	60	70	14%
	1994	14	90	104	13%
	1995	5	112	117	4%
	1996	24	78	102	24%
	1997	25	124	149	17%
	1998	24	125	149	16%
	1999	18	123	141	13%
	2000	16	108	124	13%
	2001	24	98	122	20%
	2002	27	249	276	10%
	2003	13	77	90	14%
	2004	9	204	213	4%
	2005	2	43	45	4%
ST0001615 Total		**261**	**1664**	**1925**	**14%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001646	1984	1	3	4	25%
	1985	3	19	22	14%
	1986	1	14	15	7%
	1987	5	31	36	14%
	1988	5	26	31	16%
	1989	14	31	45	31%
	1990	6	38	44	14%
	1991	9	46	55	16%
	1992	11	55	66	17%
	1993	13	97	110	12%
	1994	13	112	125	10%
	1995	20	153	173	12%
	1996	29	141	170	17%
	1997	29	176	205	14%
	1998	27	193	220	12%
	1999	21	217	238	9%
	2000	25	188	213	12%
	2001	26	164	190	14%
	2002	44	443	487	9%
	2003	13	166	179	7%
	2004	18	477	495	4%
	2005	3	74	77	4%
ST0001646 Total		**336**	**2864**	**3200**	**11%**
ST0001660	1984		2	2	0%
	1985	6	9	15	40%
	1986	11	15	26	42%
	1987	5	14	19	26%
	1988	2	22	24	8%
	1989	10	32	42	24%
	1990	7	43	50	14%
	1991	15	58	73	21%
	1992	13	72	85	15%
	1993	14	93	107	13%
	1994	19	144	163	12%
	1995	16	210	226	7%
	1996	25	175	200	13%
	1997	43	230	273	16%
	1998	74	315	389	19%
	1999	35	333	368	10%
	2000	55	269	324	17%
	2001	48	318	366	13%
	2002	70	773	843	8%
	2003	27	346	373	7%
	2004	39	848	887	4%
	2005	16	235	251	6%
ST0001660 Total		**550**	**4556**	**5106**	**11%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001662	1984	2	2	4	50%
	1985	3	12	15	20%
	1986	7	5	12	58%
	1987	1	26	27	4%
	1988	5	25	30	17%
	1989	8	34	42	19%
	1990	5	37	42	12%
	1991	11	31	42	26%
	1992	9	51	60	15%
	1993	10	81	91	11%
	1994	9	126	135	7%
	1995	15	142	157	10%
	1996	26	131	157	17%
	1997	33	161	194	17%
	1998	18	245	263	7%
	1999	18	213	231	8%
	2000	19	157	176	11%
	2001	31	178	209	15%
	2002	43	495	538	8%
	2003	5	174	179	3%
	2004	30	616	646	5%
	2005	23	198	221	10%
ST0001662 Total		**331**	**3140**	**3471**	**10%**
ST0001679	1984	3		3	100%
	1985	6	13	19	32%
	1986	7	28	35	20%
	1987	8	33	41	20%
	1988	6	42	48	13%
	1989	11	54	65	17%
	1990	12	67	79	15%
	1991	9	66	75	12%
	1992	22	75	97	23%
	1993	15	121	136	11%
	1994	21	196	217	10%
	1995	28	221	249	11%
	1996	49	219	268	18%
	1997	39	283	322	12%
	1998	43	349	392	11%
	1999	32	329	361	9%
	2000	31	209	240	13%
	2001	30	230	260	12%
	2002	57	758	815	7%
	2003	19	200	219	9%
	2004	28	785	813	3%
	2005	6	51	57	11%
ST0001679 Total		**482**	**4329**	**4811**	**10%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001704	1984	2		2	100%
	1985	8	16	24	33%
	1986	12	18	30	40%
	1987	5	33	38	13%
	1988	8	37	45	18%
	1989	5	38	43	12%
	1990	9	43	52	17%
	1991	10	54	64	16%
	1992	9	89	98	9%
	1993	10	121	131	8%
	1994	17	119	136	13%
	1995	17	188	205	8%
	1996	29	137	166	17%
	1997	18	184	202	9%
	1998	30	233	263	11%
	1999	27	216	243	11%
	2000	23	146	169	14%
	2001	24	135	159	15%
	2002	33	448	481	7%
	2003	10	123	133	8%
	2004	11	502	513	2%
	2005	1	40	41	2%
ST0001704 Total		**318**	**2920**	**3238**	**10%**
ST0001725	1984	1	2	3	33%
	1985	2	15	17	12%
	1986	3	21	24	13%
	1987	2	29	31	6%
	1988	3	60	63	5%
	1989	1	44	45	2%
	1990	3	48	51	6%
	1991	6	43	49	12%
	1992	5	62	67	7%
	1993	11	115	126	9%
	1994	7	134	141	5%
	1995	7	183	190	4%
	1996	26	161	187	14%
	1997	26	223	249	10%
	1998	29	249	278	10%
	1999	24	291	315	8%
	2000	22	155	177	12%
	2001	22	146	168	13%
	2002	39	598	637	6%
	2003	10	142	152	7%
	2004	2	563	565	0%
	2005	1	25	26	4%
ST0001725 Total		**252**	**3309**	**3561**	**7%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001767	1984	2	1	3	67%
	1985	7	15	22	32%
	1986	8	26	34	24%
	1987	11	26	37	30%
	1988	7	44	51	14%
	1989	14	64	78	18%
	1990	8	70	78	10%
	1991	5	79	84	6%
	1992	18	90	108	17%
	1993	12	157	169	7%
	1994	20	219	239	8%
	1995	28	297	325	9%
	1996	74	258	332	22%
	1997	83	325	408	20%
	1998	76	442	518	15%
	1999	74	409	483	15%
	2000	59	380	439	13%
	2001	53	301	354	15%
	2002	78	914	992	8%
	2003	31	324	355	9%
	2004	26	1061	1087	2%
	2005	6	167	173	3%
ST0001767 Total		**700**	**5669**	**6369**	**11%**
ST0001790	1984	1		1	100%
	1986	1	1	2	50%
	1987	2	4	6	33%
	1988	1	4	5	20%
	1989	3	6	9	33%
	1990		11	11	0%
	1991	2	12	14	14%
	1992	2	9	11	18%
	1993	4	19	23	17%
	1994	6	41	47	13%
	1995	3	34	37	8%
	1996	15	50	65	23%
	1997	8	60	68	12%
	1998	13	82	95	14%
	1999	11	87	98	11%
	2000	11	70	81	14%
	2001	12	65	77	16%
	2002	18	273	291	6%
	2003	6	75	81	7%
	2004	13	279	292	4%
	2005		37	37	0%
ST0001790 Total		**132**	**1219**	**1351**	**10%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001797	1985	4	4	8	50%
	1986		13	13	0%
	1987	5	13	18	28%
	1988	3	24	27	11%
	1989	4	13	17	24%
	1990	6	24	30	20%
	1991	7	18	25	28%
	1992	3	25	28	11%
	1993	4	43	47	9%
	1994		44	44	0%
	1995	9	58	67	13%
	1996	12	54	66	18%
	1997	6	91	97	6%
	1998	13	116	129	10%
	1999	5	113	118	4%
	2000	10	69	79	13%
	2001	13	84	97	13%
	2002	18	251	269	7%
	2003	2	60	62	3%
	2004	4	288	292	1%
	2005	1	33	34	3%
ST0001797 Total		**129**	**1438**	**1567**	**8%**
ST0001799	1983		2	2	0%
	1984		2	2	0%
	1985	6	10	16	38%
	1986	6	19	25	24%
	1987	9	22	31	29%
	1988	6	23	29	21%
	1989	5	30	35	14%
	1990	6	36	42	14%
	1991	5	43	48	10%
	1992	4	49	53	8%
	1993	5	74	79	6%
	1994	8	119	127	6%
	1995	13	142	155	8%
	1996	15	128	143	10%
	1997	15	159	174	9%
	1998	18	225	243	7%
	1999	23	195	218	11%
	2000	13	136	149	9%
	2001	19	166	185	10%
	2002	32	542	574	6%
	2003	7	149	156	4%
	2004	18	525	543	3%
	2005	3	64	67	4%
ST0001799 Total		**236**	**2860**	**3096**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001805	1984	4	3	7	57%
	1985	13	11	24	54%
	1986	9	32	41	22%
	1987	21	45	66	32%
	1988	12	76	88	14%
	1989	11	89	100	11%
	1990	15	74	89	17%
	1991	13	81	94	14%
	1992	22	114	136	16%
	1993	17	188	205	8%
	1994	25	249	274	9%
	1995	32	283	315	10%
	1996	65	287	352	18%
	1997	75	374	449	17%
	1998	73	409	482	15%
	1999	59	415	474	12%
	2000	55	360	415	13%
	2001	51	264	315	16%
	2002	92	804	896	10%
	2003	27	261	288	9%
	2004	50	878	928	5%
	2005	7	130	137	5%
ST0001805 Total		**748**	**5427**	**6175**	**12%**
ST0001825	1985	2	3	5	40%
	1986	6	6	12	50%
	1987	1	12	13	8%
	1988	3	25	28	11%
	1989	7	21	28	25%
	1990	5	16	21	24%
	1991	6	25	31	19%
	1992	5	39	44	11%
	1993	7	56	63	11%
	1994	8	79	87	9%
	1995	6	84	90	7%
	1996	14	97	111	13%
	1997	18	112	130	14%
	1998	18	140	158	11%
	1999	21	127	148	14%
	2000	16	92	108	15%
	2001	14	88	102	14%
	2002	34	331	365	9%
	2003	3	86	89	3%
	2004	10	371	381	3%
	2005	3	36	39	8%
ST0001825 Total		**207**	**1846**	**2053**	**10%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001835	1984	1	1	2	50%
	1985	2	8	10	20%
	1986	6	10	16	38%
	1987	7	20	27	26%
	1988	11	33	44	25%
	1989	3	40	43	7%
	1990	3	40	43	7%
	1991	4	31	35	11%
	1992	11	59	70	16%
	1993	9	71	80	11%
	1994	14	95	109	13%
	1995	9	142	151	6%
	1996	14	107	121	12%
	1997	24	157	181	13%
	1998	27	177	204	13%
	1999	18	182	200	9%
	2000	11	143	154	7%
	2001	19	118	137	14%
	2002	18	345	363	5%
	2003	4	104	108	4%
	2004	8	364	372	2%
	2005		32	32	0%
ST0001835 Total		**223**	**2279**	**2502**	**9%**
ST0001876	1984		4	4	0%
	1985	13	24	37	35%
	1986	7	36	43	16%
	1987	13	48	61	21%
	1988	7	70	77	9%
	1989	11	85	96	11%
	1990	6	88	94	6%
	1991	5	101	106	5%
	1992	15	111	126	12%
	1993	13	200	213	6%
	1994	27	267	294	9%
	1995	22	292	314	7%
	1996	52	330	382	14%
	1997	54	420	474	11%
	1998	65	483	548	12%
	1999	52	512	564	9%
	2000	47	299	346	14%
	2001	50	330	380	13%
	2002	78	1199	1277	6%
	2003	23	287	310	7%
	2004	28	1153	1181	2%
	2005	6	112	118	5%
ST0001876 Total		**594**	**6451**	**7045**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001889	1984	1		1	100%
	1985	1	6	7	14%
	1986	9	20	29	31%
	1987	9	18	27	33%
	1988	10	32	42	24%
	1989	10	41	51	20%
	1990	12	43	55	22%
	1991	7	48	55	13%
	1992	5	57	62	8%
	1993	6	88	94	6%
	1994	9	121	130	7%
	1995	14	151	165	8%
	1996	21	153	174	12%
	1997	24	228	252	10%
	1998	26	278	304	9%
	1999	29	272	301	10%
	2000	20	261	281	7%
	2001	33	274	307	11%
	2002	39	667	706	6%
	2003	26	316	342	8%
	2004	34	744	778	4%
	2005	14	225	239	6%
ST0001889 Total		**359**	**4043**	**4402**	**8%**
ST0001896	1985	5	3	8	63%
	1986	3	17	20	15%
	1987	7	24	31	23%
	1988	5	34	39	13%
	1989	5	29	34	15%
	1990	3	42	45	7%
	1991	7	36	43	16%
	1992	6	53	59	10%
	1993	8	91	99	8%
	1994	8	115	123	7%
	1995	16	130	146	11%
	1996	20	134	154	13%
	1997	20	165	185	11%
	1998	16	215	231	7%
	1999	25	239	264	9%
	2000	17	139	156	11%
	2001	28	165	193	15%
	2002	29	593	622	5%
	2003	13	150	163	8%
	2004	15	585	600	3%
	2005	10	91	101	10%
ST0001896 Total		**266**	**3050**	**3316**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001944	1984	2	2	4	50%
	1985	2	19	21	10%
	1986	3	20	23	13%
	1987	11	35	46	24%
	1988	14	54	68	21%
	1989	8	43	51	16%
	1990	8	61	69	12%
	1991	7	65	72	10%
	1992	13	104	117	11%
	1993	10	117	127	8%
	1994	11	156	167	7%
	1995	14	208	222	6%
	1996	36	230	266	14%
	1997	35	291	326	11%
	1998	44	351	395	11%
	1999	42	390	432	10%
	2000	39	262	301	13%
	2001	51	249	300	17%
	2002	65	985	1050	6%
	2003	20	260	280	7%
	2004	23	895	918	3%
	2005	3	135	138	2%
ST0001944 Total		**461**	**4932**	**5393**	**9%**
ST0001969	1985		6	6	0%
	1986		7	7	0%
	1987	1	8	9	11%
	1988	1	15	16	6%
	1989	4	17	21	19%
	1990	1	11	12	8%
	1991	2	18	20	10%
	1992	3	21	24	13%
	1993	6	45	51	12%
	1994	4	70	74	5%
	1995	4	78	82	5%
	1996	15	104	119	13%
	1997	12	118	130	9%
	1998	26	180	206	13%
	1999	15	221	236	6%
	2000	7	119	126	6%
	2001	10	127	137	7%
	2002	26	559	585	4%
	2003	10	111	121	8%
	2004	13	563	576	2%
	2005	1	66	67	1%
ST0001969 Total		**161**	**2464**	**2625**	**6%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0001970	1984	2		2	100%
	1985	2	12	14	14%
	1986	3	8	11	27%
	1987	4	24	28	14%
	1988	5	20	25	20%
	1989	6	26	32	19%
	1990	2	33	35	6%
	1991	8	48	56	14%
	1992	3	66	69	4%
	1993	7	70	77	9%
	1994	8	92	100	8%
	1995	14	156	170	8%
	1996	16	128	144	11%
	1997	22	191	213	10%
	1998	24	243	267	9%
	1999	24	305	329	7%
	2000	21	162	183	11%
	2001	24	178	202	12%
	2002	32	823	855	4%
	2003	9	202	211	4%
	2004	18	883	901	2%
	2005	4	99	103	4%
ST0001970 Total		**258**	**3769**	**4027**	**6%**
ST0002018	1984		1	1	0%
	1985	2	11	13	15%
	1986	1	8	9	11%
	1987	3	22	25	12%
	1988	3	22	25	12%
	1989	2	27	29	7%
	1990		13	13	0%
	1991	3	29	32	9%
	1992	6	31	37	16%
	1993	4	41	45	9%
	1994	5	71	76	7%
	1995	3	86	89	3%
	1996	7	72	79	9%
	1997	6	123	129	5%
	1998	13	138	151	9%
	1999	10	161	171	6%
	2000	10	99	109	9%
	2001	10	96	106	9%
	2002	17	371	388	4%
	2003	4	74	78	5%
	2004	5	386	391	1%
	2005		30	30	0%
ST0002018 Total		**114**	**1912**	**2026**	**6%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002020	1985		1	1	0%
	1986		2	2	0%
	1987	1	6	7	14%
	1988		7	7	0%
	1989	2	7	9	22%
	1990	3	10	13	23%
	1991	1	10	11	9%
	1992	2	13	15	13%
	1993	2	25	27	7%
	1994	2	26	28	7%
	1995	2	44	46	4%
	1996	8	48	56	14%
	1997	11	63	74	15%
	1998	13	86	99	13%
	1999	10	100	110	9%
	2000	8	71	79	10%
	2001	15	108	123	12%
	2002	23	360	383	6%
	2003	9	121	130	7%
	2004	21	573	594	4%
	2005		63	63	0%
ST0002020 Total		**133**	**1744**	**1877**	**7%**
ST0002026	1983	1		1	100%
	1984	1		1	100%
	1985	1	8	9	11%
	1986	3	12	15	20%
	1987	3	21	24	13%
	1988	5	21	26	19%
	1989	2	28	30	7%
	1990	4	22	26	15%
	1991	6	26	32	19%
	1992	4	35	39	10%
	1993	6	52	58	10%
	1994	6	79	85	7%
	1995	5	85	90	6%
	1996	14	85	99	14%
	1997	17	116	133	13%
	1998	26	131	157	17%
	1999	7	141	148	5%
	2000	15	85	100	15%
	2001	12	75	87	14%
	2002	18	352	370	5%
	2003	9	95	104	9%
	2004	12	332	344	3%
	2005	5	59	64	8%
ST0002026 Total		**182**	**1860**	**2042**	**9%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002060	1984	1		1	100%
	1985	5	10	15	33%
	1986	7	18	25	28%
	1987	7	24	31	23%
	1988	3	41	44	7%
	1989	5	35	40	13%
	1990	8	37	45	18%
	1991	2	38	40	5%
	1992	3	55	58	5%
	1993	7	77	84	8%
	1994	6	107	113	5%
	1995	11	135	146	8%
	1996	24	159	183	13%
	1997	24	173	197	12%
	1998	28	243	271	10%
	1999	28	247	275	10%
	2000	31	183	214	14%
	2001	28	151	179	16%
	2002	41	578	619	7%
	2003	10	138	148	7%
	2004	38	552	590	6%
	2005		35	35	0%
ST0002060 Total		**317**	**3036**	**3353**	**9%**
ST0002080	1985	2		2	100%
	1987		5	5	0%
	1988		2	2	0%
	1989	2	6	8	25%
	1990		9	9	0%
	1991		11	11	0%
	1992		6	6	0%
	1993	3	18	21	14%
	1994	1	22	23	4%
	1995	1	26	27	4%
	1996	1	20	21	5%
	1997	4	31	35	11%
	1998	1	27	28	4%
	1999	2	17	19	11%
	2000	4	13	17	24%
	2001	2	23	25	8%
	2002	2	30	32	6%
	2003		14	14	0%
	2004	4	35	39	10%
ST0002080 Total		**29**	**315**	**344**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002120	1985	1	8	9	11%
	1986	2	2	4	50%
	1987	4	10	14	29%
	1988	3	13	16	19%
	1989	2	25	27	7%
	1990	2	23	25	8%
	1991	2	21	23	9%
	1992	2	22	24	8%
	1993	1	23	24	4%
	1994	6	35	41	15%
	1995	3	67	70	4%
	1996	9	64	73	12%
	1997	7	105	112	6%
	1998	11	111	122	9%
	1999	7	144	151	5%
	2000	6	71	77	8%
	2001	12	101	113	11%
	2002	21	364	385	5%
	2003	2	99	101	2%
	2004	9	412	421	2%
	2005	1	31	32	3%
ST0002120 Total		**113**	**1751**	**1864**	**6%**
ST0002133	1985	6	5	11	55%
	1986	2	12	14	14%
	1987	2	9	11	18%
	1988	1	14	15	7%
	1989	3	10	13	23%
	1990	7	30	37	19%
	1991	4	36	40	10%
	1992	3	29	32	9%
	1993	8	57	65	12%
	1994	9	89	98	9%
	1995	8	125	133	6%
	1996	16	116	132	12%
	1997	31	129	160	19%
	1998	29	215	244	12%
	1999	25	217	242	10%
	2000	26	165	191	14%
	2001	20	175	195	10%
	2002	41	573	614	7%
	2003	9	175	184	5%
	2004	16	640	656	2%
	2005	13	134	147	9%
ST0002133 Total		**279**	**2955**	**3234**	**9%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002141	1985	1	1	2	50%
	1986	1	8	9	11%
	1987	5	4	9	56%
	1988		12	12	0%
	1989	1	15	16	6%
	1990		15	15	0%
	1991	1	21	22	5%
	1992	4	23	27	15%
	1993	5	28	33	15%
	1994		37	37	0%
	1995	3	68	71	4%
	1996	7	40	47	15%
	1997	5	93	98	5%
	1998	11	128	139	8%
	1999	13	125	138	9%
	2000	14	82	96	15%
	2001	12	104	116	10%
	2002	23	335	358	6%
	2003	4	99	103	4%
	2004	16	431	447	4%
	2005	2	32	34	6%
ST0002141 Total		**128**	**1701**	**1829**	**7%**
ST0002143	1986		2	2	0%
	1987	1		1	100%
	1989		1	1	0%
	1990	1	1	2	50%
	1991		3	3	0%
	1992		5	5	0%
	1993		6	6	0%
	1994	2	4	6	33%
	1995		11	11	0%
	1996	2	3	5	40%
	1997	2	7	9	22%
	1998	1	5	6	17%
	1999	2	9	11	18%
	2000	2	9	11	18%
	2001	1	11	12	8%
	2002	3	12	15	20%
	2003	1	11	12	8%
	2004		13	13	0%
	2005		7	7	0%
ST0002143 Total		**18**	**120**	**138**	**13%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002149	1984	1		1	100%
	1985	1	9	10	10%
	1986	6	8	14	43%
	1987	4	9	13	31%
	1988	6	11	17	35%
	1989	6	23	29	21%
	1990	11	28	39	28%
	1991	2	31	33	6%
	1992	9	47	56	16%
	1993	9	58	67	13%
	1994	6	69	75	8%
	1995	16	105	121	13%
	1996	24	77	101	24%
	1997	17	110	127	13%
	1998	19	153	172	11%
	1999	21	120	141	15%
	2000	13	105	118	11%
	2001	14	105	119	12%
	2002	31	272	303	10%
	2003	6	98	104	6%
	2004	14	282	296	5%
	2005	7	86	93	8%
ST0002149 Total		**243**	**1806**	**2049**	**12%**
ST0002153	1984		1	1	0%
	1985	3	17	20	15%
	1986	3	14	17	18%
	1987	6	29	35	17%
	1988	4	36	40	10%
	1989	4	49	53	8%
	1990	11	50	61	18%
	1991	4	50	54	7%
	1992	12	55	67	18%
	1993	9	97	106	8%
	1994	9	111	120	8%
	1995	8	140	148	5%
	1996	21	150	171	12%
	1997	24	189	213	11%
	1998	24	283	307	8%
	1999	15	238	253	6%
	2000	12	164	176	7%
	2001	16	153	169	9%
	2002	28	663	691	4%
	2003	14	124	138	10%
	2004	18	668	686	3%
	2005		45	45	0%
ST0002153 Total		**245**	**3326**	**3571**	**7%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002178	1982		1	1	0%
	1984		3	3	0%
	1985	3	24	27	11%
	1986	5	6	11	45%
	1987	5	25	30	17%
	1988	1	23	24	4%
	1989	6	34	40	15%
	1990	7	35	42	17%
	1991	3	47	50	6%
	1992	8	49	57	14%
	1993	6	75	81	7%
	1994	10	61	71	14%
	1995	12	111	123	10%
	1996	12	107	119	10%
	1997	16	136	152	11%
	1998	17	164	181	9%
	1999	11	188	199	6%
	2000	11	123	134	8%
	2001	15	117	132	11%
	2002	27	378	405	7%
	2003	9	114	123	7%
	2004	15	405	420	4%
	2005	4	36	40	10%
ST0002178 Total		**203**	**2262**	**2465**	**8%**
ST0002181	1984	1	2	3	33%
	1985	7	10	17	41%
	1986	1	24	25	4%
	1987	3	39	42	7%
	1988	9	63	72	13%
	1989	3	56	59	5%
	1990	9	75	84	11%
	1991	11	74	85	13%
	1992	8	92	100	8%
	1993	23	133	156	15%
	1994	9	167	176	5%
	1995	15	259	274	5%
	1996	36	235	271	13%
	1997	43	371	414	10%
	1998	62	475	537	12%
	1999	51	496	547	9%
	2000	30	264	294	10%
	2001	37	305	342	11%
	2002	68	1238	1306	5%
	2003	18	284	302	6%
	2004	42	1185	1227	3%
	2005	2	91	93	2%
ST0002181 Total		**488**	**5938**	**6426**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002233	1984		2	2	0%
	1985	4	7	11	36%
	1986	7	25	32	22%
	1987	9	25	34	26%
	1988	7	36	43	16%
	1989	8	69	77	10%
	1990	4	77	81	5%
	1991	12	64	76	16%
	1992	13	102	115	11%
	1993	25	146	171	15%
	1994	12	178	190	6%
	1995	22	231	253	9%
	1996	37	196	233	16%
	1997	65	287	352	18%
	1998	51	304	355	14%
	1999	47	338	385	12%
	2000	55	255	310	18%
	2001	39	249	288	14%
	2002	54	591	645	8%
	2003	20	222	242	8%
	2004	33	586	619	5%
	2005	11	149	160	7%
ST0002233 Total		**535**	**4139**	**4674**	**11%**
ST0002267	1985		3	3	0%
	1986	1	6	7	14%
	1987	2	7	9	22%
	1988	5	9	14	36%
	1989	5	13	18	28%
	1990	2	23	25	8%
	1991	2	27	29	7%
	1992	5	19	24	21%
	1993	2	32	34	6%
	1994	3	55	58	5%
	1995	2	63	65	3%
	1996	1	62	63	2%
	1997	6	94	100	6%
	1998	8	102	110	7%
	1999	11	95	106	10%
	2000	6	61	67	9%
	2001	9	52	61	15%
	2002	11	312	323	3%
	2003	4	69	73	5%
	2004	5	376	381	1%
	2005	2	64	66	3%
ST0002267 Total		**92**	**1544**	**1636**	**6%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002280	1985		1	1	0%
	1986		1	1	0%
	1987		1	1	0%
	1988		1	1	0%
	1989	1	3	4	25%
	1990		1	1	0%
	1991		3	3	0%
	1992		3	3	0%
	1993		2	2	0%
	1994	1	3	4	25%
	1995		9	9	0%
	1996	1	10	11	9%
	1997	1	12	13	8%
	1998	2	14	16	13%
	1999	1	11	12	8%
	2000		7	7	0%
	2001	1	6	7	14%
	2002	3	39	42	7%
	2003	1	12	13	8%
	2004	2	35	37	5%
	2005		9	9	0%
ST0002280 Total		**14**	**183**	**197**	**7%**
ST0002304	1984	2	2	4	50%
	1985	2	11	13	15%
	1986	5	11	16	31%
	1987	8	21	29	28%
	1988	5	36	41	12%
	1989	6	51	57	11%
	1990	3	35	38	8%
	1991	10	54	64	16%
	1992	8	71	79	10%
	1993	7	92	99	7%
	1994	4	127	131	3%
	1995	14	183	197	7%
	1996	32	154	186	17%
	1997	22	235	257	9%
	1998	21	251	272	8%
	1999	28	267	295	9%
	2000	22	193	215	10%
	2001	39	194	233	17%
	2002	45	557	602	7%
	2003	11	165	176	6%
	2004	14	596	610	2%
	2005	6	96	102	6%
ST0002304 Total		**314**	**3402**	**3716**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002318	1984		2	2	0%
	1985	3	6	9	33%
	1986	1	7	8	13%
	1987	1	12	13	8%
	1988	4	12	16	25%
	1989	2	19	21	10%
	1990	4	16	20	20%
	1991	5	24	29	17%
	1992	1	23	24	4%
	1993	1	41	42	2%
	1994	2	38	40	5%
	1995	3	47	50	6%
	1996	12	33	45	27%
	1997	14	61	75	19%
	1998	13	90	103	13%
	1999	12	52	64	19%
	2000	3	37	40	8%
	2001	5	36	41	12%
	2002	6	92	98	6%
	2003	1	30	31	3%
	2004	3	101	104	3%
	2005		10	10	0%
ST0002318 Total		**96**	**789**	**885**	**11%**
ST0002330	1984	1	1	2	50%
	1985	1	5	6	17%
	1986	7	10	17	41%
	1987	4	29	33	12%
	1988		35	35	0%
	1989	4	27	31	13%
	1990	2	17	19	11%
	1991	6	30	36	17%
	1992	5	38	43	12%
	1993	4	52	56	7%
	1994	5	82	87	6%
	1995	8	107	115	7%
	1996	15	93	108	14%
	1997	20	121	141	14%
	1998	19	154	173	11%
	1999	18	152	170	11%
	2000	13	119	132	10%
	2001	12	111	123	10%
	2002	39	387	426	9%
	2003	10	107	117	9%
	2004	13	466	479	3%
	2005	1	37	38	3%
	2006		1	1	0%
	2007		3	3	0%
ST0002330 Total		**207**	**2184**	**2391**	**9%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002340	1984		1	1	0%
	1986	2	1	3	67%
	1987	1	4	5	20%
	1988		5	5	0%
	1989		4	4	0%
	1990	1	9	10	10%
	1991	1	4	5	20%
	1992	1	13	14	7%
	1993		16	16	0%
	1994	1	17	18	6%
	1995	2	28	30	7%
	1996	8	38	46	17%
	1997	6	41	47	13%
	1998	9	68	77	12%
	1999	10	86	96	10%
	2000	7	57	64	11%
	2001	7	67	74	9%
	2002	10	186	196	5%
	2003	9	71	80	11%
	2004	8	323	331	2%
	2005	8	182	190	4%
	2007		1	1	0%
ST0002340 Total		**91**	**1222**	**1313**	**7%**
ST0002358	1984		1	1	0%
	1985	1	5	6	17%
	1986	2	3	5	40%
	1987	2	4	6	33%
	1988	2	10	12	17%
	1989	4	16	20	20%
	1990	7	18	25	28%
	1991	3	7	10	30%
	1992	3	23	26	12%
	1993	3	34	37	8%
	1994	5	59	64	8%
	1995	6	77	83	7%
	1996	15	93	108	14%
	1997	16	91	107	15%
	1998	21	132	153	14%
	1999	11	123	134	8%
	2000	13	89	102	13%
	2001	15	89	104	14%
	2002	24	369	393	6%
	2003	6	102	108	6%
	2004	11	407	418	3%
	2005		23	23	0%
ST0002358 Total		**170**	**1775**	**1945**	**9%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002365	1984		1	1	0%
	1985	2	7	9	22%
	1986	2	11	13	15%
	1987	6	14	20	30%
	1988	2	21	23	9%
	1989	6	29	35	17%
	1990	4	42	46	9%
	1991	7	33	40	18%
	1992	7	48	55	13%
	1993	7	82	89	8%
	1994	5	92	97	5%
	1995	14	132	146	10%
	1996	33	124	157	21%
	1997	25	172	197	13%
	1998	28	217	245	11%
	1999	25	181	206	12%
	2000	26	140	166	16%
	2001	27	137	164	16%
	2002	41	510	551	7%
	2003	16	141	157	10%
	2004	16	455	471	3%
	2005	4	34	38	11%
ST0002365 Total		**303**	**2623**	**2926**	**10%**
ST0002373	1984		1	1	0%
	1985	4	20	24	17%
	1986	8	36	44	18%
	1987	7	54	61	11%
	1988	2	46	48	4%
	1989	11	53	64	17%
	1990	15	58	73	21%
	1991	5	65	70	7%
	1992	8	92	100	8%
	1993	9	136	145	6%
	1994	11	154	165	7%
	1995	13	204	217	6%
	1996	42	218	260	16%
	1997	40	263	303	13%
	1998	37	336	373	10%
	1999	34	357	391	9%
	2000	29	198	227	13%
	2001	22	200	222	10%
	2002	52	775	827	6%
	2003	12	195	207	6%
	2004	36	772	808	4%
	2005	5	70	75	7%
ST0002373 Total		**402**	**4303**	**4705**	**9%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002380	1985	2	4	6	33%
	1986	4	11	15	27%
	1987	5	19	24	21%
	1988	2	17	19	11%
	1989	4	30	34	12%
	1990	4	27	31	13%
	1991	4	29	33	12%
	1992	5	43	48	10%
	1993	4	69	73	5%
	1994	5	68	73	7%
	1995	11	84	95	12%
	1996	17	93	110	15%
	1997	12	120	132	9%
	1998	20	121	141	14%
	1999	12	147	159	8%
	2000	13	89	102	13%
	2001	12	75	87	14%
	2002	18	399	417	4%
	2003	4	95	99	4%
	2004	8	402	410	2%
	2005		24	24	0%
ST0002380 Total		**166**	**1966**	**2132**	**8%**
ST0002419	1984	1	1	2	50%
	1985	4	4	8	50%
	1986	1	7	8	13%
	1987	3	20	23	13%
	1988	8	25	33	24%
	1989	4	23	27	15%
	1990	4	30	34	12%
	1991	6	40	46	13%
	1992	3	44	47	6%
	1993	9	75	84	11%
	1994	3	90	93	3%
	1995	11	105	116	9%
	1996	13	104	117	11%
	1997	22	153	175	13%
	1998	12	170	182	7%
	1999	12	188	200	6%
	2000	9	97	106	8%
	2001	14	91	105	13%
	2002	25	427	452	6%
	2003	10	125	135	7%
	2004	17	503	520	3%
	2005	8	150	158	5%
ST0002419 Total		**199**	**2472**	**2671**	**7%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002427	1984		2	2	0%
	1985	4	15	19	21%
	1986		8	8	0%
	1987	8	22	30	27%
	1988	4	21	25	16%
	1989	7	29	36	19%
	1990	5	23	28	18%
	1991	8	36	44	18%
	1992	6	46	52	12%
	1993	10	59	69	14%
	1994	5	80	85	6%
	1995	11	89	100	11%
	1996	14	104	118	12%
	1997	9	154	163	6%
	1998	12	165	177	7%
	1999	12	177	189	6%
	2000	7	134	141	5%
	2001	15	170	185	8%
	2002	23	405	428	5%
	2003	7	159	166	4%
	2004	28	494	522	5%
	2005	19	339	358	5%
ST0002427 Total		**214**	**2731**	**2945**	**7%**
ST0002493	1984		3	3	0%
	1985	3	5	8	38%
	1986	5	12	17	29%
	1987	5	27	32	16%
	1988	2	32	34	6%
	1989	3	36	39	8%
	1990	3	47	50	6%
	1991	6	54	60	10%
	1992	5	60	65	8%
	1993	2	96	98	2%
	1994	7	117	124	6%
	1995	10	165	175	6%
	1996	20	201	221	9%
	1997	21	269	290	7%
	1998	24	317	341	7%
	1999	27	387	414	7%
	2000	19	265	284	7%
	2001	14	242	256	5%
	2002	37	1052	1089	3%
	2003	8	231	239	3%
	2004	20	1181	1201	2%
	2005	2	62	64	3%
ST0002493 Total		**243**	**4861**	**5104**	**5%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002540	1984	1		1	100%
	1985	5	13	18	28%
	1986	5	9	14	36%
	1987	6	11	17	35%
	1988	6	11	17	35%
	1989	1	22	23	4%
	1990	2	23	25	8%
	1991	1	36	37	3%
	1992	3	39	42	7%
	1993	9	55	64	14%
	1994	11	68	79	14%
	1995	6	88	94	6%
	1996	15	89	104	14%
	1997	19	138	157	12%
	1998	21	154	175	12%
	1999	16	184	200	8%
	2000	13	95	108	12%
	2001	11	118	129	9%
	2002	26	417	443	6%
	2003	10	100	110	9%
	2004	10	382	392	3%
	2005	2	46	48	4%
ST0002540 Total		**199**	**2098**	**2297**	**9%**
ST0002560	1984	1		1	100%
	1985	1	11	12	8%
	1986	3	10	13	23%
	1987	5	29	34	15%
	1988	5	30	35	14%
	1989	6	43	49	12%
	1990	7	61	68	10%
	1991	4	53	57	7%
	1992	5	73	78	6%
	1993	14	87	101	14%
	1994	10	123	133	8%
	1995	8	167	175	5%
	1996	33	193	226	15%
	1997	27	228	255	11%
	1998	34	293	327	10%
	1999	34	286	320	11%
	2000	21	193	214	10%
	2001	16	209	225	7%
	2002	55	886	941	6%
	2003	16	210	226	7%
	2004	32	1027	1059	3%
	2005	16	176	192	8%
ST0002560 Total		**353**	**4388**	**4741**	**7%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002573	1984	1	1	2	50%
	1985	3	7	10	30%
	1986	3	14	17	18%
	1987	6	12	18	33%
	1988	3	17	20	15%
	1989	1	23	24	4%
	1990	2	32	34	6%
	1991	1	29	30	3%
	1992	5	36	41	12%
	1993	11	50	61	18%
	1994	7	80	87	8%
	1995	7	93	100	7%
	1996	14	78	92	15%
	1997	22	102	124	18%
	1998	14	146	160	9%
	1999	13	159	172	8%
	2000	12	130	142	8%
	2001	18	111	129	14%
	2002	43	446	489	9%
	2003	11	122	133	8%
	2004	20	447	467	4%
	2005	7	115	122	6%
ST0002573 Total		**224**	**2250**	**2474**	**9%**
ST0002593	1984	1		1	100%
	1985	2	1	3	67%
	1986	3	11	14	21%
	1987	5	17	22	23%
	1988	2	19	21	10%
	1989	5	20	25	20%
	1990	2	20	22	9%
	1991	2	31	33	6%
	1992	5	32	37	14%
	1993	5	48	53	9%
	1994	7	62	69	10%
	1995	5	79	84	6%
	1996	18	75	93	19%
	1997	19	122	141	13%
	1998	15	166	181	8%
	1999	18	157	175	10%
	2000	10	133	143	7%
	2001	13	118	131	10%
	2002	20	333	353	6%
	2003	6	114	120	5%
	2004	11	342	353	3%
	2005	6	36	42	14%
ST0002593 Total		**180**	**1936**	**2116**	**9%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002603	1985	1		1	100%
	1986		6	6	0%
	1987	1	4	5	20%
	1988		2	2	0%
	1989	1	5	6	17%
	1990	2	9	11	18%
	1991	1	16	17	6%
	1992	3	22	25	12%
	1993	2	27	29	7%
	1994		22	22	0%
	1995	3	53	56	5%
	1996	3	38	41	7%
	1997	5	79	84	6%
	1998	14	89	103	14%
	1999	9	98	107	8%
	2000	10	64	74	14%
	2001	10	80	90	11%
	2002	12	237	249	5%
	2003	5	90	95	5%
	2004	5	269	274	2%
	2005		18	18	0%
ST0002603 Total		**87**	**1228**	**1315**	**7%**
ST0002631	1985	2	4	6	33%
	1986	3	5	8	38%
	1987	1	14	15	7%
	1988	4	14	18	22%
	1989	2	11	13	15%
	1990	1	21	22	5%
	1991	4	18	22	18%
	1992	3	32	35	9%
	1993	1	39	40	3%
	1994	4	42	46	9%
	1995	6	66	72	8%
	1996	7	73	80	9%
	1997	10	86	96	10%
	1998	15	79	94	16%
	1999	11	115	126	9%
	2000	10	81	91	11%
	2001	9	67	76	12%
	2002	19	323	342	6%
	2003	5	62	67	7%
	2004	12	310	322	4%
	2005		15	15	0%
ST0002631 Total		**129**	**1477**	**1606**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002651	1984	1	3	4	25%
	1985	1	4	5	20%
	1986	2	12	14	14%
	1987		17	17	0%
	1988	5	19	24	21%
	1989	2	19	21	10%
	1990	5	13	18	28%
	1991	5	20	25	20%
	1992	6	23	29	21%
	1993	3	35	38	8%
	1994	5	35	40	13%
	1995	4	58	62	6%
	1996	5	53	58	9%
	1997	12	69	81	15%
	1998	8	92	100	8%
	1999	10	90	100	10%
	2000	3	43	46	7%
	2001	3	45	48	6%
	2002	12	196	208	6%
	2003	5	49	54	9%
	2004	10	152	162	6%
	2005		12	12	0%
ST0002651 Total		**107**	**1059**	**1166**	**9%**
ST0002652	1984		2	2	0%
	1985	3	14	17	18%
	1986	11	7	18	61%
	1987	1	41	42	2%
	1988	5	37	42	12%
	1989	5	51	56	9%
	1990	7	52	59	12%
	1991	8	63	71	11%
	1992	11	64	75	15%
	1993	7	91	98	7%
	1994	7	149	156	4%
	1995	16	193	209	8%
	1996	20	186	206	10%
	1997	30	219	249	12%
	1998	28	303	331	8%
	1999	32	297	329	10%
	2000	16	200	216	7%
	2001	38	158	196	19%
	2002	57	779	836	7%
	2003	10	158	168	6%
	2004	24	767	791	3%
	2005	1	54	55	2%
ST0002652 Total		**337**	**3885**	**4222**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002672	1984		3	3	0%
	1985	3	21	24	13%
	1986	12	32	44	27%
	1987	9	50	59	15%
	1988	3	58	61	5%
	1989	11	59	70	16%
	1990	4	58	62	6%
	1991	10	73	83	12%
	1992	11	92	103	11%
	1993	13	133	146	9%
	1994	14	214	228	6%
	1995	13	276	289	4%
	1996	45	233	278	16%
	1997	45	367	412	11%
	1998	44	457	501	9%
	1999	41	452	493	8%
	2000	30	328	358	8%
	2001	42	303	345	12%
	2002	74	1243	1317	6%
	2003	26	307	333	8%
	2004	42	1353	1395	3%
	2005	10	111	121	8%
ST0002672 Total		**502**	**6223**	**6725**	**7%**
ST0002722	1985		5	5	0%
	1986	2	6	8	25%
	1987	2	9	11	18%
	1988	4	14	18	22%
	1989	4	19	23	17%
	1990	4	18	22	18%
	1991	2	24	26	8%
	1992	2	34	36	6%
	1993	5	58	63	8%
	1994	6	70	76	8%
	1995	4	82	86	5%
	1996	14	121	135	10%
	1997	18	135	153	12%
	1998	18	183	201	9%
	1999	25	178	203	12%
	2000	9	112	121	7%
	2001	16	117	133	12%
	2002	35	517	552	6%
	2003	12	112	124	10%
	2004	16	583	599	3%
	2005	4	51	55	7%
ST0002722 Total		**202**	**2448**	**2650**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002740	1984	1	2	3	33%
	1985	7	4	11	64%
	1986	5	15	20	25%
	1987	3	16	19	16%
	1988	2	28	30	7%
	1989	5	32	37	14%
	1990	2	32	34	6%
	1991	6	36	42	14%
	1992	5	50	55	9%
	1993	9	89	98	9%
	1994	12	126	138	9%
	1995	13	126	139	9%
	1996	21	171	192	11%
	1997	30	199	229	13%
	1998	28	307	335	8%
	1999	30	258	288	10%
	2000	18	175	193	9%
	2001	29	186	215	13%
	2002	46	607	653	7%
	2003	12	155	167	7%
	2004	12	692	704	2%
	2005	1	53	54	2%
ST0002740 Total		**297**	**3359**	**3656**	**8%**
ST0002744	1985	3	14	17	18%
	1986	6	25	31	19%
	1987	12	30	42	29%
	1988	7	49	56	13%
	1989	5	50	55	9%
	1990	8	38	46	17%
	1991	5	45	50	10%
	1992	5	78	83	6%
	1993	12	110	122	10%
	1994	16	126	142	11%
	1995	13	195	208	6%
	1996	32	176	208	15%
	1997	29	255	284	10%
	1998	33	296	329	10%
	1999	29	312	341	9%
	2000	34	152	186	18%
	2001	19	185	204	9%
	2002	64	781	845	8%
	2003	12	172	184	7%
	2004	27	797	824	3%
	2005		70	70	0%
ST0002744 Total		**371**	**3956**	**4327**	**9%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002822	1984	1	3	4	25%
	1985	6	11	17	35%
	1986	5	22	27	19%
	1987	9	40	49	18%
	1988	12	55	67	18%
	1989	6	49	55	11%
	1990	10	61	71	14%
	1991	12	77	89	13%
	1992	13	104	117	11%
	1993	15	148	163	9%
	1994	21	182	203	10%
	1995	26	234	260	10%
	1996	41	239	280	15%
	1997	36	273	309	12%
	1998	57	338	395	14%
	1999	56	329	385	15%
	2000	44	238	282	16%
	2001	38	219	257	15%
	2002	60	817	877	7%
	2003	22	264	286	8%
	2004	34	815	849	4%
	2005	15	198	213	7%
ST0002822 Total		**539**	**4716**	**5255**	**10%**
ST0002830	1983		1	1	0%
	1984	2	1	3	67%
	1985	4	12	16	25%
	1986	2	17	19	11%
	1987	5	17	22	23%
	1988	3	29	32	9%
	1989	7	35	42	17%
	1990	4	35	39	10%
	1991	7	39	46	15%
	1992	6	56	62	10%
	1993	6	77	83	7%
	1994	5	90	95	5%
	1995	12	142	154	8%
	1996	19	119	138	14%
	1997	28	187	215	13%
	1998	21	225	246	9%
	1999	16	216	232	7%
	2000	17	136	153	11%
	2001	25	144	169	15%
	2002	34	561	595	6%
	2003	13	137	150	9%
	2004	15	539	554	3%
	2005		51	51	0%
ST0002830 Total		**251**	**2866**	**3117**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002880	1984	2	3	5	40%
	1985	2	16	18	11%
	1986	4	24	28	14%
	1987	8	29	37	22%
	1988	4	51	55	7%
	1989	15	53	68	22%
	1990	4	59	63	6%
	1991	8	54	62	13%
	1992	5	84	89	6%
	1993	9	120	129	7%
	1994	10	161	171	6%
	1995	14	187	201	7%
	1996	30	219	249	12%
	1997	38	260	298	13%
	1998	33	324	357	9%
	1999	41	318	359	11%
	2000	23	165	188	12%
	2001	32	167	199	16%
	2002	39	714	753	5%
	2003	8	182	190	4%
	2004	21	707	728	3%
	2005	2	59	61	3%
ST0002880 Total		**352**	**3956**	**4308**	**8%**
ST0002884	1984	1	1	2	50%
	1985		6	6	0%
	1986		14	14	0%
	1987	1	13	14	7%
	1988	1	11	12	8%
	1989	7	41	48	15%
	1990	2	28	30	7%
	1991	3	30	33	9%
	1992	3	37	40	8%
	1993	5	53	58	9%
	1994	11	87	98	11%
	1995	8	114	122	7%
	1996	11	110	121	9%
	1997	23	145	168	14%
	1998	10	206	216	5%
	1999	15	218	233	6%
	2000	14	133	147	10%
	2001	11	132	143	8%
	2002	28	525	553	5%
	2003	7	123	130	5%
	2004	10	539	549	2%
	2005	2	49	51	4%
ST0002884 Total		**173**	**2615**	**2788**	**6%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002903	1984	1	3	4	25%
	1985	2	4	6	33%
	1986	5	5	10	50%
	1987	3	8	11	27%
	1988	1	11	12	8%
	1989	5	15	20	25%
	1990	3	23	26	12%
	1991	3	31	34	9%
	1992	7	27	34	21%
	1993	2	36	38	5%
	1994	2	59	61	3%
	1995	5	76	81	6%
	1996	11	74	85	13%
	1997	21	82	103	20%
	1998	19	109	128	15%
	1999	17	117	134	13%
	2000	18	83	101	18%
	2001	13	71	84	15%
	2002	10	146	156	6%
	2003	5	54	59	8%
	2004	11	192	203	5%
	2005	1	46	47	2%
ST0002903 Total		**165**	**1272**	**1437**	**11%**
ST0002915	1985	2	16	18	11%
	1986	8	15	23	35%
	1987	8	31	39	21%
	1988	9	31	40	23%
	1989	13	61	74	18%
	1990	5	33	38	13%
	1991	10	51	61	16%
	1992	9	72	81	11%
	1993	4	121	125	3%
	1994	13	149	162	8%
	1995	16	235	251	6%
	1996	46	193	239	19%
	1997	32	257	289	11%
	1998	45	343	388	12%
	1999	42	331	373	11%
	2000	21	201	222	9%
	2001	24	189	213	11%
	2002	67	792	859	8%
	2003	14	218	232	6%
	2004	28	776	804	3%
	2005	4	98	102	4%
ST0002915 Total		**420**	**4213**	**4633**	**9%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002919	1985	3	5	8	38%
	1986	1	3	4	25%
	1987	1	5	6	17%
	1988		9	9	0%
	1989	2	17	19	11%
	1990	4	19	23	17%
	1991	5	29	34	15%
	1992	3	29	32	9%
	1993	15	41	56	27%
	1994	7	75	82	9%
	1995	7	75	82	9%
	1996	24	84	108	22%
	1997	19	107	126	15%
	1998	19	175	194	10%
	1999	10	137	147	7%
	2000	19	102	121	16%
	2001	15	105	120	13%
	2002	17	250	267	6%
	2003	9	89	98	9%
	2004	8	271	279	3%
	2005	4	19	23	17%
ST0002919 Total		**192**	**1646**	**1838**	**10%**
ST0002955	1985	1	1	2	50%
	1986	4	5	9	44%
	1987		9	9	0%
	1988	2	15	17	12%
	1989	6	21	27	22%
	1990	5	30	35	14%
	1991	11	26	37	30%
	1992	8	40	48	17%
	1993	16	78	94	17%
	1994	13	81	94	14%
	1995	14	117	131	11%
	1996	25	116	141	18%
	1997	42	101	143	29%
	1998	36	119	155	23%
	1999	19	128	147	13%
	2000	21	108	129	16%
	2001	12	94	106	11%
	2002	13	161	174	7%
	2003	9	67	76	12%
	2004	6	133	139	4%
	2005	2	17	19	11%
	2006		1	1	0%
ST0002955 Total		**265**	**1468**	**1733**	**15%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0002964	1985	1	8	9	11%
	1986	7	20	27	26%
	1987	5	28	33	15%
	1988	6	40	46	13%
	1989	10	43	53	19%
	1990	6	49	55	11%
	1991	12	39	51	24%
	1992	12	73	85	14%
	1993	13	118	131	10%
	1994	12	129	141	9%
	1995	19	162	181	10%
	1996	46	184	230	20%
	1997	37	223	260	14%
	1998	43	269	312	14%
	1999	40	255	295	14%
	2000	40	210	250	16%
	2001	31	198	229	14%
	2002	58	630	688	8%
	2003	11	191	202	5%
	2004	21	614	635	3%
	2005	4	103	107	4%
ST0002964 Total		**434**	**3586**	**4020**	**11%**
ST0003004	1983		1	1	0%
	1984	3	2	5	60%
	1985	3	5	8	38%
	1986	4	21	25	16%
	1987	4	21	25	16%
	1988	7	43	50	14%
	1989	12	35	47	26%
	1990	9	44	53	17%
	1991	9	51	60	15%
	1992	6	95	101	6%
	1993	17	134	151	11%
	1994	20	168	188	11%
	1995	24	189	213	11%
	1996	43	174	217	20%
	1997	42	232	274	15%
	1998	51	272	323	16%
	1999	37	274	311	12%
	2000	40	216	256	16%
	2001	39	211	250	16%
	2002	33	493	526	6%
	2003	22	189	211	10%
	2004	21	476	497	4%
	2005	10	273	283	4%
ST0003004 Total		**456**	**3619**	**4075**	**11%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0003102	1985	1	4	5	20%
	1986	1	5	6	17%
	1987	4	7	11	36%
	1988	4	16	20	20%
	1989	2	17	19	11%
	1990	6	26	32	19%
	1991	4	41	45	9%
	1992	7	46	53	13%
	1993	8	61	69	12%
	1994	11	88	99	11%
	1995	8	110	118	7%
	1996	41	101	142	29%
	1997	25	102	127	20%
	1998	37	126	163	23%
	1999	28	152	180	16%
	2000	21	101	122	17%
	2001	24	87	111	22%
	2002	29	268	297	10%
	2003	10	84	94	11%
	2004	9	224	233	4%
	2005	1	12	13	8%
ST0003102 Total		**281**	**1678**	**1959**	**14%**
ST0003106	1985		3	3	0%
	1986	1	9	10	10%
	1987	2	13	15	13%
	1988	1	15	16	6%
	1989	2	18	20	10%
	1990	7	12	19	37%
	1991	2	27	29	7%
	1992	5	34	39	13%
	1993	7	49	56	13%
	1994	7	52	59	12%
	1995	6	73	79	8%
	1996	22	58	80	28%
	1997	16	81	97	16%
	1998	9	90	99	9%
	1999	15	99	114	13%
	2000	14	68	82	17%
	2001	9	60	69	13%
	2002	14	179	193	7%
	2003	6	34	40	15%
	2004	7	174	181	4%
	2005	1	16	17	6%
ST0003106 Total		**153**	**1164**	**1317**	**12%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0003107	1984	1	1	2	50%
	1985	1	8	9	11%
	1986	9	16	25	36%
	1987	3	35	38	8%
	1988	8	40	48	17%
	1989	4	45	49	8%
	1990	8	57	65	12%
	1991	9	41	50	18%
	1992	13	94	107	12%
	1993	12	100	112	11%
	1994	18	153	171	11%
	1995	13	167	180	7%
	1996	32	162	194	16%
	1997	33	208	241	14%
	1998	44	217	261	17%
	1999	45	248	293	15%
	2000	24	173	197	12%
	2001	31	130	161	19%
	2002	43	429	472	9%
	2003	8	120	128	6%
	2004	12	346	358	3%
	2005		36	36	0%
ST0003107 Total		**371**	**2826**	**3197**	**12%**
ST0003176	1984	1		1	100%
	1985	4	8	12	33%
	1986	5	10	15	33%
	1987	5	18	23	22%
	1988	6	21	27	22%
	1989	5	27	32	16%
	1990	5	26	31	16%
	1991	3	51	54	6%
	1992	7	53	60	12%
	1993	4	75	79	5%
	1994	5	108	113	4%
	1995	17	150	167	10%
	1996	25	131	156	16%
	1997	22	159	181	12%
	1998	38	208	246	15%
	1999	27	172	199	14%
	2000	25	154	179	14%
	2001	27	126	153	18%
	2002	32	353	385	8%
	2003	12	117	129	9%
	2004	19	375	394	5%
	2005	4	37	41	10%
ST0003176 Total		**298**	**2379**	**2677**	**11%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0003190	1984		4	4	0%
	1985	1	11	12	8%
	1986	1	8	9	11%
	1987	8	23	31	26%
	1988	4	23	27	15%
	1989	3	22	25	12%
	1990	4	47	51	8%
	1991	5	50	55	9%
	1992	11	74	85	13%
	1993	4	77	81	5%
	1994	7	106	113	6%
	1995	8	138	146	5%
	1996	13	175	188	7%
	1997	19	241	260	7%
	1998	26	281	307	8%
	1999	29	331	360	8%
	2000	25	204	229	11%
	2001	32	216	248	13%
	2002	43	1047	1090	4%
	2003	14	260	274	5%
	2004	21	1177	1198	2%
	2005	3	84	87	3%
ST0003190 Total		**281**	**4599**	**4880**	**6%**
ST0003192	1984	6	6	12	50%
	1985	11	26	37	30%
	1986	11	39	50	22%
	1987	23	61	84	27%
	1988	24	72	96	25%
	1989	20	121	141	14%
	1990	30	128	158	19%
	1991	19	140	159	12%
	1992	35	208	243	14%
	1993	39	308	347	11%
	1994	47	421	468	10%
	1995	73	547	620	12%
	1996	119	537	656	18%
	1997	124	729	853	15%
	1998	131	779	910	14%
	1999	105	822	927	11%
	2000	106	756	862	12%
	2001	97	681	778	12%
	2002	111	1387	1498	7%
	2003	32	650	682	5%
	2004	42	1305	1347	3%
	2005	9	364	373	2%
ST0003192 Total		**1214**	**10087**	**11301**	**11%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0003225	1984		4	4	0%
	1985	3	5	8	38%
	1986	8	3	11	73%
	1987	8	14	22	36%
	1988	4	19	23	17%
	1989	10	27	37	27%
	1990	8	25	33	24%
	1991	16	42	58	28%
	1992	16	70	86	19%
	1993	25	93	118	21%
	1994	23	149	172	13%
	1995	25	171	196	13%
	1996	47	140	187	25%
	1997	60	178	238	25%
	1998	54	166	220	25%
	1999	51	208	259	20%
	2000	48	148	196	24%
	2001	29	112	141	21%
	2002	32	171	203	16%
	2003	15	75	90	17%
	2004	8	142	150	5%
	2005		17	17	0%
ST0003225 Total		**490**	**1979**	**2469**	**20%**
ST0003253	1984		1	1	0%
	1985	3	5	8	38%
	1986		9	9	0%
	1987	3	13	16	19%
	1988	2	16	18	11%
	1989	4	17	21	19%
	1990	5	20	25	20%
	1991	5	21	26	19%
	1992	4	31	35	11%
	1993	4	39	43	9%
	1994	4	60	64	6%
	1995	8	92	100	8%
	1996	14	94	108	13%
	1997	7	109	116	6%
	1998	13	150	163	8%
	1999	13	207	220	6%
	2000	7	118	125	6%
	2001	10	122	132	8%
	2002	25	529	554	5%
	2003	8	113	121	7%
	2004	15	614	629	2%
	2005	3	57	60	5%
ST0003253 Total		**157**	**2437**	**2594**	**6%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0003263	1982		1	1	0%
	1984		2	2	0%
	1985	3	2	5	60%
	1986	1	5	6	17%
	1987	5	7	12	42%
	1988	5	12	17	29%
	1989	2	13	15	13%
	1990	4	14	18	22%
	1991	6	22	28	21%
	1992	4	26	30	13%
	1993	4	50	54	7%
	1994	6	63	69	9%
	1995	5	74	79	6%
	1996	13	77	90	14%
	1997	20	103	123	16%
	1998	20	137	157	13%
	1999	12	148	160	8%
	2000	26	125	151	17%
	2001	12	118	130	9%
	2002	19	335	354	5%
	2003	7	88	95	7%
	2004	10	281	291	3%
	2005	1	28	29	3%
ST0003263 Total		**185**	**1731**	**1916**	**10%**
ST0003292	1984		1	1	0%
	1985	1	8	9	11%
	1986	5	18	23	22%
	1987	6	33	39	15%
	1988	8	34	42	19%
	1989	7	48	55	13%
	1990	9	46	55	16%
	1991	4	78	82	5%
	1992	11	76	87	13%
	1993	12	121	133	9%
	1994	13	154	167	8%
	1995	10	180	190	5%
	1996	23	144	167	14%
	1997	47	203	250	19%
	1998	56	261	317	18%
	1999	37	211	248	15%
	2000	36	130	166	22%
	2001	21	116	137	15%
	2002	28	448	476	6%
	2003	7	106	113	6%
	2004	17	356	373	5%
	2005	3	37	40	8%
ST0003292 Total		**361**	**2809**	**3170**	**11%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0003406	1984	3	3	6	50%
	1985	10	5	15	67%
	1986	5	22	27	19%
	1987	16	33	49	33%
	1988	19	60	79	24%
	1989	22	57	79	28%
	1990	17	70	87	20%
	1991	26	101	127	20%
	1992	24	121	145	17%
	1993	45	157	202	22%
	1994	32	218	250	13%
	1995	39	272	311	13%
	1996	100	197	297	34%
	1997	107	208	315	34%
	1998	91	211	302	30%
	1999	74	214	288	26%
	2000	49	188	237	21%
	2001	53	128	181	29%
	2002	39	210	249	16%
	2003	27	91	118	23%
	2004	26	150	176	15%
	2005	7	37	44	16%
ST0003406 Total		**831**	**2753**	**3584**	**23%**
ST0003432	1984	1	4	5	20%
	1985	3	17	20	15%
	1986	10	26	36	28%
	1987	17	55	72	24%
	1988	12	66	78	15%
	1989	19	94	113	17%
	1990	23	110	133	17%
	1991	25	127	152	16%
	1992	44	178	222	20%
	1993	49	261	310	16%
	1994	45	358	403	11%
	1995	45	440	485	9%
	1996	131	316	447	29%
	1997	144	447	591	24%
	1998	128	452	580	22%
	1999	119	481	600	20%
	2000	122	470	592	21%
	2001	96	394	490	20%
	2002	106	683	789	13%
	2003	50	314	364	14%
	2004	36	578	614	6%
	2005	18	196	214	8%
ST0003432 Total		**1243**	**6067**	**7310**	**17%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0003437	1984		1	1	0%
	1985	3	8	11	27%
	1986	1	12	13	8%
	1987	2	12	14	14%
	1988	4	18	22	18%
	1989	2	34	36	6%
	1990	5	39	44	11%
	1991	3	44	47	6%
	1992	6	44	50	12%
	1993	4	75	79	5%
	1994	7	88	95	7%
	1995	8	108	116	7%
	1996	22	129	151	15%
	1997	31	141	172	18%
	1998	28	199	227	12%
	1999	16	263	279	6%
	2000	21	190	211	10%
	2001	29	163	192	15%
	2002	56	806	862	6%
	2003	7	185	192	4%
	2004	21	871	892	2%
	2005	1	55	56	2%
ST0003437 Total		**277**	**3485**	**3762**	**7%**
ST0003449	1983	1		1	100%
	1984	1	1	2	50%
	1985	10	14	24	42%
	1986	8	29	37	22%
	1987	13	41	54	24%
	1988	20	72	92	22%
	1989	21	101	122	17%
	1990	26	100	126	21%
	1991	36	162	198	18%
	1992	56	204	260	22%
	1993	52	280	332	16%
	1994	59	414	473	12%
	1995	49	529	578	8%
	1996	110	449	559	20%
	1997	176	554	730	24%
	1998	183	579	762	24%
	1999	145	618	763	19%
	2000	138	541	679	20%
	2001	104	485	589	18%
	2002	110	859	969	11%
	2003	49	407	456	11%
	2004	38	691	729	5%
	2005	15	179	194	8%
	2006		1	1	0%
ST0003449 Total		**1420**	**7310**	**8730**	**16%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0003458	1984		4	4	0%
	1985	5	18	23	22%
	1986	3	27	30	10%
	1987	3	19	22	14%
	1988	2	33	35	6%
	1989	4	36	40	10%
	1990	3	42	45	7%
	1991	2	44	46	4%
	1992	6	69	75	8%
	1993	11	72	83	13%
	1994	8	101	109	7%
	1995	7	163	170	4%
	1996	28	152	180	16%
	1997	27	280	307	9%
	1998	29	310	339	9%
	1999	26	345	371	7%
	2000	15	184	199	8%
	2001	30	215	245	12%
	2002	57	1131	1188	5%
	2003	18	229	247	7%
	2004	25	1193	1218	2%
	2005	2	67	69	3%
ST0003458 Total		**311**	**4734**	**5045**	**6%**
ST0003483	1984		1	1	0%
	1985	1	5	6	17%
	1986	3	11	14	21%
	1987	5	16	21	24%
	1988	2	29	31	6%
	1989	10	31	41	24%
	1990	5	29	34	15%
	1991		39	39	0%
	1992	5	60	65	8%
	1993	8	76	84	10%
	1994	7	81	88	8%
	1995	5	114	119	4%
	1996	27	116	143	19%
	1997	23	145	168	14%
	1998	21	196	217	10%
	1999	24	187	211	11%
	2000	21	114	135	16%
	2001	12	108	120	10%
	2002	38	507	545	7%
	2003	9	135	144	6%
	2004	19	512	531	4%
	2005	3	42	45	7%
ST0003483 Total		**248**	**2554**	**2802**	**9%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0003498	1984	2	3	5	40%
	1985	5	20	25	20%
	1986	9	23	32	28%
	1987	12	43	55	22%
	1988	7	52	59	12%
	1989	15	71	86	17%
	1990	14	85	99	14%
	1991	23	118	141	16%
	1992	23	142	165	14%
	1993	31	201	232	13%
	1994	40	295	335	12%
	1995	32	351	383	8%
	1996	75	307	382	20%
	1997	88	366	454	19%
	1998	76	407	483	16%
	1999	80	445	525	15%
	2000	57	278	335	17%
	2001	52	257	309	17%
	2002	54	703	757	7%
	2003	31	275	306	10%
	2004	29	671	700	4%
	2005	8	167	175	5%
ST0003498 Total		**763**	**5280**	**6043**	**13%**
ST0003548	1984	2	2	4	50%
	1985	10	18	28	36%
	1986	13	28	41	32%
	1987	20	66	86	23%
	1988	18	97	115	16%
	1989	21	112	133	16%
	1990	17	104	121	14%
	1991	21	132	153	14%
	1992	34	197	231	15%
	1993	37	252	289	13%
	1994	30	358	388	8%
	1995	36	492	528	7%
	1996	91	380	471	19%
	1997	100	485	585	17%
	1998	113	568	681	17%
	1999	83	546	629	13%
	2000	91	458	549	17%
	2001	74	444	518	14%
	2002	88	986	1074	8%
	2003	35	413	448	8%
	2004	46	943	989	5%
	2005	13	228	241	5%
ST0003548 Total		**993**	**7309**	**8302**	**12%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0003592	1984		2	2	0%
	1985	5	15	20	25%
	1986	4	22	26	15%
	1987	10	31	41	24%
	1988	6	43	49	12%
	1989	11	58	69	16%
	1990	2	67	69	3%
	1991	9	68	77	12%
	1992	13	93	106	12%
	1993	17	154	171	10%
	1994	26	221	247	11%
	1995	26	329	355	7%
	1996	55	268	323	17%
	1997	48	386	434	11%
	1998	59	438	497	12%
	1999	68	467	535	13%
	2000	48	313	361	13%
	2001	43	336	379	11%
	2002	71	905	976	7%
	2003	26	266	292	9%
	2004	31	817	848	4%
	2005	5	104	109	5%
ST0003592 Total		**583**	**5403**	**5986**	**10%**
ST0003662	1984	1	3	4	25%
	1985	3	14	17	18%
	1986	2	29	31	6%
	1987	6	21	27	22%
	1988	7	40	47	15%
	1989	8	44	52	15%
	1990	8	37	45	18%
	1991	12	70	82	15%
	1992	10	86	96	10%
	1993	13	95	108	12%
	1994	17	134	151	11%
	1995	17	220	237	7%
	1996	34	178	212	16%
	1997	50	213	263	19%
	1998	46	279	325	14%
	1999	52	271	323	16%
	2000	43	195	238	18%
	2001	39	218	257	15%
	2002	66	505	571	12%
	2003	29	232	261	11%
	2004	63	709	772	8%
	2005	57	445	502	11%
ST0003662 Total		**583**	**4038**	**4621**	**13%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0003724	1984		1	1	0%
	1985	1	6	7	14%
	1986	2	10	12	17%
	1987	4	14	18	22%
	1988	2	17	19	11%
	1989	2	9	11	18%
	1990	4	13	17	24%
	1991	1	20	21	5%
	1992	1	19	20	5%
	1993	2	42	44	5%
	1994	1	62	63	2%
	1995	3	56	59	5%
	1996	7	68	75	9%
	1997	7	84	91	8%
	1998	5	89	94	5%
	1999	8	112	120	7%
	2000	5	52	57	9%
	2001	7	53	60	12%
	2002	13	225	238	5%
	2003	5	47	52	10%
	2004	3	242	245	1%
	2005		9	9	0%
ST0003724 Total		**83**	**1250**	**1333**	**6%**
ST0003732	1984		1	1	0%
	1985		3	3	0%
	1986		4	4	0%
	1987		5	5	0%
	1988	1	10	11	9%
	1989		5	5	0%
	1990	2	6	8	25%
	1991		2	2	0%
	1992	1	11	12	8%
	1993	1	15	16	6%
	1994	3	23	26	12%
	1995	2	27	29	7%
	1996	10	17	27	37%
	1997	5	24	29	17%
	1998	4	40	44	9%
	1999	4	38	42	10%
	2000	2	23	25	8%
	2001	4	23	27	15%
	2002	6	100	106	6%
	2003	4	15	19	21%
	2004	4	99	103	4%
	2005		4	4	0%
ST0003732 Total		**53**	**495**	**548**	**10%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0003739	1984		3	3	0%
	1985		5	5	0%
	1986	2	9	11	18%
	1987		13	13	0%
	1988	2	17	19	11%
	1989	2	18	20	10%
	1990	1	13	14	7%
	1991	2	22	24	8%
	1992	1	22	23	4%
	1993	4	25	29	14%
	1994	1	29	30	3%
	1995	2	51	53	4%
	1996	6	48	54	11%
	1997	6	62	68	9%
	1998	10	79	89	11%
	1999	6	66	72	8%
	2000	1	49	50	2%
	2001	4	46	50	8%
	2002	10	159	169	6%
	2003	4	43	47	9%
	2004	4	163	167	2%
	2005	1	30	31	3%
ST0003739 Total		**69**	**972**	**1041**	**7%**
ST0003746	1985	1	1	2	50%
	1986	1	2	3	33%
	1987	2	5	7	29%
	1988	4	6	10	40%
	1989	1	6	7	14%
	1990		6	6	0%
	1991	1	11	12	8%
	1992	1	12	13	8%
	1993	1	23	24	4%
	1994	5	29	34	15%
	1995	2	33	35	6%
	1996	6	34	40	15%
	1997	6	44	50	12%
	1998	7	56	63	11%
	1999	5	58	63	8%
	2000	4	35	39	10%
	2001	5	38	43	12%
	2002	13	151	164	8%
	2003	4	43	47	9%
	2004	5	188	193	3%
	2005		14	14	0%
ST0003746 Total		**74**	**795**	**869**	**9%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0003767	1984	1	3	4	25%
	1985	4	13	17	24%
	1986	7	17	24	29%
	1987	12	33	45	27%
	1988	7	38	45	16%
	1989	8	42	50	16%
	1990	11	54	65	17%
	1991	7	63	70	10%
	1992	10	98	108	9%
	1993	10	133	143	7%
	1994	14	192	206	7%
	1995	28	264	292	10%
	1996	47	229	276	17%
	1997	54	309	363	15%
	1998	52	398	450	12%
	1999	40	397	437	9%
	2000	35	247	282	12%
	2001	35	262	297	12%
	2002	54	1006	1060	5%
	2003	23	276	299	8%
	2004	43	1009	1052	4%
	2005	9	144	153	6%
ST0003767 Total		**511**	**5227**	**5738**	**9%**
ST0003876	1984		3	3	0%
	1985	4	9	13	31%
	1986	5	26	31	16%
	1987	6	24	30	20%
	1988	3	34	37	8%
	1989	14	46	60	23%
	1990	11	50	61	18%
	1991	11	50	61	18%
	1992	18	50	68	26%
	1993	13	103	116	11%
	1994	12	143	155	8%
	1995	18	169	187	10%
	1996	27	162	189	14%
	1997	37	203	240	15%
	1998	37	271	308	12%
	1999	30	248	278	11%
	2000	27	191	218	12%
	2001	28	198	226	12%
	2002	59	713	772	8%
	2003	16	218	234	7%
	2004	25	785	810	3%
	2005	2	99	101	2%
ST0003876 Total		**403**	**3795**	**4198**	**10%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0003932	1984	1	2	3	33%
	1985	3	5	8	38%
	1986	5	15	20	25%
	1987	4	21	25	16%
	1988	4	29	33	12%
	1989	5	36	41	12%
	1990	6	28	34	18%
	1991	8	39	47	17%
	1992	2	49	51	4%
	1993	6	87	93	6%
	1994	9	93	102	9%
	1995	15	144	159	9%
	1996	22	152	174	13%
	1997	19	198	217	9%
	1998	25	250	275	9%
	1999	23	235	258	9%
	2000	27	162	189	14%
	2001	9	150	159	6%
	2002	37	587	624	6%
	2003	7	155	162	4%
	2004	14	598	612	2%
	2005	1	78	79	1%
ST0003932 Total		**252**	**3113**	**3365**	**7%**
ST0003937	1985	2	3	5	40%
	1986	3	2	5	60%
	1987	2	7	9	22%
	1988	2	11	13	15%
	1989	3	15	18	17%
	1990	1	18	19	5%
	1991	3	13	16	19%
	1992	3	30	33	9%
	1993	3	25	28	11%
	1994	11	42	53	21%
	1995	3	75	78	4%
	1996	13	95	108	12%
	1997	10	93	103	10%
	1998	15	175	190	8%
	1999	15	135	150	10%
	2000	10	109	119	8%
	2001	6	112	118	5%
	2002	17	446	463	4%
	2003	7	95	102	7%
	2004	13	507	520	3%
	2005	12	79	91	13%
ST0003937 Total		**154**	**2087**	**2241**	**7%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0003943	1984	1	1	2	50%
	1985	6	14	20	30%
	1986	10	32	42	24%
	1987	13	31	44	30%
	1988	11	64	75	15%
	1989	16	61	77	21%
	1990	18	60	78	23%
	1991	9	76	85	11%
	1992	7	106	113	6%
	1993	20	149	169	12%
	1994	16	173	189	8%
	1995	26	243	269	10%
	1996	48	217	265	18%
	1997	47	259	306	15%
	1998	46	290	336	14%
	1999	33	308	341	10%
	2000	28	188	216	13%
	2001	33	202	235	14%
	2002	52	689	741	7%
	2003	11	158	169	7%
	2004	21	658	679	3%
	2005	6	125	131	5%
ST0003943 Total		**478**	**4104**	**4582**	**10%**
ST0003988	1984		1	1	0%
	1985	1	3	4	25%
	1986	1	8	9	11%
	1987	3	16	19	16%
	1988	2	16	18	11%
	1989	6	18	24	25%
	1990	1	20	21	5%
	1991	3	23	26	12%
	1992	2	41	43	5%
	1993	4	59	63	6%
	1994	9	80	89	10%
	1995	10	112	122	8%
	1996	9	123	132	7%
	1997	9	132	141	6%
	1998	19	192	211	9%
	1999	17	223	240	7%
	2000	11	134	145	8%
	2001	16	153	169	9%
	2002	38	656	694	5%
	2003	4	187	191	2%
	2004	26	852	878	3%
	2005	12	230	242	5%
ST0003988 Total		**203**	**3279**	**3482**	**6%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0003997	1984	2	2	4	50%
	1985	5	15	20	25%
	1986	8	30	38	21%
	1987	10	41	51	20%
	1988	5	41	46	11%
	1989	10	52	62	16%
	1990	6	59	65	9%
	1991	12	59	71	17%
	1992	6	87	93	6%
	1993	12	104	116	10%
	1994	12	136	148	8%
	1995	14	209	223	6%
	1996	24	209	233	10%
	1997	37	299	336	11%
	1998	33	354	387	9%
	1999	29	351	380	8%
	2000	20	230	250	8%
	2001	29	215	244	12%
	2002	53	964	1017	5%
	2003	15	242	257	6%
	2004	35	1042	1077	3%
	2005	4	95	99	4%
ST0003997 Total		**381**	**4836**	**5217**	**7%**
ST0004004	1984	2	2	4	50%
	1985	7	5	12	58%
	1986	2	12	14	14%
	1987	4	29	33	12%
	1988	5	35	40	13%
	1989	10	40	50	20%
	1990	5	56	61	8%
	1991	4	65	69	6%
	1992	7	94	101	7%
	1993	9	108	117	8%
	1994	17	172	189	9%
	1995	12	192	204	6%
	1996	40	185	225	18%
	1997	51	318	369	14%
	1998	40	382	422	9%
	1999	44	384	428	10%
	2000	45	320	365	12%
	2001	37	258	295	13%
	2002	61	1142	1203	5%
	2003	22	237	259	8%
	2004	26	1178	1204	2%
	2005	1	153	154	1%
ST0004004 Total		**451**	**5367**	**5818**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004016	1984	1	1	2	50%
	1985	1	2	3	33%
	1986	1	7	8	13%
	1987	3	11	14	21%
	1988	3	11	14	21%
	1989	4	13	17	24%
	1990	3	15	18	17%
	1991		27	27	0%
	1992	7	23	30	23%
	1993	7	50	57	12%
	1994	7	88	95	7%
	1995	15	114	129	12%
	1996	20	115	135	15%
	1997	19	186	205	9%
	1998	28	276	304	9%
	1999	21	279	300	7%
	2000	23	174	197	12%
	2001	34	211	245	14%
	2002	44	795	839	5%
	2003	14	230	244	6%
	2004	25	958	983	3%
	2005	5	140	145	3%
ST0004016 Total		**285**	**3726**	**4011**	**7%**
ST0004034	1984	1	1	2	50%
	1985	2	5	7	29%
	1986	7	10	17	41%
	1987	5	16	21	24%
	1988	6	29	35	17%
	1989	5	34	39	13%
	1990	7	48	55	13%
	1991	13	59	72	18%
	1992	7	72	79	9%
	1993	14	113	127	11%
	1994	19	175	194	10%
	1995	25	219	244	10%
	1996	51	193	244	21%
	1997	49	225	274	18%
	1998	52	281	333	16%
	1999	35	275	310	11%
	2000	53	238	291	18%
	2001	47	216	263	18%
	2002	53	524	577	9%
	2003	20	158	178	11%
	2004	24	522	546	4%
	2005	7	99	106	7%
ST0004034 Total		**502**	**3512**	**4014**	**13%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004040	1984		2	2	0%
	1985	2	1	3	67%
	1986	5	12	17	29%
	1987	7	11	18	39%
	1988	1	20	21	5%
	1989	5	26	31	16%
	1990	9	51	60	15%
	1991	10	54	64	16%
	1992	13	64	77	17%
	1993	17	92	109	16%
	1994	15	159	174	9%
	1995	17	228	245	7%
	1996	48	138	186	26%
	1997	48	206	254	19%
	1998	55	242	297	19%
	1999	39	269	308	13%
	2000	40	176	216	19%
	2001	50	170	220	23%
	2002	47	382	429	11%
	2003	14	154	168	8%
	2004	30	429	459	7%
	2005	12	183	195	6%
ST0004040 Total		**484**	**3069**	**3553**	**14%**
ST0004080	1985		3	3	0%
	1986		3	3	0%
	1987	1	7	8	13%
	1988		7	7	0%
	1989	1	4	5	20%
	1990		7	7	0%
	1991	1	15	16	6%
	1992	3	21	24	13%
	1993		16	16	0%
	1994	3	28	31	10%
	1995	3	32	35	9%
	1996	4	40	44	9%
	1997	5	55	60	8%
	1998	7	82	89	8%
	1999	9	75	84	11%
	2000	5	62	67	7%
	2001	4	74	78	5%
	2002	13	277	290	4%
	2003	4	107	111	4%
	2004	12	406	418	3%
	2005	17	182	199	9%
ST0004080 Total		**92**	**1503**	**1595**	**6%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004105	1986		3	3	0%
	1987		3	3	0%
	1988	2	6	8	25%
	1989	3	8	11	27%
	1990	7	20	27	26%
	1991	5	31	36	14%
	1992	6	35	41	15%
	1993	3	40	43	7%
	1994	6	54	60	10%
	1995	16	80	96	17%
	1996	26	84	110	24%
	1997	30	98	128	23%
	1998	26	98	124	21%
	1999	19	96	115	17%
	2000	21	96	117	18%
	2001	12	58	70	17%
	2002	10	88	98	10%
	2003	7	48	55	13%
	2004	2	77	79	3%
	2005	1	16	17	6%
ST0004105 Total		**202**	**1039**	**1241**	**16%**
ST0004107	1984	1	6	7	14%
	1985	5	17	22	23%
	1986	7	27	34	21%
	1987	8	27	35	23%
	1988	6	31	37	16%
	1989	7	54	61	11%
	1990	8	57	65	12%
	1991	12	81	93	13%
	1992	16	103	119	13%
	1993	12	149	161	7%
	1994	12	203	215	6%
	1995	20	292	312	6%
	1996	53	254	307	17%
	1997	61	336	397	15%
	1998	70	375	445	16%
	1999	61	428	489	12%
	2000	60	342	402	15%
	2001	67	307	374	18%
	2002	60	828	888	7%
	2003	32	355	387	8%
	2004	44	1043	1087	4%
	2005	23	320	343	7%
ST0004107 Total		**645**	**5635**	**6280**	**10%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004111	1984	1	3	4	25%
	1985	2	9	11	18%
	1986	5	18	23	22%
	1987	4	23	27	15%
	1988	8	26	34	24%
	1989	9	41	50	18%
	1990	9	39	48	19%
	1991	10	67	77	13%
	1992	13	90	103	13%
	1993	16	91	107	15%
	1994	14	144	158	9%
	1995	19	225	244	8%
	1996	37	210	247	15%
	1997	43	248	291	15%
	1998	53	330	383	14%
	1999	39	402	441	9%
	2000	46	375	421	11%
	2001	48	451	499	10%
	2002	53	1127	1180	4%
	2003	27	478	505	5%
	2004	31	1376	1407	2%
	2005	12	292	304	4%
ST0004111 Total		**499**	**6065**	**6564**	**8%**
ST0004144	1988		1	1	0%
	1989		1	1	0%
	1991		2	2	0%
	1992		3	3	0%
	1993	1		1	100%
	1994		2	2	0%
	1995		2	2	0%
	1996	1	8	9	11%
	1997	4	13	17	24%
	1998	2	4	6	33%
	1999	5	15	20	25%
	2000	2	11	13	15%
	2001	2	7	9	22%
	2002	1	20	21	5%
	2003	2	8	10	20%
	2004		27	27	0%
	2005		3	3	0%
ST0004144 Total		**20**	**127**	**147**	**14%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004152	1984		2	2	0%
	1985	1	2	3	33%
	1986		3	3	0%
	1987		6	6	0%
	1988		3	3	0%
	1989	1	8	9	11%
	1990	4	5	9	44%
	1991	3	13	16	19%
	1992		14	14	0%
	1993	2	32	34	6%
	1994	2	24	26	8%
	1995	7	46	53	13%
	1996	6	37	43	14%
	1997	11	59	70	16%
	1998	11	64	75	15%
	1999	7	72	79	9%
	2000	4	55	59	7%
	2001	8	52	60	13%
	2002	12	132	144	8%
	2003	3	53	56	5%
	2004	13	128	141	9%
	2005	4	93	97	4%
ST0004152 Total		**99**	**903**	**1002**	**10%**
ST0004161	1984		1	1	0%
	1985		3	3	0%
	1986	4	1	5	80%
	1987	1	7	8	13%
	1988	1	6	7	14%
	1989	1	7	8	13%
	1990		11	11	0%
	1991	3	13	16	19%
	1992	2	20	22	9%
	1993	1	36	37	3%
	1994	4	32	36	11%
	1995	4	59	63	6%
	1996	8	48	56	14%
	1997	10	65	75	13%
	1998	15	84	99	15%
	1999	10	94	104	10%
	2000	3	91	94	3%
	2001	11	63	74	15%
	2002	24	255	279	9%
	2003	2	81	83	2%
	2004	4	280	284	1%
	2005	1	36	37	3%
ST0004161 Total		**109**	**1293**	**1402**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004167	1984	1	2	3	33%
	1985	3	5	8	38%
	1986	7	10	17	41%
	1987	4	17	21	19%
	1988	3	20	23	13%
	1989	2	33	35	6%
	1990	6	24	30	20%
	1991	2	34	36	6%
	1992	4	53	57	7%
	1993	5	64	69	7%
	1994	8	90	98	8%
	1995	8	134	142	6%
	1996	11	114	125	9%
	1997	10	172	182	5%
	1998	11	224	235	5%
	1999	20	190	210	10%
	2000	14	144	158	9%
	2001	11	149	160	7%
	2002	24	546	570	4%
	2003	6	168	174	3%
	2004	10	614	624	2%
	2005	10	139	149	7%
ST0004167 Total		**180**	**2946**	**3126**	**6%**
ST0004170	1984	1		1	100%
	1985	1	8	9	11%
	1986	3	6	9	33%
	1987	2	7	9	22%
	1988	1	17	18	6%
	1989	4	18	22	18%
	1990	3	17	20	15%
	1991	1	24	25	4%
	1992	2	33	35	6%
	1993	6	45	51	12%
	1994	6	68	74	8%
	1995	4	92	96	4%
	1996	21	72	93	23%
	1997	17	143	160	11%
	1998	23	189	212	11%
	1999	16	202	218	7%
	2000	26	137	163	16%
	2001	17	124	141	12%
	2002	28	544	572	5%
	2003	12	160	172	7%
	2004	16	620	636	3%
	2005		59	59	0%
ST0004170 Total		**210**	**2585**	**2795**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004180	1985	1	3	4	25%
	1986	4	9	13	31%
	1987	3	23	26	12%
	1988	4	22	26	15%
	1989	9	40	49	18%
	1990	8	32	40	20%
	1991	4	41	45	9%
	1992	10	54	64	16%
	1993	7	65	72	10%
	1994	9	97	106	8%
	1995	5	114	119	4%
	1996	19	115	134	14%
	1997	19	178	197	10%
	1998	22	221	243	9%
	1999	17	261	278	6%
	2000	19	140	159	12%
	2001	16	194	210	8%
	2002	42	708	750	6%
	2003	10	194	204	5%
	2004	26	943	969	3%
	2005	2	80	82	2%
ST0004180 Total		**256**	**3534**	**3790**	**7%**
ST0004191	1985		4	4	0%
	1986	3	5	8	38%
	1987		11	11	0%
	1988	2	17	19	11%
	1989	2	12	14	14%
	1990	2	23	25	8%
	1991	1	23	24	4%
	1992	3	24	27	11%
	1993	7	47	54	13%
	1994	4	58	62	6%
	1995	3	72	75	4%
	1996	8	67	75	11%
	1997	12	99	111	11%
	1998	13	107	120	11%
	1999	9	144	153	6%
	2000	5	91	96	5%
	2001	11	95	106	10%
	2002	23	392	415	6%
	2003	5	121	126	4%
	2004	24	512	536	4%
	2005	2	96	98	2%
ST0004191 Total		**139**	**2020**	**2159**	**6%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004230	1984		1	1	0%
	1985	4	13	17	24%
	1986	9	34	43	21%
	1987	6	30	36	17%
	1988	6	29	35	17%
	1989	9	48	57	16%
	1990	12	55	67	18%
	1991	9	53	62	15%
	1992	17	75	92	18%
	1993	14	113	127	11%
	1994	15	174	189	8%
	1995	20	205	225	9%
	1996	42	216	258	16%
	1997	36	265	301	12%
	1998	45	341	386	12%
	1999	52	388	440	12%
	2000	17	297	314	5%
	2001	50	344	394	13%
	2002	65	1017	1082	6%
	2003	25	405	430	6%
	2004	38	1490	1528	2%
	2005	22	326	348	6%
ST0004230 Total		**513**	**5919**	**6432**	**8%**
ST0004243	1985		8	8	0%
	1986	1	8	9	11%
	1987	1	8	9	11%
	1988	1	7	8	13%
	1989	2	11	13	15%
	1990	2	15	17	12%
	1991		14	14	0%
	1992	1	18	19	5%
	1993	1	22	23	4%
	1994	1	36	37	3%
	1995	4	57	61	7%
	1996	9	58	67	13%
	1997	6	63	69	9%
	1998	8	118	126	6%
	1999	14	128	142	10%
	2000	10	84	94	11%
	2001	9	114	123	7%
	2002	16	467	483	3%
	2003	7	145	152	5%
	2004	20	732	752	3%
	2005		79	79	0%
ST0004243 Total		**113**	**2192**	**2305**	**5%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004257	1984		3	3	0%
	1985	4	9	13	31%
	1986	5	23	28	18%
	1987	12	45	57	21%
	1988	9	48	57	16%
	1989	18	64	82	22%
	1990	11	62	73	15%
	1991	15	77	92	16%
	1992	15	152	167	9%
	1993	28	140	168	17%
	1994	21	222	243	9%
	1995	32	274	306	10%
	1996	52	207	259	20%
	1997	57	286	343	17%
	1998	59	386	445	13%
	1999	56	401	457	12%
	2000	52	285	337	15%
	2001	56	301	357	16%
	2002	73	915	988	7%
	2003	24	308	332	7%
	2004	44	906	950	5%
	2005	11	147	158	7%
ST0004257 Total		**654**	**5261**	**5915**	**11%**
ST0004262	1984		2	2	0%
	1985	5	15	20	25%
	1986	6	20	26	23%
	1987	6	36	42	14%
	1988	9	64	73	12%
	1989	17	69	86	20%
	1990	15	82	97	15%
	1991	12	96	108	11%
	1992	22	109	131	17%
	1993	21	174	195	11%
	1994	19	222	241	8%
	1995	19	281	300	6%
	1996	56	260	316	18%
	1997	71	304	375	19%
	1998	47	365	412	11%
	1999	66	337	403	16%
	2000	47	256	303	16%
	2001	39	251	290	13%
	2002	72	792	864	8%
	2003	14	220	234	6%
	2004	35	869	904	4%
	2005	5	107	112	4%
ST0004262 Total		**603**	**4931**	**5534**	**11%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004298	1984	2		2	100%
	1985	3	12	15	20%
	1986	10	19	29	34%
	1987	9	29	38	24%
	1988	5	45	50	10%
	1989	11	50	61	18%
	1990	10	61	71	14%
	1991	19	68	87	22%
	1992	13	78	91	14%
	1993	24	118	142	17%
	1994	21	203	224	9%
	1995	21	218	239	9%
	1996	35	224	259	14%
	1997	30	297	327	9%
	1998	43	348	391	11%
	1999	43	394	437	10%
	2000	30	258	288	10%
	2001	34	294	328	10%
	2002	77	1093	1170	7%
	2003	29	317	346	8%
	2004	38	1369	1407	3%
	2005	6	145	151	4%
ST0004298 Total		**513**	**5640**	**6153**	**8%**
ST0004363	1985	2	5	7	29%
	1986	2	6	8	25%
	1987	1	22	23	4%
	1988	2	17	19	11%
	1989	4	8	12	33%
	1990	1	26	27	4%
	1991	7	30	37	19%
	1992	4	32	36	11%
	1993	3	39	42	7%
	1994		56	56	0%
	1995	3	54	57	5%
	1996	2	54	56	4%
	1997	6	88	94	6%
	1998	6	108	114	5%
	1999	12	108	120	10%
	2000	7	75	82	9%
	2001	3	81	84	4%
	2002	16	344	360	4%
	2003	8	104	112	7%
	2004	7	396	403	2%
	2005	2	44	46	4%
ST0004363 Total		**98**	**1697**	**1795**	**5%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004375	1985		1	1	0%
	1986	1	4	5	20%
	1987	1	8	9	11%
	1988	3	6	9	33%
	1989	1	16	17	6%
	1990	3	20	23	13%
	1991		13	13	0%
	1992	1	30	31	3%
	1993	7	27	34	21%
	1994	2	40	42	5%
	1995	3	72	75	4%
	1996	8	68	76	11%
	1997	6	107	113	5%
	1998	15	137	152	10%
	1999	11	158	169	7%
	2000	13	109	122	11%
	2001	16	152	168	10%
	2002	23	514	537	4%
	2003	7	180	187	4%
	2004	9	664	673	1%
	2005	3	90	93	3%
	2006		1	1	0%
ST0004375 Total		**133**	**2417**	**2550**	**5%**
ST0004377	1984		1	1	0%
	1985		10	10	0%
	1986	2	8	10	20%
	1987	3	16	19	16%
	1988	5	22	27	19%
	1989	9	13	22	41%
	1990	1	25	26	4%
	1991	5	26	31	16%
	1992	5	40	45	11%
	1993	7	64	71	10%
	1994	6	65	71	8%
	1995	7	124	131	5%
	1996	12	128	140	9%
	1997	14	176	190	7%
	1998	14	251	265	5%
	1999	26	242	268	10%
	2000	10	172	182	5%
	2001	15	186	201	7%
	2002	28	682	710	4%
	2003	9	211	220	4%
	2004	15	845	860	2%
	2005	9	127	136	7%
ST0004377 Total		**202**	**3434**	**3636**	**6%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004397	1984	1		1	100%
	1985	2	14	16	13%
	1986	2	20	22	9%
	1987	9	25	34	26%
	1988	7	32	39	18%
	1989	5	31	36	14%
	1990	8	65	73	11%
	1991	6	58	64	9%
	1992	5	52	57	9%
	1993	7	102	109	6%
	1994	9	117	126	7%
	1995	16	172	188	9%
	1996	22	193	215	10%
	1997	21	240	261	8%
	1998	19	311	330	6%
	1999	21	317	338	6%
	2000	24	247	271	9%
	2001	33	261	294	11%
	2002	43	871	914	5%
	2003	13	288	301	4%
	2004	36	1215	1251	3%
	2005	12	197	209	6%
ST0004397 Total		**321**	**4828**	**5149**	**6%**
ST0004405	1983		1	1	0%
	1985		3	3	0%
	1986	1	4	5	20%
	1987		11	11	0%
	1988	4	14	18	22%
	1989	1	20	21	5%
	1990	2	11	13	15%
	1991	3	20	23	13%
	1992		24	24	0%
	1993	1	33	34	3%
	1994	1	34	35	3%
	1995	7	72	79	9%
	1996	7	54	61	11%
	1997	14	93	107	13%
	1998	10	109	119	8%
	1999	11	124	135	8%
	2000	6	95	101	6%
	2001	13	111	124	10%
	2002	24	432	456	5%
	2003	2	122	124	2%
	2004	14	598	612	2%
	2005	3	75	78	4%
ST0004405 Total		**124**	**2060**	**2184**	**6%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004480	1985	3	4	7	43%
	1986	4	13	17	24%
	1987	1	15	16	6%
	1988	4	24	28	14%
	1989	10	22	32	31%
	1990	7	54	61	11%
	1991	9	60	69	13%
	1992	18	96	114	16%
	1993	25	118	143	17%
	1994	23	170	193	12%
	1995	16	232	248	6%
	1996	52	210	262	20%
	1997	77	256	333	23%
	1998	62	264	326	19%
	1999	69	330	399	17%
	2000	55	284	339	16%
	2001	54	259	313	17%
	2002	46	588	634	7%
	2003	19	269	288	7%
	2004	25	642	667	4%
	2005	15	216	231	6%
ST0004480 Total		**594**	**4126**	**4720**	**13%**
ST0004525	1984	2	2	4	50%
	1985	2	23	25	8%
	1986	7	24	31	23%
	1987	7	26	33	21%
	1988	6	23	29	21%
	1989	5	42	47	11%
	1990	10	55	65	15%
	1991	5	71	76	7%
	1992	17	92	109	16%
	1993	15	132	147	10%
	1994	21	165	186	11%
	1995	23	244	267	9%
	1996	53	202	255	21%
	1997	57	324	381	15%
	1998	55	459	514	11%
	1999	56	460	516	11%
	2000	53	399	452	12%
	2001	80	415	495	16%
	2002	67	1295	1362	5%
	2003	29	425	454	6%
	2004	68	1438	1506	5%
	2005	12	200	212	6%
ST0004525 Total		**650**	**6516**	**7166**	**9%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004541	1985	1	5	6	17%
	1986	1	13	14	7%
	1987	4	15	19	21%
	1988	2	16	18	11%
	1989	3	29	32	9%
	1990	4	33	37	11%
	1991		39	39	0%
	1992	9	54	63	14%
	1993	4	66	70	6%
	1994	7	78	85	8%
	1995	9	114	123	7%
	1996	15	119	134	11%
	1997	19	142	161	12%
	1998	12	172	184	7%
	1999	16	173	189	8%
	2000	14	141	155	9%
	2001	17	111	128	13%
	2002	32	460	492	7%
	2003	6	115	121	5%
	2004	15	455	470	3%
	2005		49	49	0%
ST0004541 Total		**190**	**2399**	**2589**	**7%**
ST0004582	1985	4	4	8	50%
	1986	3	8	11	27%
	1987	1	11	12	8%
	1988	2	13	15	13%
	1989	3	21	24	13%
	1990	3	20	23	13%
	1991	7	15	22	32%
	1992	10	43	53	19%
	1993	6	57	63	10%
	1994	12	65	77	16%
	1995	9	107	116	8%
	1996	15	101	116	13%
	1997	35	103	138	25%
	1998	23	126	149	15%
	1999	31	134	165	19%
	2000	21	114	135	16%
	2001	17	70	87	20%
	2002	22	174	196	11%
	2003	10	76	86	12%
	2004	6	180	186	3%
	2005	9	75	84	11%
ST0004582 Total		**249**	**1517**	**1766**	**14%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004591	1984		1	1	0%
	1985	1	2	3	33%
	1986	3	6	9	33%
	1987	2	12	14	14%
	1988	2	13	15	13%
	1989	3	12	15	20%
	1990	2	9	11	18%
	1991	1	22	23	4%
	1992	1	18	19	5%
	1993	5	35	40	13%
	1994	3	46	49	6%
	1995	7	54	61	11%
	1996	11	55	66	17%
	1997	7	86	93	8%
	1998	10	109	119	8%
	1999	4	102	106	4%
	2000	3	51	54	6%
	2001	12	57	69	17%
	2002	10	180	190	5%
	2003	3	57	60	5%
	2004	4	162	166	2%
	2005	2	32	34	6%
ST0004591 Total		**96**	**1121**	**1217**	**8%**
ST0004592	1984	1	1	2	50%
	1985	5	14	19	26%
	1986	15	20	35	43%
	1987	9	34	43	21%
	1988	10	50	60	17%
	1989	11	62	73	15%
	1990	7	55	62	11%
	1991	7	66	73	10%
	1992	14	93	107	13%
	1993	16	109	125	13%
	1994	23	191	214	11%
	1995	18	224	242	7%
	1996	23	218	241	10%
	1997	28	298	326	9%
	1998	41	321	362	11%
	1999	34	311	345	10%
	2000	27	264	291	9%
	2001	30	240	270	11%
	2002	28	608	636	4%
	2003	15	258	273	5%
	2004	31	866	897	3%
	2005	31	471	502	6%
ST0004592 Total		**424**	**4774**	**5198**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004615	1985		1	1	0%
	1986	2	2	4	50%
	1987	1	8	9	11%
	1988		5	5	0%
	1989	1	19	20	5%
	1990		17	17	0%
	1991	5	23	28	18%
	1992	4	22	26	15%
	1993	3	38	41	7%
	1994	5	55	60	8%
	1995	5	69	74	7%
	1996	10	79	89	11%
	1997	13	85	98	13%
	1998	11	130	141	8%
	1999	11	125	136	8%
	2000	12	79	91	13%
	2001	15	91	106	14%
	2002	23	397	420	5%
	2003	3	97	100	3%
	2004	12	429	441	3%
	2005	1	28	29	3%
ST0004615 Total		**137**	**1799**	**1936**	**7%**
ST0004628	1985		6	6	0%
	1986	1	10	11	9%
	1987	2	15	17	12%
	1988	2	20	22	9%
	1989	3	22	25	12%
	1990	3	29	32	9%
	1991	4	27	31	13%
	1992	5	36	41	12%
	1993	6	64	70	9%
	1994	10	75	85	12%
	1995	9	104	113	8%
	1996	16	72	88	18%
	1997	19	145	164	12%
	1998	23	203	226	10%
	1999	29	222	251	12%
	2000	25	148	173	14%
	2001	20	186	206	10%
	2002	30	616	646	5%
	2003	6	155	161	4%
	2004	16	673	689	2%
	2005	3	66	69	4%
ST0004628 Total		**232**	**2894**	**3126**	**7%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004632	1984		2	2	0%
	1985	6	8	14	43%
	1986	8	16	24	33%
	1987	8	18	26	31%
	1988	3	32	35	9%
	1989	2	37	39	5%
	1990	6	44	50	12%
	1991	9	48	57	16%
	1992	19	75	94	20%
	1993	9	93	102	9%
	1994	16	125	141	11%
	1995	12	195	207	6%
	1996	32	170	202	16%
	1997	37	212	249	15%
	1998	42	259	301	14%
	1999	44	251	295	15%
	2000	32	189	221	14%
	2001	25	189	214	12%
	2002	45	555	600	8%
	2003	16	163	179	9%
	2004	14	590	604	2%
	2005	6	166	172	3%
ST0004632 Total		**391**	**3437**	**3828**	**10%**
ST0004657	1984	1	1	2	50%
	1985	7	15	22	32%
	1986	10	27	37	27%
	1987	1	34	35	3%
	1988	7	28	35	20%
	1989	3	71	74	4%
	1990	14	51	65	22%
	1991	7	76	83	8%
	1992	10	88	98	10%
	1993	7	140	147	5%
	1994	10	170	180	6%
	1995	8	204	212	4%
	1996	29	222	251	12%
	1997	27	295	322	8%
	1998	39	333	372	10%
	1999	22	378	400	6%
	2000	14	218	232	6%
	2001	35	236	271	13%
	2002	49	762	811	6%
	2003	15	229	244	6%
	2004	19	970	989	2%
	2005	5	184	189	3%
ST0004657 Total		**339**	**4732**	**5071**	**7%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004658	1985	3	6	9	33%
	1986	9	8	17	53%
	1987	4	25	29	14%
	1988	7	33	40	18%
	1989	6	27	33	18%
	1990	6	38	44	14%
	1991	1	43	44	2%
	1992	4	54	58	7%
	1993	3	66	69	4%
	1994	13	95	108	12%
	1995	5	135	140	4%
	1996	19	104	123	15%
	1997	18	157	175	10%
	1998	21	221	242	9%
	1999	24	275	299	8%
	2000	20	145	165	12%
	2001	25	177	202	12%
	2002	32	606	638	5%
	2003	8	178	186	4%
	2004	29	730	759	4%
	2005	21	176	197	11%
ST0004658 Total		**278**	**3299**	**3577**	**8%**
ST0004696	1984		2	2	0%
	1985	6	3	9	67%
	1986	5	4	9	56%
	1987	2	21	23	9%
	1988	6	24	30	20%
	1989	4	27	31	13%
	1990	4	23	27	15%
	1991	2	39	41	5%
	1992	7	37	44	16%
	1993	8	63	71	11%
	1994	12	89	101	12%
	1995	9	110	119	8%
	1996	17	95	112	15%
	1997	23	127	150	15%
	1998	20	164	184	11%
	1999	25	183	208	12%
	2000	28	147	175	16%
	2001	23	123	146	16%
	2002	27	395	422	6%
	2003	10	125	135	7%
	2004	13	462	475	3%
	2005	1	50	51	2%
ST0004696 Total		**252**	**2313**	**2565**	**10%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004701	1985	5	6	11	45%
	1986	10	14	24	42%
	1987	5	34	39	13%
	1988	2	37	39	5%
	1989	5	42	47	11%
	1990	6	42	48	13%
	1991	5	47	52	10%
	1992	6	68	74	8%
	1993	8	73	81	10%
	1994	10	116	126	8%
	1995	14	148	162	9%
	1996	18	140	158	11%
	1997	35	191	226	15%
	1998	28	245	273	10%
	1999	19	257	276	7%
	2000	17	139	156	11%
	2001	24	135	159	15%
	2002	30	558	588	5%
	2003	6	120	126	5%
	2004	14	597	611	2%
	2005	2	40	42	5%
ST0004701 Total		**269**	**3049**	**3318**	**8%**
ST0004710	1985	4	10	14	29%
	1986	1	14	15	7%
	1987	1	24	25	4%
	1988	7	33	40	18%
	1989	6	24	30	20%
	1990	7	28	35	20%
	1991	7	32	39	18%
	1992	4	50	54	7%
	1993	7	51	58	12%
	1994	8	92	100	8%
	1995	4	92	96	4%
	1996	4	103	107	4%
	1997	5	102	107	5%
	1998	4	133	137	3%
	1999	5	118	123	4%
	2000	4	82	86	5%
	2001	7	60	67	10%
	2002	8	180	188	4%
	2003		58	58	0%
	2004	1	174	175	1%
	2005	1	20	21	5%
ST0004710 Total		**95**	**1480**	**1575**	**6%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004713	1984	2	1	3	67%
	1985	4	8	12	33%
	1986	5	20	25	20%
	1987	13	22	35	37%
	1988	8	30	38	21%
	1989	7	32	39	18%
	1990	7	25	32	22%
	1991	4	32	36	11%
	1992	7	55	62	11%
	1993	11	68	79	14%
	1994	14	103	117	12%
	1995	7	104	111	6%
	1996	35	110	145	24%
	1997	30	157	187	16%
	1998	36	144	180	20%
	1999	15	142	157	10%
	2000	19	108	127	15%
	2001	24	81	105	23%
	2002	30	319	349	9%
	2003	12	80	92	13%
	2004	16	272	288	6%
	2005	3	15	18	17%
ST0004713 Total		**309**	**1928**	**2237**	**14%**
ST0004722	1984		3	3	0%
	1985	4	16	20	20%
	1986	4	24	28	14%
	1987	13	47	60	22%
	1988	9	52	61	15%
	1989	13	59	72	18%
	1990	9	75	84	11%
	1991	15	84	99	15%
	1992	19	122	141	13%
	1993	16	186	202	8%
	1994	20	220	240	8%
	1995	18	331	349	5%
	1996	55	310	365	15%
	1997	69	396	465	15%
	1998	75	549	624	12%
	1999	64	621	685	9%
	2000	52	435	487	11%
	2001	81	451	532	15%
	2002	86	1505	1591	5%
	2003	25	542	567	4%
	2004	70	1918	1988	4%
	2005	18	426	444	4%
ST0004722 Total		**735**	**8372**	**9107**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004739	1984		1	1	0%
	1985	3	7	10	30%
	1986	5	14	19	26%
	1987	4	27	31	13%
	1988	8	26	34	24%
	1989	5	31	36	14%
	1990	4	26	30	13%
	1991	4	35	39	10%
	1992	9	54	63	14%
	1993	9	79	88	10%
	1994	9	111	120	8%
	1995	21	154	175	12%
	1996	22	180	202	11%
	1997	28	266	294	10%
	1998	38	342	380	10%
	1999	34	383	417	8%
	2000	28	313	341	8%
	2001	28	281	309	9%
	2002	66	746	812	8%
	2003	22	271	293	8%
	2004	31	963	994	3%
	2005	18	369	387	5%
ST0004739 Total		**396**	**4679**	**5075**	**8%**
ST0004745	1984	2	1	3	67%
	1985	2	8	10	20%
	1986	3	10	13	23%
	1987	4	16	20	20%
	1988	4	12	16	25%
	1989	1	17	18	6%
	1990	5	23	28	18%
	1991	3	18	21	14%
	1992	2	30	32	6%
	1993	2	36	38	5%
	1994	4	56	60	7%
	1995	6	68	74	8%
	1996	8	50	58	14%
	1997	12	78	90	13%
	1998	8	94	102	8%
	1999	4	107	111	4%
	2000	8	53	61	13%
	2001	8	59	67	12%
	2002	14	219	233	6%
	2003	4	46	50	8%
	2004	2	226	228	1%
	2005		27	27	0%
ST0004745 Total		**106**	**1254**	**1360**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004750	1985	4	8	12	33%
	1986	6	14	20	30%
	1987	6	33	39	15%
	1988	2	38	40	5%
	1989	7	32	39	18%
	1990	7	36	43	16%
	1991	7	54	61	11%
	1992	12	65	77	16%
	1993	9	87	96	9%
	1994	10	125	135	7%
	1995	13	138	151	9%
	1996	23	142	165	14%
	1997	36	205	241	15%
	1998	51	233	284	18%
	1999	30	237	267	11%
	2000	27	214	241	11%
	2001	33	180	213	15%
	2002	46	573	619	7%
	2003	15	179	194	8%
	2004	28	675	703	4%
	2005		65	65	0%
ST0004750 Total		**372**	**3333**	**3705**	**10%**
ST0004762	1984	1	1	2	50%
	1985	5	4	9	56%
	1986	4	7	11	36%
	1987	6	13	19	32%
	1988		20	20	0%
	1989	4	22	26	15%
	1990	5	27	32	16%
	1991	8	24	32	25%
	1992	4	38	42	10%
	1993	4	47	51	8%
	1994	1	75	76	1%
	1995	6	93	99	6%
	1996	8	81	89	9%
	1997	13	107	120	11%
	1998	11	162	173	6%
	1999	14	133	147	10%
	2000	7	93	100	7%
	2001	9	90	99	9%
	2002	18	242	260	7%
	2003	2	50	52	4%
	2004	6	236	242	2%
	2005		17	17	0%
ST0004762 Total		**136**	**1582**	**1718**	**8%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004764	1985		1	1	0%
	1986	1	11	12	8%
	1987	1	1	2	50%
	1988	1	10	11	9%
	1989		9	9	0%
	1990	1	9	10	10%
	1991	3	11	14	21%
	1992		16	16	0%
	1993	1	28	29	3%
	1994	4	39	43	9%
	1995	2	67	69	3%
	1996	5	40	45	11%
	1997	4	68	72	6%
	1998	8	86	94	9%
	1999	6	88	94	6%
	2000	7	68	75	9%
	2001	6	92	98	6%
	2002	16	368	384	4%
	2003	8	107	115	7%
	2004	6	450	456	1%
	2005	6	100	106	6%
	2006		1	1	0%
ST0004764 Total		**86**	**1670**	**1756**	**5%**
ST0004765	1984		2	2	0%
	1985	1	2	3	33%
	1986	3	12	15	20%
	1987	6	14	20	30%
	1988	2	14	16	13%
	1989	4	15	19	21%
	1990	7	28	35	20%
	1991	5	33	38	13%
	1992	2	37	39	5%
	1993	6	66	72	8%
	1994	4	82	86	5%
	1995	11	97	108	10%
	1996	35	150	185	19%
	1997	30	212	242	12%
	1998	32	225	257	12%
	1999	37	235	272	14%
	2000	34	183	217	16%
	2001	20	148	168	12%
	2002	50	487	537	9%
	2003	14	173	187	7%
	2004	23	590	613	4%
	2005	3	70	73	4%
ST0004765 Total		**329**	**2875**	**3204**	**10%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004769	1984		1	1	0%
	1985	4	9	13	31%
	1986	6	11	17	35%
	1987	4	9	13	31%
	1988	5	14	19	26%
	1989	10	29	39	26%
	1990	5	27	32	16%
	1991	5	32	37	14%
	1992	6	37	43	14%
	1993	5	55	60	8%
	1994	13	67	80	16%
	1995	7	88	95	7%
	1996	16	75	91	18%
	1997	16	114	130	12%
	1998	20	153	173	12%
	1999	18	158	176	10%
	2000	8	102	110	7%
	2001	11	96	107	10%
	2002	37	396	433	9%
	2003	9	99	108	8%
	2004	8	474	482	2%
	2005	4	78	82	5%
ST0004769 Total		**217**	**2124**	**2341**	**9%**
ST0004772	1985	3	7	10	30%
	1986	2	13	15	13%
	1987	11	15	26	42%
	1988	3	26	29	10%
	1989	2	23	25	8%
	1990	2	30	32	6%
	1991	4	37	41	10%
	1992	3	42	45	7%
	1993	3	69	72	4%
	1994	2	87	89	2%
	1995	6	111	117	5%
	1996	10	103	113	9%
	1997	17	157	174	10%
	1998	14	138	152	9%
	1999	13	162	175	7%
	2000	8	107	115	7%
	2001	10	99	109	9%
	2002	19	403	422	5%
	2003	5	79	84	6%
	2004	4	356	360	1%
	2005	1	21	22	5%
ST0004772 Total		**142**	**2085**	**2227**	**6%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004777	1984	2		2	100%
	1985	5	4	9	56%
	1986	5	18	23	22%
	1987	7	25	32	22%
	1988	13	31	44	30%
	1989	9	35	44	20%
	1990	6	35	41	15%
	1991	7	29	36	19%
	1992	11	59	70	16%
	1993	11	85	96	11%
	1994	25	137	162	15%
	1995	13	144	157	8%
	1996	34	126	160	21%
	1997	39	195	234	17%
	1998	34	200	234	15%
	1999	27	203	230	12%
	2000	26	193	219	12%
	2001	34	171	205	17%
	2002	39	560	599	7%
	2003	23	198	221	10%
	2004	31	637	668	5%
	2005	4	104	108	4%
ST0004777 Total		**405**	**3189**	**3594**	**11%**
ST0004788	1984	2	1	3	67%
	1985	3	6	9	33%
	1986	7	11	18	39%
	1987	7	21	28	25%
	1988	16	43	59	27%
	1989	13	38	51	25%
	1990	21	58	79	27%
	1991	27	78	105	26%
	1992	18	82	100	18%
	1993	32	127	159	20%
	1994	23	163	186	12%
	1995	18	242	260	7%
	1996	69	157	226	31%
	1997	92	182	274	34%
	1998	65	211	276	24%
	1999	57	235	292	20%
	2000	49	233	282	17%
	2001	35	195	230	15%
	2002	40	406	446	9%
	2003	26	198	224	12%
	2004	27	411	438	6%
	2005	10	133	143	7%
ST0004788 Total		**657**	**3231**	**3888**	**17%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004816	1984		1	1	0%
	1985	1	3	4	25%
	1986	1	10	11	9%
	1987	3	8	11	27%
	1988		10	10	0%
	1989	1	23	24	4%
	1990	4	24	28	14%
	1991	1	28	29	3%
	1992	4	36	40	10%
	1993	5	53	58	9%
	1994	3	65	68	4%
	1995	3	87	90	3%
	1996	11	88	99	11%
	1997	26	135	161	16%
	1998	23	154	177	13%
	1999	16	157	173	9%
	2000	8	99	107	7%
	2001	14	104	118	12%
	2002	32	336	368	9%
	2003	11	121	132	8%
	2004	18	389	407	4%
	2005	11	89	100	11%
ST0004816 Total		**196**	**2020**	**2216**	**9%**
ST0004817	1985	1	5	6	17%
	1986		6	6	0%
	1987		6	6	0%
	1988	4	10	14	29%
	1989	3	12	15	20%
	1990	4	25	29	14%
	1991	6	25	31	19%
	1992	4	45	49	8%
	1993	3	59	62	5%
	1994	6	72	78	8%
	1995	6	80	86	7%
	1996	17	74	91	19%
	1997	14	101	115	12%
	1998	17	134	151	11%
	1999	17	139	156	11%
	2000	14	91	105	13%
	2001	10	77	87	11%
	2002	15	277	292	5%
	2003	5	64	69	7%
	2004	2	257	259	1%
	2005	1	19	20	5%
ST0004817 Total		**149**	**1578**	**1727**	**9%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004820	1984	2	2	4	50%
	1985	4	7	11	36%
	1986	5	18	23	22%
	1987	10	32	42	24%
	1988	8	27	35	23%
	1989	5	42	47	11%
	1990	19	59	78	24%
	1991	17	84	101	17%
	1992	13	113	126	10%
	1993	20	152	172	12%
	1994	34	197	231	15%
	1995	27	281	308	9%
	1996	76	201	277	27%
	1997	83	241	324	26%
	1998	62	260	322	19%
	1999	46	295	341	13%
	2000	44	236	280	16%
	2001	44	187	231	19%
	2002	48	306	354	14%
	2003	10	142	152	7%
	2004	13	228	241	5%
	2005	3	34	37	8%
	2006		1	1	0%
ST0004820 Total		**593**	**3145**	**3738**	**16%**
ST0004828	1984		2	2	0%
	1985	4	7	11	36%
	1986	12	21	33	36%
	1987	7	39	46	15%
	1988	9	35	44	20%
	1989	9	58	67	13%
	1990	16	83	99	16%
	1991	18	85	103	17%
	1992	15	138	153	10%
	1993	30	180	210	14%
	1994	32	237	269	12%
	1995	33	338	371	9%
	1996	85	269	354	24%
	1997	94	369	463	20%
	1998	83	358	441	19%
	1999	78	405	483	16%
	2000	70	291	361	19%
	2001	56	276	332	17%
	2002	82	712	794	10%
	2003	25	248	273	9%
	2004	29	671	700	4%
	2005	6	66	72	8%
ST0004828 Total		**793**	**4888**	**5681**	**14%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004837	1984		4	4	0%
	1985	2	9	11	18%
	1986	1	10	11	9%
	1987		24	24	0%
	1988	8	19	27	30%
	1989	2	35	37	5%
	1990	9	47	56	16%
	1991	5	44	49	10%
	1992	12	43	55	22%
	1993	11	85	96	11%
	1994	19	106	125	15%
	1995	20	153	173	12%
	1996	40	148	188	21%
	1997	37	181	218	17%
	1998	41	223	264	16%
	1999	37	192	229	16%
	2000	23	144	167	14%
	2001	32	131	163	20%
	2002	25	379	404	6%
	2003	9	103	112	8%
	2004	18	357	375	5%
	2005	1	26	27	4%
ST0004837 Total		**352**	**2463**	**2815**	**13%**
ST0004839	1983		3	3	0%
	1984		3	3	0%
	1985	5	16	21	24%
	1986	2	16	18	11%
	1987	7	28	35	20%
	1988	5	23	28	18%
	1989	4	48	52	8%
	1990	10	57	67	15%
	1991	9	49	58	16%
	1992	10	92	102	10%
	1993	9	116	125	7%
	1994	11	140	151	7%
	1995	10	172	182	5%
	1996	22	153	175	13%
	1997	30	228	258	12%
	1998	41	244	285	14%
	1999	41	258	299	14%
	2000	27	201	228	12%
	2001	25	237	262	10%
	2002	46	676	722	6%
	2003	19	218	237	8%
	2004	35	768	803	4%
	2005	17	252	269	6%
ST0004839 Total		**385**	**3998**	**4383**	**9%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004843	1984		2	2	0%
	1985	4	14	18	22%
	1986	5	23	28	18%
	1987	6	29	35	17%
	1988	9	27	36	25%
	1989	8	50	58	14%
	1990	4	38	42	10%
	1991	2	41	43	5%
	1992	11	70	81	14%
	1993	5	91	96	5%
	1994	6	138	144	4%
	1995	11	175	186	6%
	1996	19	175	194	10%
	1997	19	223	242	8%
	1998	31	264	295	11%
	1999	35	302	337	10%
	2000	18	177	195	9%
	2001	24	168	192	13%
	2002	51	758	809	6%
	2003	12	224	236	5%
	2004	31	1044	1075	3%
	2005	7	163	170	4%
ST0004843 Total		**318**	**4196**	**4514**	**7%**
ST0004847	1981		1	1	0%
	1984		1	1	0%
	1985	3	5	8	38%
	1986	2	20	22	9%
	1987	4	22	26	15%
	1988	9	27	36	25%
	1989	8	41	49	16%
	1990	8	43	51	16%
	1991	3	36	39	8%
	1992	3	69	72	4%
	1993	3	70	73	4%
	1994	11	96	107	10%
	1995	15	132	147	10%
	1996	26	139	165	16%
	1997	35	169	204	17%
	1998	28	251	279	10%
	1999	28	236	264	11%
	2000	13	140	153	8%
	2001	17	153	170	10%
	2002	39	621	660	6%
	2003	15	154	169	9%
	2004	28	651	679	4%
	2005		64	64	0%
ST0004847 Total		**298**	**3141**	**3439**	**9%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004854	1984		1	1	0%
	1985	3	17	20	15%
	1986	2	30	32	6%
	1987	9	33	42	21%
	1988	11	61	72	15%
	1989	17	65	82	21%
	1990	12	73	85	14%
	1991	16	71	87	18%
	1992	13	120	133	10%
	1993	24	148	172	14%
	1994	22	192	214	10%
	1995	32	297	329	10%
	1996	38	285	323	12%
	1997	55	356	411	13%
	1998	71	426	497	14%
	1999	64	434	498	13%
	2000	73	344	417	18%
	2001	63	327	390	16%
	2002	97	1055	1152	8%
	2003	24	323	347	7%
	2004	41	1182	1223	3%
	2005	9	180	189	5%
ST0004854 Total		**696**	**6020**	**6716**	**10%**
ST0004855	1984	1	2	3	33%
	1985	6	3	9	67%
	1986	8	12	20	40%
	1987	7	24	31	23%
	1988	11	38	49	22%
	1989	6	40	46	13%
	1990	14	33	47	30%
	1991	14	62	76	18%
	1992	21	74	95	22%
	1993	13	105	118	11%
	1994	16	129	145	11%
	1995	22	177	199	11%
	1996	38	124	162	23%
	1997	44	156	200	22%
	1998	43	170	213	20%
	1999	39	171	210	19%
	2000	34	121	155	22%
	2001	13	114	127	10%
	2002	28	226	254	11%
	2003	7	72	79	9%
	2004	10	207	217	5%
	2005		20	20	0%
ST0004855 Total		**395**	**2080**	**2475**	**16%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004866	1984	1	2	3	33%
	1985	2	10	12	17%
	1986	4	14	18	22%
	1987	7	19	26	27%
	1988	5	21	26	19%
	1989	9	26	35	26%
	1990	11	37	48	23%
	1991	17	54	71	24%
	1992	21	93	114	18%
	1993	8	98	106	8%
	1994	17	125	142	12%
	1995	19	158	177	11%
	1996	52	163	215	24%
	1997	62	200	262	24%
	1998	45	225	270	17%
	1999	49	219	268	18%
	2000	28	196	224	13%
	2001	25	190	215	12%
	2002	44	359	403	11%
	2003	19	131	150	13%
	2004	20	319	339	6%
	2005	2	46	48	4%
ST0004866 Total		**467**	**2705**	**3172**	**15%**
ST0004867	1984	1	3	4	25%
	1985	5	15	20	25%
	1986	12	28	40	30%
	1987	13	48	61	21%
	1988	13	75	88	15%
	1989	14	99	113	12%
	1990	24	93	117	21%
	1991	27	119	146	18%
	1992	38	177	215	18%
	1993	35	240	275	13%
	1994	50	355	405	12%
	1995	49	419	468	10%
	1996	90	374	464	19%
	1997	100	499	599	17%
	1998	100	562	662	15%
	1999	81	608	689	12%
	2000	64	368	432	15%
	2001	82	369	451	18%
	2002	98	1239	1337	7%
	2003	35	358	393	9%
	2004	51	1300	1351	4%
	2005	7	176	183	4%
ST0004867 Total		**989**	**7524**	**8513**	**12%**

Table (a) (3 & 4). # of Tests by Station, % Fail By Station					
Station ID	**Model Year**	**Fail**	**Pass**	**Total**	**% Fail**
ST0004870	1985		1	1	0%
	1986	1	2	3	33%
	1987	2	4	6	33%
	1988	2	4	6	33%
	1989	1	5	6	17%
	1990		8	8	0%
	1991		13	13	0%
	1992	1	13	14	7%
	1993	3	17	20	15%
	1994	1	25	26	4%
	1995	2	31	33	6%
	1996	3	23	26	12%
	1997	4	39	43	9%
	1998	8	56	64	13%
	1999	5	62	67	7%
	2000	7	39	46	15%
	2001		45	45	0%
	2002	15	219	234	6%
	2003	4	39	43	9%
	2004	5	278	283	2%
	2005		16	16	0%
ST0004870 Total		**64**	**939**	**1003**	**6%**
ST0004871	1984	1	1	2	50%
	1985	2	4	6	33%
	1986		4	4	0%
	1987	2	17	19	11%
	1988	1	16	17	6%
	1989	4	15	19	21%
	1990	6	20	26	23%
	1991	1	24	25	4%
	1992	3	33	36	8%
	1993	2	50	52	4%
	1994	5	59	64	8%
	1995	3	97	100	3%
	1996	11	85	96	11%
	1997	20	121	141	14%
	1998	26	151	177	15%
	1999	21	179	200	11%
	2000	19	84	103	18%
	2001	22	102	124	18%
	2002	42	396	438	10%
	2003	3	125	128	2%
	2004	2	430	432	0%
	2005	1	30	31	3%
ST0004871 Total		**197**	**2043**	**2240**	**9%**
Grand Total		**79476**	**772917**	**852393**	**9%**

Table (b) (1) & (2)(i, ii, & v). Quality Assurance

	Beginnning of Year	Left Program	Added to Program
No. of Inspection stations/lanes operating throughout 2008	275	11	6
Receiving overt performance audits in 2008	252		
Not Receiving overt performance audits in 2008	0		
That have been shut down as a result of overt performance audits	2		

Table (b)(2)(iii, iv) & (3,8,9) Quality Assurance

No of Inspection stations/lanes operating throughout 2008	All Test Types	OBD Tests	ASM Tests
Receiving Covert Audits	252	247	135
Not Receiving Covert Audits	0		
Number of Covert Audits	1025	831	194
Conducted with vehicle set to fail	932	756	176
Conducted with vehicle set to fail any combination of two or more types	N/A	N/A	N/A
Resulting in a False Pass	209	209	0
Resulting in a False Pass for any combination of two or more test types	N/A	N/A	N/A
Total number of Covert vehicles available for undercover audits in 2008	8	5	3
Total number of Covert auditors available for undercover audits in 2008	16	16	16

Table (b) (4)(i & ii) Quality Assurance

	Stations	Inspectors
Suspended as a result of covert audits	4	29
Suspended for other reasons	3	191

Table (b) (5) Quality Assurance

Certified Testing Inspectors as of 12/31/08	984

Table (c) (1,2,3 & 4). Quality Control				
Station #	**Station Name**	**Lane number**	**Initial Gas Audits**	**Initial Gas Audit Fail**
0001	Valley Dodge	**1**	2	
0014	Gary Rome KIA	**1**	3	
0015	Artioli Kia	**1**	1	
0017	Morande Linc-Merc	**1**	2	
0019	Artioli Dodge	**1**	CLOSED	
0020	Cargill Chevrolet Co	**1**	2	
0023	Robert's Chrysler-Dodge	**1**	3	1
0034	Bob Valenti Chevrolet-Olds	**1**	2	
0036	Hoffman Auto Group	**1**	2	1
0060	Dan Perkins Chevrolet	**1**	2	
0065	Stevens Ford Linc-Merc	**1**	3	
0107	King Olds-Cadillac	**1**	2	
0112	Brustolon	**1**	3	1
0120	Girard Ford	**1**	2	
0125	Candlewood Motors	**1**	1	
0128	Southworths Dodge	**1**	CLOSED	
0129	Southworth's Chrysler	**1**	3	
0132	Middletown Toyota	**1**	2	1
0168	Merriam Motors	**1**	CLOSED	
0171	O'Neills	**1**	2	1
0193	M J Sullivan Auto	**1**	2	
0229	Hartford Toyota Superstore	**1**	2	
0315	Schaller Tire Distributer	**1**	2	
0326	Midas	**1**	2	
0328	Automotive Plus	**1**	3	
0359	Laurel Automotive	**1**	3	
0386	Hamelin & Sons	**1**	3	
0412	Arnold's Garage	**1**	2	2
0434	Midas	**1**	2	1
0469	Lees Auto Center	**1**	3	1
0493	Midas	**1**	2	
0516	Hallmark Tire Co	**1**	4	
0520	Farmington Motor Sports	**1**	3	3
0525	Firestone	**1**	2	2
0549	Morande Ford	**1**	3	
0557	Kensington Auto	**1**	3	
0581	J & M Corvettes	**1**	2	
0616	Firestone	**1**	3	1
0618	Computer Tune & Lube	**1**	2	1
0621	Ex-Per Tech	**1**	3	
0648	Bolton Motors	**1**	2	
0697	Firestone	**1**	2	
0718	Ceglarz	**1**	2	
0725	Story Bros, Inc.	**1**	2	
0730	Midas	**1**	4	2

Table (c) (1,2,3 & 4). Quality Control				
Station #	**Station Name**	**Lane number**	**Initial Gas Audits**	**Initial Gas Audit Fail**
0776	Anthony's Service	**1**	3	1
0779	Central Conn Tire	**1**	4	1
0790	Farm Car Care	**1**	3	1
0809	Moore's Auto	**1**	3	1
0825	Meineke	**1**	2	1
0915	Bolles ChyDge	**1**	2	
0951	Ready Credit	**1**	3	
0963	Firestone	**1**	2	
0969	Meineke	**1**	2	
0971	Computer Tune & Lube	**1**	3	1
0972	Mad Hatter	**1**	2	
0976	Midas	**1**	CLOSED	
0986	Suburban Tire	**1**	3	
0994	Tolland Citgo	**1**	2	1
1051	L and J Service	**1**	4	
1056	Scata's Auto	**1**	4	
1066	Bobby G's	**1**	CLOSED	
1095	Prospect Foreign Car	**1**	2	1
1131	Main St Auto	**1**	3	
1193	Herb's Auto Electric	**1**	2	
1214	Rick's Auto	**1**	CLOSED	
1216	Wethersfield Auto	**1**	2	
1220	Midas Rocky Hill	**1**	4	1
1235	Valvoline	**1**	3	
1253	Midas	**1**	5	
1264	Mike's Auto	**1**	4	
1267	Mirabelli Auto	**1**	3	2
1270	R & M Auto	**1**	2	
1274	West Hill Auto	**1**	3	1
1284	Modern Tire	**1**	2	2
1294	Modern Tire	**1**	2	1
1297	Aquas Buenas	**1**	4	1
1299	B & S Auto	**1**	4	
1303	South Green Auto	**1**	4	
1363	Midas	**1**	2	2
1368	Lyons Service	**1**	3	2
1371	Cox's Service	**1**	2	
1377	A & P Auto	**1**	2	
1401	Nutmeg Auto	**1**	2	
1423	Midas	**1**	3	
1470	Columbia Car Care	**1**	CLOSED	
1511	T and B Motor Sales	**1**	2	
1519	Raymond's Auto	**1**	2	
1594	Town Hill Auto	**1**	2	1
1613	Midas	**1**	2	

Table (c) (1,2,3 & 4). Quality Control				
Station #	**Station Name**	**Lane number**	**Initial Gas Audits**	**Initial Gas Audit Fail**
1615	Firestone	**1**	3	1
1646	Bob's Auto	**1**	2	
1660	Midas	**1**	2	1
1662	Meineke	**1**	2	1
1679	Montville Auto	**1**	2	
1704	Precision Motors, Inc.	**1**	2	1
1725	Nick's Service Center	**1**	2	1
1767	Firestone	**1**	2	
1797	Shoreline Service	**1**	3	2
1799	All Pro Automotive	**1**	2	
1805	Plainfield Shell	**1**	3	1
1835	Montville Auto	**1**	1	
1852	Marvin's Midway	**1**	CLOSED	
1876	General Muffler	**1**	3	
1889	Gabe's Service Station	**1**	5	
1896	A & M Service Station	**1**	3	
1944	Branford Auto Center	**1**	3	
1969	Cheshire Shell Service	**1**	3	1
1970	Cheshire Tire & Auto	**1**	3	2
2018	D and R Automotive	**1**	2	
2020	Hamanaset Ford	**1**	4	1
2026	Desmonds Auto Sales	**1**	4	
2060	Cromwell Automotive	**1**	3	1
2080	Derby Auto	**1**	CLOSED	
2120	Greenfield Hill Service	**1**	4	3
2133	Firestone	**1**	2	1
2141	Fairfield Tire & Auto	**1**	2	1
2143	Brooklawn Service Center	**1**	1	
2149	Meineke	**1**	2	1
2153	Sport Hill Service Station.	**1**	2	
2175	Audi of Fairfield	**1**	CLOSED	
2178	Nick's Precision Auto	**1**	2	
2181	Auto Associates	**1**	2	
2233	Cos' Central Auto	**1**	2	
2267	Harte Chevrolet	**1**	4	
2280	Auto Sales & Service	**1**	2	
2304	Alarcon Tire Co	**1**	4	2
2318	Fine Tunes	**1**	2	
2330	BellTown Motors	**1**	2	
2340	European Motorcars	**1**	3	2
2358	Computer Tune & Lube	**1**	5	1
2365	Midas	**1**	2	1
2373	Personal Auto Care	**1**	3	
2380	New Image Auto	**1**	2	1
2419	Robert's Service Center	**1**	3	1

Table (c) (1,2,3 & 4). Quality Control				
Station #	**Station Name**	**Lane number**	**Initial Gas Audits**	**Initial Gas Audit Fail**
2427	Westshore Motors	**1**	2	
2493	Amaral Motors, Inc.	**1**	2	
2540	J & P Auto	**1**	2	
2554	Bouchard Automotive.	**1**	CLOSED	
2560	Tech One Automotive	**1**	2	1
2573	Oceanside Auto	**1**	2	
2593	Bens Service Center	**1**	2	
2603	Meineke	**1**	3	1
2631	Portland Automotive	**1**	3	
2651	East Coast Four-Wheel	**1**	3	1
2652	Falbos Tire and Auto	**1**	3	
2672	AJ'S Center Service	**1**	2	
2722	Computer Tune and Lube	**1**	3	2
2740	Mad Hatter Muffler	**1**	2	1
2744	Tire Depot Plus	**1**	3	1
2770	South Colony Mobil	**1**	CLOSED	
2822	Frenchys Auto .	**1**	2	
2830	Nelson's Automotive	**1**	2	
2880	Broadbridge Auto Service	**1**	3	3
2884	Don Schiffer's Auto	**1**	2	
2903	Cars, Inc.	**1**	2	1
2915	Midas	**1**	3	1
2919	Meineke Discount Mufflers	**1**	2	
2955	Nova Automotive	**1**	2	1
2964	Canzanella Brothers	**1**	2	
3004	Annex Auto Repair	**1**	3	1
3086	Barco Motors, Inc.	**1**	CLOSED	
3102	Auto Specialist	**1**	2	
3106	Campbell Motor Sales.	**1**	5	1
3107	Chuck's Garage	**1**	2	
3176	Circle A Auto	**1**	3	1
3190	Partyka Chevrolet	**1**	3	
3192	Dougan Automotive	**1**	9	2
3225	Tire Doctor	**1**	4	2
3253	Crest Lincoln Mercury	**1**	2	1
3263	Firestone	**1**	2	
3292	Joey's Capitol-Wood	**1**	3	2
3406	Genesis Motorworks	**1**	3	1
3432	E & S Auto	**1**	2	
3437	Monroe Muffler	**1**	3	1
3449	Boston Ave Auto (Getty)	**1**	2	
3458	Knecht's Garage	**1**	2	
3483	Breezy Point Auto	**1**	2	
3498	Model Garage.	**1**	3	
3548	Montambault's	**1**	9	

Table (c) (1,2,3 & 4). Quality Control				
Station #	Station Name	Lane number	Initial Gas Audits	Initial Gas Audit Fail
3592	Superior Transmissions	1	2	1
3662	United Auto	1	3	
3724	Superior Transmissions	1	3	
3732	Litchfield Hills Motorsports	1	3	
3739	Bennett Motor Works	1	2	
3746	Sunshine Car Repair	1	2	
3767	Mezzio Auto Body	1	3	
3876	The Quiet Zone	1	2	
3932	Wilson Dodge Nissan	1	3	
3937	Northwest Hills Chrysler	1	4	2
3943	Bahr Auto Repair	1	2	1
3988	Valenti Motors	1	2	
3997	Murray Bros Garage	1	3	
4004	Belardinelli Tire Comp	1	2	
4016	Firestone	1	3	
4034	A 1 Service Center	1	2	
4040	Cardinale Auto Repair.	1	2	
4080	Danbury Chevy Olds	1	2	
4105	E.M. Auto Repair	1	2	
4107	Federal Towing	1	2	
4111	Wilton Service	1	2	
4144	Advanced Auto Repair	1	2	
4152	Motor Works	1	2	
4161	Danbury Autowerks	1	3	
4167	Superior Service (Getty)	1	2	
4170	New Fairfield Automotive	1	2	
4180	Noroton Getty	1	2	
4191	Darien Auto Center	1	3	
4230	Greenwich Shell	1	2	
4243	AC Autobody	1	2	
4257	New Canaan Ave. Service	1	3	
4262	The Brigg's Tire Co.	1	2	
4298	Hank Mays Goodyear	1	2	
4363	Soundview North Service	1	3	1
4375	Copps Hill Shell	1	2	
4377	Limestone Service	1	2	
4397	Green's Farms Shell	1	5	1
4405	Weston Service Center	1	2	
4480	Stamford Firestone	1	3	
4525	High Ridge Shell	1	3	
4541	Sotires Auto Diagnostic	1	3	
4582	A-OK Auto Center	1	3	
4591	AutoWorks of Devon	1	5	
4592	Avery Brothers	1	2	1
4612	Platt Automotive	1	CLOSED	

Table (c) (1,2,3 & 4). Quality Control				
Station #	**Station Name**	**Lane number**	**Initial Gas Audits**	**Initial Gas Audit Fail**
4615	Firestone	**1**	2	
4628	Firestone	**1**	4	2
4632	Burt Humphrey & Sons	**1**	2	
4657	Essex Service Center	**1**	2	
4658	Fairfield Auto & Truck	**1**	3	1
4696	Long Ridge Service	**1**	2	
4701	Martin & Parson's Auto	**1**	3	1
4710	Middlesex Auto Center	**1**	2	1
4713	Milex Auto Repair	**1**	2	
4722	Mobile Lube Express	**1**	2	
4739	Precision Motor Coach	**1**	2	
4745	R.K. Rogers	**1**	5	3
4750	Sam Wibberley	**1**	2	
4762	Auto Tek	**1**	3	
4764	Suburban Subaru	**1**	2	
4765	Meineke	**1**	2	2
4769	The Quiet Zone	**1**	2	
4772	Tim's Auto Center	**1**	2	1
4777	Townline Auto Sales	**1**	2	
4788	West High Service	**1**	3	
4810	Valvoline	**1**	CLOSED	
4816	Valenti Pontiac	**1**	2	
4817	High Tech Auto	**1**	2	
4820	John & Son's Auto	**1**	3	1
4827	Balkos Service	**1**	CLOSED	
4828	Waterbury Tire & Auto	**1**	4	
4837	Car Tune	**1**	3	2
4839	Hank Mays Goodyear	**1**	3	
4843	Toyota of Colchester	**1**	2	1
4847	Tarcas Hebron Quick Lube	**1**	2	
4854	Valvoline	**1**	3	
4855	Auto Parts Mart	**1**	3	
4866	Lee Myles Transmissions	**1**	4	
4867	Foxy Fast Lube	**1**	2	
4868	Artioli Chevrolet	**1**	CLOSED	
4870	Middlebury Garage	**1**	2	
4871	Midas Milford	**1**	2	
9998	CTC	**1**	7	2
FL 1001	City of Bristol	**1**	2	
FL 1002	Aquarion Water	**1**	2	
FL 1003	Regional Water	**1**	2	
FL 1004	ATT- Middletown	**1**	2	
FL 1005	Stamford PD	**1**	2	
FL 1006	Hunter Ambulance	**1**	2	
FL 1007	New Haven PD	**1**	2	

Table (c) (1,2,3 & 4). Quality Control				
Station #	**Station Name**	**Lane number**	**Initial Gas Audits**	**Initial Gas Audit Fail**
FL 1008	Cablevision - Bridgeport	**1**	2	
FL 1009	Cablevision - Norwalk	**1**	2	1
FL1010	Town of Trumbull	**1**	2	
FL 1011	University of Hartford	**1**	CLOSED	
FL 1012	Town of Guilford	**1**	2	
FL 1013	Southern CT Gas	**1**	2	
FL 1014	CT DAS - New Haven	**1**	2	
FL 1015	CT DAS - Norwich	**1**	2	
FL 1016	CT DAS - Wethersfield	**1**	2	
FL 1017	City of Waterbury	**1**	2	
FL 1018	CNG	**1**	2	
FL 1019	ATT - Meriden	**1**	2	
FL 1020	ATT - Winsted	**1**	2	1
FL 1021	ATT - Waterbury	**1**	2	
FL 1022	ATT - Danbury	**1**	0	
FL 1023	ATT - Stamford	**1**	2	
FL 1024	ATT - Shelton	**1**	0	
FL 1025	ATT - Stratford	**1**	0	
FL 1026	ATT - Norwalk	**1**	2	2
FL 1027	ATT - New Haven	**1**	2	
FL 1028	ATT - No. Branford	**1**	2	
FL 1029	ATT - Waterford	**1**	2	
FL 1030	ATT - No. Windham	**1**	2	
FL 1031	ATT - Enfield	**1**	2	
FL 1032	ATT - Hartford	**1**	2	

Total Stations in Program (Including Fleet Stations)	**295**
Total Equipment Audits	**701**
Total Stations that Failed Equipment Audit	**90**
Percentage of stations failing an equipment (gas) audit[1]	**30.5%**
Number of Stations shut down as a result of a failed equipment (gas) audit[2]	**0**
Percentage of stations shut down as a result of a failed equipment (gas) audit[2]	**0%**

[1] Failures are limited to gas calibration audits. By contract, Testing contractor must resolve equipment failures within 24 hours.

[2] Stations are prohibited from performing tailpipe emission testing only until the equipment problem is resolved. Stations continue to perform OBD testing (In 2008 - 75% of all tests).

Enforcement Report: (d) (1)(i & ii), (2), & (3)(ii & iii).

(d) Enforcement Report –

(1) All varieties of enforcement programs shall, at a minimum . . . .

(i) An estimate of the number of vehicles subject to the inspection program, including the results of an analysis of the registration data base:

Connecticut's estimated emission eligible population is two million vehicles per testing cycle. During 2008, 75.4% of initial inspections were OBD tests.

(ii) The percentage of motorist compliance based upon a comparison of the number of valid final tests with the number of subject vehicles:

Connecticut's compliance rate was approximately 96.9% for 2008.

(2) Registration denial bases enforcement programs shall provide the following additional information.

(i) A report of the program's efforts and actions to prevent motorists from falsely registering vehicles out of the program area or falsely changing fuel type or weight class on the vehicle registration and the results of special studies to investigate the frequency of such activity:

Connecticut does not perform an analysis of its emission eligible database to detect vehicles that are falsely registered out of state to avoid being emission tested in the state. The majority of vehicles registered with an incorrect GVWR are those in which the vehicle owner registers the vehicle at a lower weight to avoid the added expense and are consequently not emission eligible (>10,000 lbs GVWR). Connecticut tests all fuel types, including hybrids.

(ii) The number of registration file audits, number of registrations reviewed and compliance rates found in such audits:

In 2008, 915,984 vehicle registrations were audited, which found a compliance rate of 96%. Of the 4% that were found to be out of compliance, 92.8% became compliant later.

(3) Computer matching based enforcement programs shall provide the following additional information.

(ii) A report on the program's efforts to detect and enforce against motorists falsely changing vehicle classifications to circumvent program requirements and the frequency of this type of activity:

In 2008, 98.7% of emission eligible vehicles in Connecticut are in the Passenger, Commercial or Combination classifications. Due to the added expense, documentation and inspection requirements needed to change a vehicle's registration classification to a non-emission eligible class, incidents of such modifications are rare.

(iii) The number of enforcement system audits and the error rate found during those audits:

Connecticut's program uses both registration denial and late fee assessment to enforce emission testing compliance. In 2008, 915,984 registration renewals were audited, resulting in 35,052 denials of which 32,545 later complied. And, in 2008, 111,077 late fees were assessed.

Table (d) (1)(v).	
Time Extension and Other Exemptions	5,953

Table (d) (3)(i). # and % of subject vehicles that were tested by the initial deadline		
Deadline	**# of Vehicles**	**% of Vehicles**
On Due date	22,286	2.99%
1-30 days early	275,098	36.91%
31-60 days early	142,020	19.05%
61-90 days early	2,222	0.29%
91-120 days early	1,135	0.15%
> 120 days early	19,559	2.62%
1-30 days late	78,962	10.59%
31-60 days late	22,213	2.98%
61-90 days late	12,157	1.63%
91-120 days late	9,583	1.28%
> 120 days late	160,069	21.47%

Figures based on 'Noticed' vehicles/tested volume of 745,303

Appendix C

Transitioning I/M: Options for Inspection and Maintenance in the OBD Dominated Fleet

U.S. EPA April 2008

Transitioning I/M

Options for Inspection and Maintenance in the OBD Dominated Fleet

April 30, 2008

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Appendixes

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.[1] 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

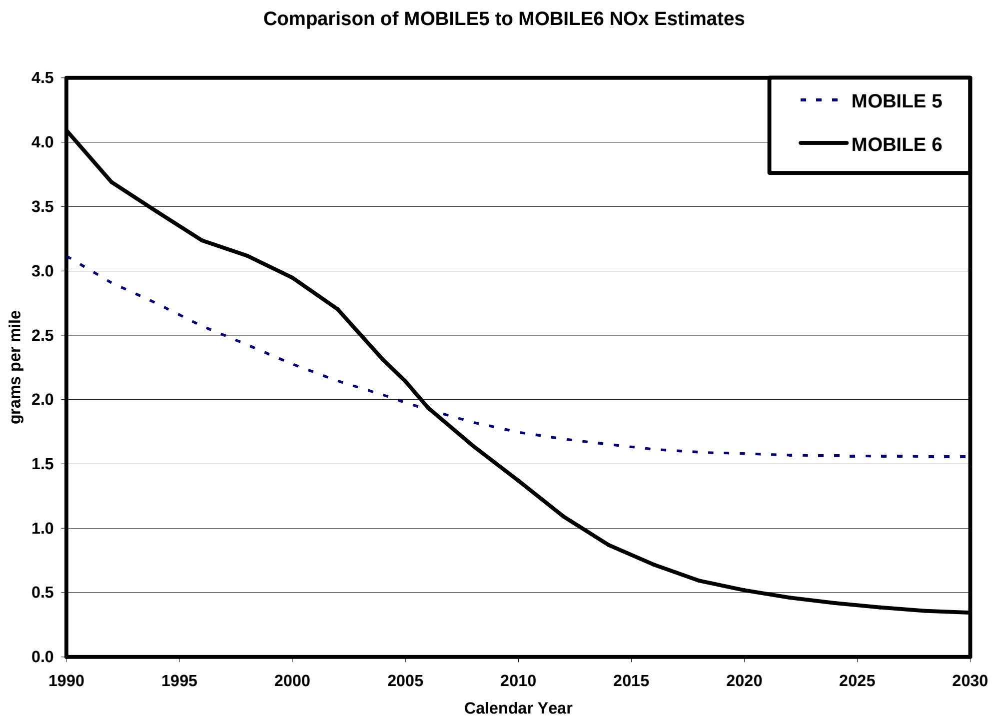
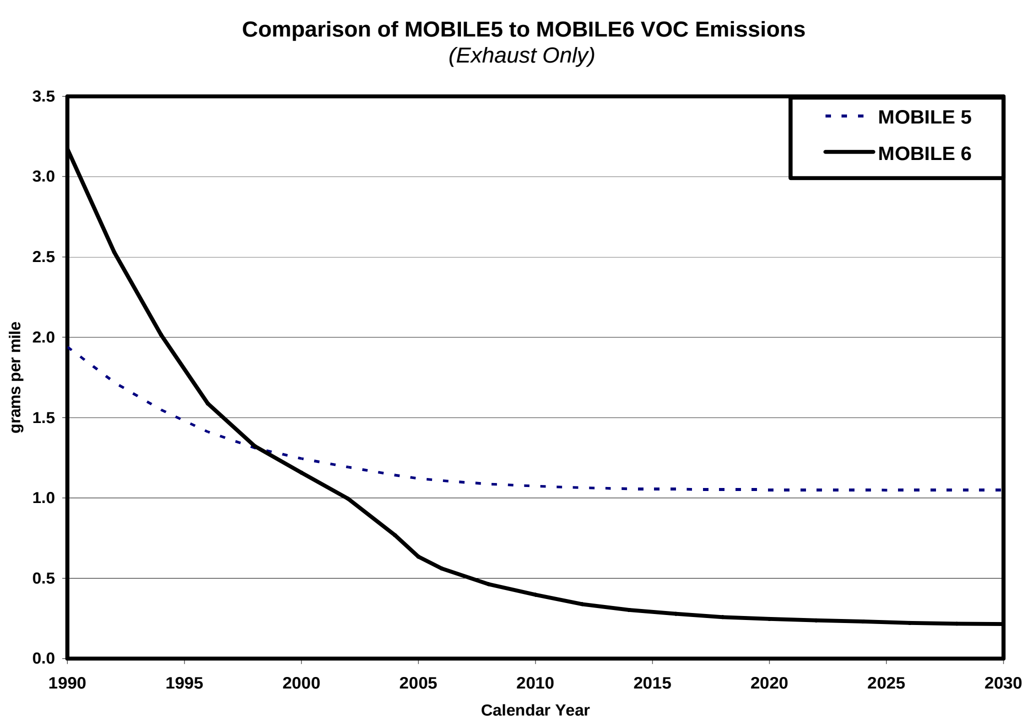
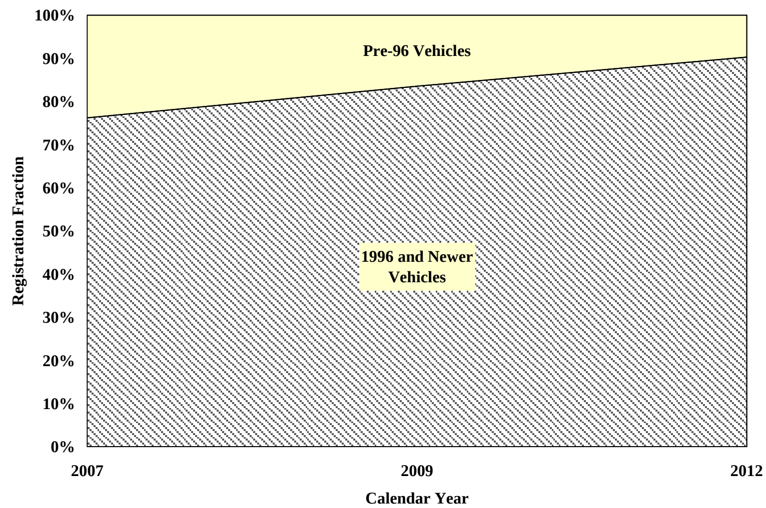


Figure 2
Volatile Organic Compound Emissions



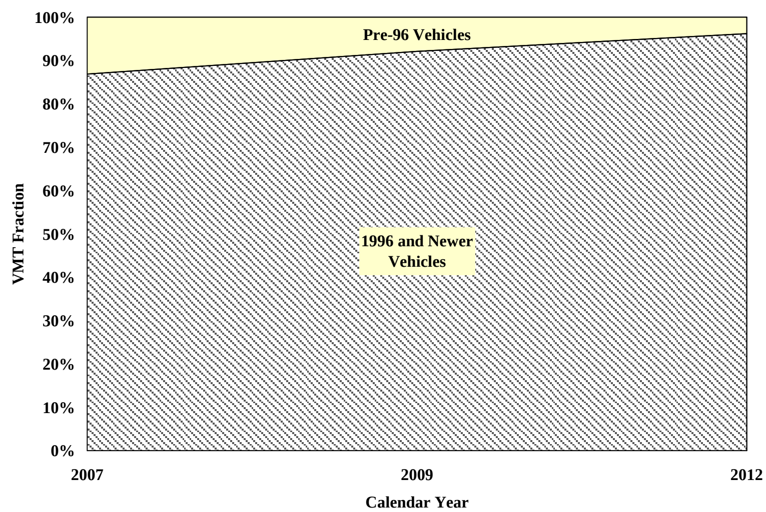
More significantly, the national fleet mix in the U.S. has shifted such that the majority of the light-duty vehicles on the road today are OBD equipped. Figure 3 shows the national fleet mix of pre-1996 and 1996 and newer light-duty vehicles between 2007 and 2012. Nationally, about 75% of the fleet is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

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



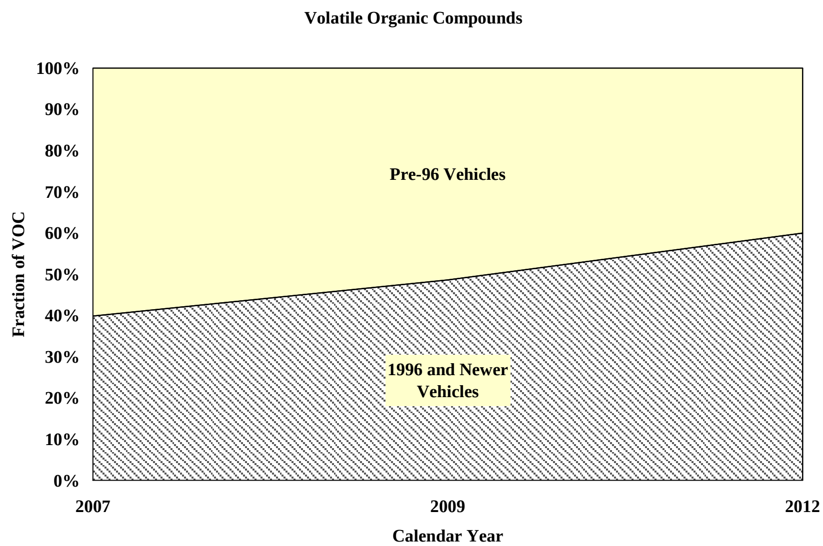
In addition, older vehicles tend to be used much less than newer vehicles. Figure 4 shows the vehicle miles traveled of 1996 and newer light-duty vehicles versus pre-1996 light-duty vehicles. Even though 25% of the vehicles registered in 2007 are pre-1996, they only contribute 15% of the total vehicle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

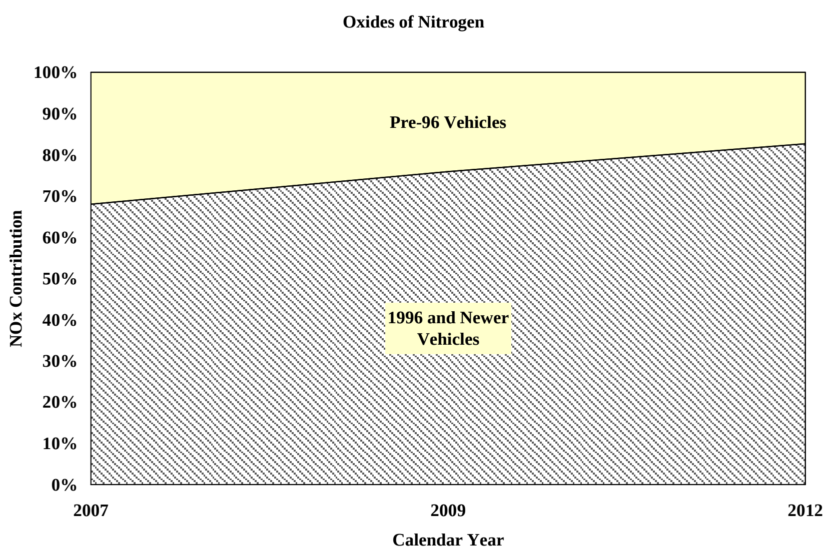
Figure 4
Changes in Light-Duty VMT Mix Over Time



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



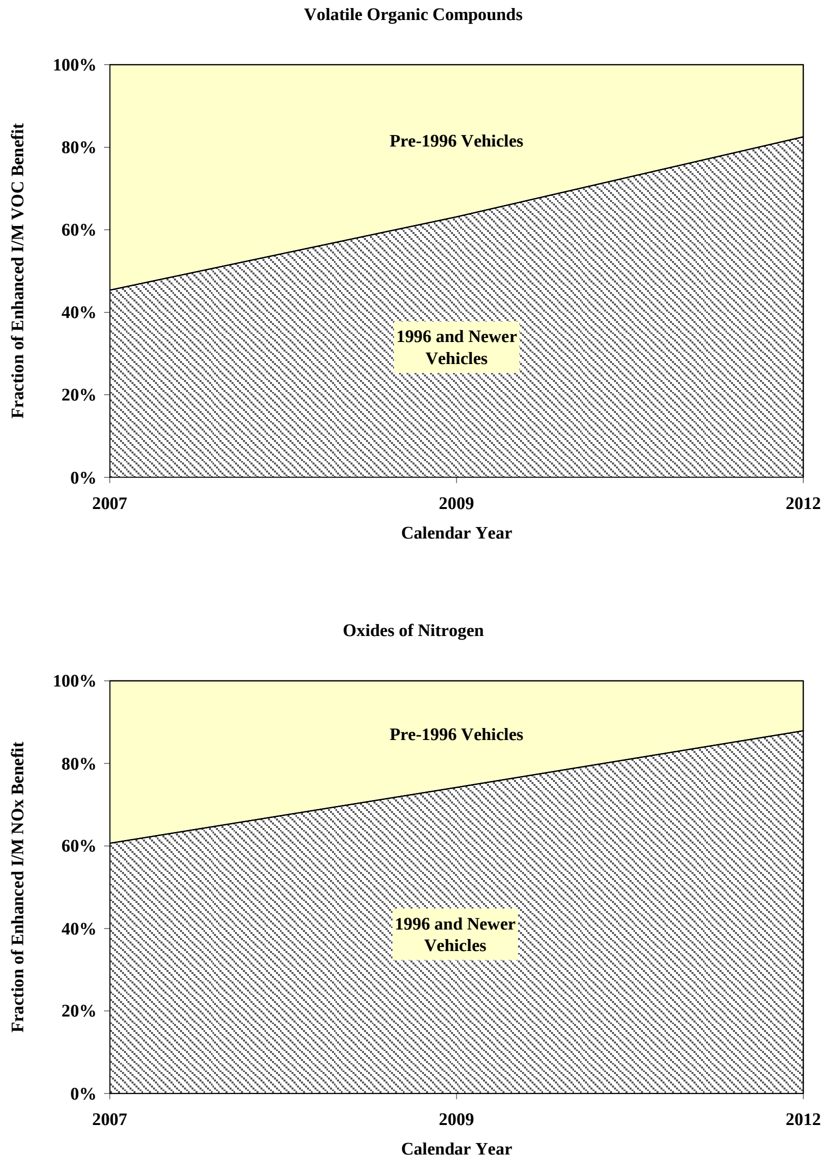


Total emissions, however, only tell part of the story. It is also important to look at the emission reduction potential from each of these subsets of the fleet. Starting in 1996, new vehicles were certified to the much tighter Tier 1 emission standards. EPA tightened these standards further in 2004 (Tier 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



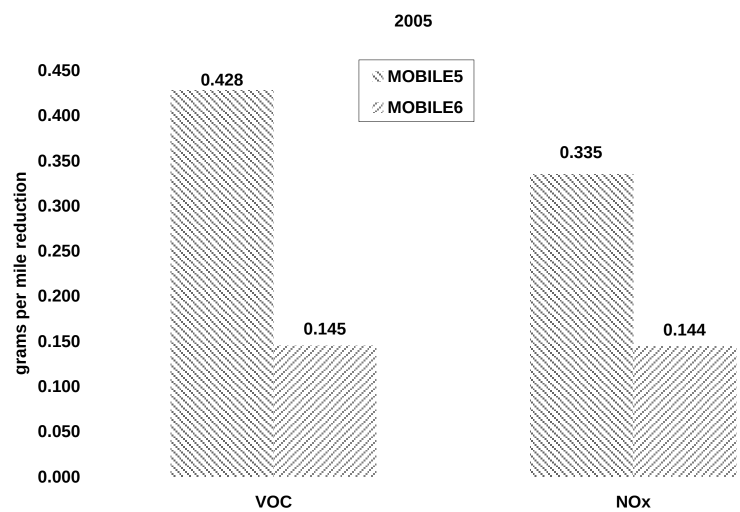
Declining Failure Rates/Improved Durability

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



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.[2] 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

[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

[3] Oregon I/M Program contract.
[4] Information provided by Chris Stock, ESP.

difference in cost of traditional periodic I/M and Remote OBD.[5] 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.[6] 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,[7] 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

Number of Vehicles in Remote OBD Program	Level 1	Level 2	Level 3
	Database design, installation, maintenance, and communications	Add reporting	Add auditing
250,000	$1.50	$2.00	$3.00
250,001 – 500,000	$1.00	$1.50	$2.75
500,001 - 1,500,000	$0.75	$1.00	$2.50
>1,500,000	$0.50	$0.75	$2.00

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

[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

		Periodic OBD	Remote OBD	Savings
Test/Install	Low	$12 billion	$4 billion	$8 billion
Cost	High	$12 billion	$5 billion	$7 billion
Convenience	Low	$9 billion	$1 billion	$8 billion
Cost	High	$17 billion	$2 billion	$15 billion
Total Cost	Low	$21 billion	$5 billion	$16 billion
	High	$29 billion	$7 billion	$22 billion

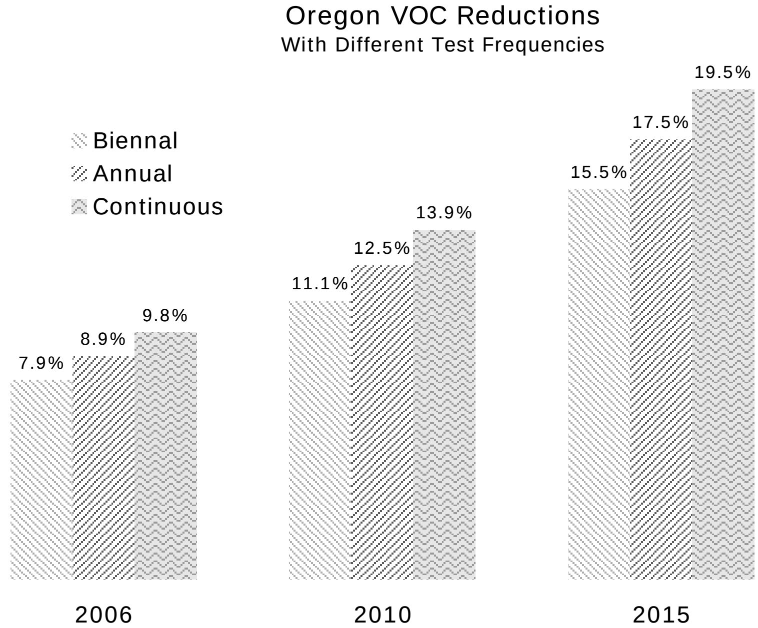
[8] This is the same dollar amount assumed in EPA’s original Technical Support Document published along with the 1992 Enhanced I/M Rule.
[9] Test volumes and costs were derived from Sierra Research’s annual I/M summary for 2005 and updated in some cases by members of the workgroup.

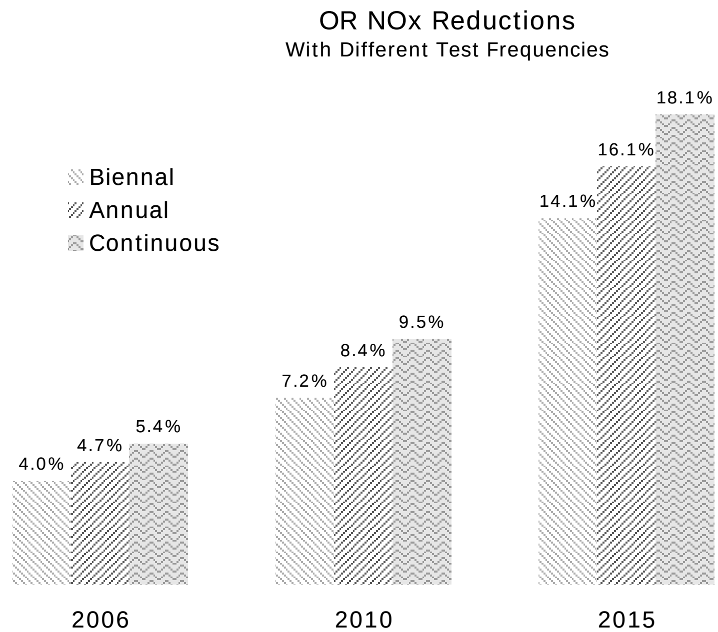
Benefits

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.

Figure 8
Additional Benefits of Continuous OBD Testing versus Periodic





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 if 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

Month	Focus	Location
September	Organizing meeting	Keystone, CO/call
October	OBD Passive Inspection	Portland, OR/call
December	OBD Active Inspection	Raleigh, NC/call
February 07	Discuss initial findings	Conference call
April	Discuss report outline	Conference call
May	RSD	Connecticut
June	Draft report	Conference call
July	Final report	

Members

Organization	Name	Organization	Name
EPA, Co-lead	Gene Tierney	New Jersey	Rob Schell
Oregon, Co-Lead	Ted Kotsakis	Envirotest	Chris Stock
California	James Goldstein	SysTech	Lothar Geilen
Massachusetts	Nancy Seidman	Gordon-Darby	Richard Joy
North Carolina	Brock Nicholson	AIAM	John Cabiniss
Missouri	Haskins Hobson	Alliance	Greg Dana
New York	Joe Tuttle, Jim Clyne	ERG	Sandeep Kishan
Maryland	Dave Filbert	Washington	Dennis McLerran
Texas	Bob Wierzowiecki		

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

State	Annual Tests	Fee	Total Fees	Frequency	Total Vehicles
Alaska, Anchorage	50,000	$45	$2,250,000	B	100,000
Alaska, Fairbanks	25,000	$33	$825,000	B	50,000
Arizona, Phoenix	735,000	$28	$20,396,250	B	1,470,000
Arizona, Tucson	344,000	$12	$4,042,000	A	344,000
California	9,200,000	$49	$450,800,000	A/B	18,400,000
Colorado	1,192,500	$25	$29,812,500	B	2,385,000
Connecticut	1,050,000	$20	$21,000,000	B	2,100,000
Delaware	180,000	$20	$3,600,000	B	360,000
District of Columbia	120,000	$20	$2,400,000	B	240,000
Georgia	2,200,000	$25	$55,000,000	A	2,200,000
Idaho	225,000	$15	$3,375,000	A	225,000
Illinois	2,900,000	$20	$58,000,000	B	5,800,000
Indiana	250,000	$20	$5,000,000	B	500,000
Louisiana	400,000	$10	$4,000,000	A	400,000
Maine	200,000	$13	$2,500,000	A	200,000
Maryland	1,600,000	$14	$22,400,000	B	3,200,000
Massachusetts	2,100,000	$29	$60,900,000	B	4,200,000
Missouri	600,000	$24	$14,400,000	B	1,200,000
Nevada	1,200,000	$36	$43,200,000	A	1,200,000
New Hampshire	1,200,000	$20	$24,000,000	A	1,200,000
New Jersey	3,000,000	$36	$109,380,000	B	5,700,000
New Mexico	220,000	$20	$4,400,000	B	440,000
New York	5,000,000	$27	$135,000,000	A	5,000,000
New York Upstate	5,000,000	$11	$55,000,000	A	5,000,000
North Carolina	2,800,000	$30	$84,000,000	A	2,800,000
Ohio	1,000,000	$20	$20,000,000	B	2,000,000
Oregon	562,500	$21	$11,812,500	B	1,125,000
Pennsylvania	5,400,000	$35	$189,000,000	A	5,400,000
Rhode Island	330,000	$47	$15,510,000	B	660,000
Tennessee, Memphis	450,000	$25	$11,250,000	A	450,000
Tennessee, Middle	1,170,000	$10	$11,700,000	A	1,170,000
Texas, Dallas-Ft Worth	2,500,000	$27	$67,500,000	A	2,500,000
Texas, Houston	2,500,000	$27	$67,500,000	A	2,500,000
Texas, El Paso	350,000	$14	$4,900,000	A	350,000
Texas, Travis, Williamson	750,000	$14	$10,500,000	A	750,000
Utah, Davis	160,000	$25	$4,000,000	A/N	200,000
Utah, Weber	100,000	$25	$2,500,000	A/B	145,000
Utah, Utah Co.	216,000	$30	$6,480,000	A/B	270,000
Utah, Salt Lake	536,000	$25	$13,400,000	A/B	670,000
Vermont	550,000	$22	$12,100,000	A	550,000
Virginia	700,000	$28	$19,600,000	B	1,400,000
Washington	1,100,000	$15	$16,500,000	B	2,200,000
Wisconsin	750,000	$20	$15,000,000	B	1,500,000
Total Tests	**60,916,000**	**$28.2**	**$1,714,933,250**		**88,554,000**

State	Annual Tests	Total Vehicles
1996+ tests (68% of total)	41,422,880	60,216,720
Rounded	41,000,000	60,000,000

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	
	High Estimate	*Low Estimate*
Current Tests	41,000,000	41,000,000
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**

Appendix D

Analysis of Future Options for Connecticut's Inspection/Maintenance (I/M) Program

June 2009

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ANALYSIS OF FUTURE OPTIONS FOR CONNECTICUT'S INSPECTION/MAINTENANCE (I/M) PROGRAM

Final Report

Prepared for:

Connecticut Department of Environmental Protection

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June 2009

1.0 INTRODUCTION

Since 1983, Connecticut has operated a motor vehicle inspection/maintenance (I/M) program to help the State attain National Ambient Air Quality Standards (NAAQS) for ozone. Evaluation of this program demonstrates that it is effective and achieves the expected air quality benefits. This program is one of most important State implemented strategies to lower the emissions of ozone precursors. Current estimates indicate that in 2010, this program will result in approximately 19 of the 200 tons per day of air pollutant reductions that are included in Connecticut's 2007 Ozone Attainment Plan[1]. The contract for the current program expires in 2010, so the State is now evaluating I/M program designs that meet environmental goals and Clean Air Act requirements, while maximizing cost effectiveness and customer convenience. Concurrently, the State is undergoing extreme budget constraints. The ultimate design may use the latest technology to provide required emission reductions while not increasing and hopefully reducing the State's cost for the program.

Background

The State of Connecticut implemented an I/M program in 1983. In an I/M program, vehicles are periodically inspected, and those with evidence that they exceed design emission standards must be repaired. I/M programs were mandated by the Clean Air Act for areas such as Connecticut that were designated as serious or severe non-attainment for ozone[2]. Connecticut's I/M program identifies vehicles that have been tampered or have received improper maintenance. These vehicles must be repaired until they comply with emission standards. The Connecticut Department of Motor Vehicles (DMV) manages the I/M program; the Connecticut Department of Environmental Protection (DEP) ensures that the program achieves the air quality benefits as outlined in Connecticut's State Implementation Plan (SIP).

The original program implemented in 1983 subjected vehicles to two inspections – an idle test where exhaust concentrations of hydrocarbons (HC) and carbon monoxide (CO) were measured while the vehicle was idling and a visual inspection for the presence of emission control devices, such as the catalytic converter. Vehicles with gross vehicle weight ratings (GVWR) less than or equal to 10,000 lbs are included in the program. In 1998, Connecticut substantially enhanced its existing I/M program to meet new SIP requirements as well as federal requirements for I/M improvements. The emission test was changed from an unloaded idle emission test to a loaded-mode test (ASM[3]). With this change, Connecticut began evaluating emissions of oxides of nitrogen[4] (NO_x) along with HC and CO. A loaded-mode test uses a chassis dynamometer to simulate on-

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[1] Revision to Connecticut's State Implementation Plan Enhanced Motor Vehicle Inspection and Maintenance Program Connecticut, Connecticut Department of Environmental Protection, December 19, 2007

[2] Fairfield County Connecticut is an severe ozone non-attainment area. Greater Connecticut is a serious ozone non-attainment area.

[3] The ASM or Acceleration Simulation Mode test measures HC, CO and NO emissions while the vehicle is driven at a constant speed (25 MPH) on a treadmill-like device termed a dynamometer.

[4] Nitric oxide (NO) is measured as a surrogate for oxides of nitrogen (NO_x). NOx along with HC emissions are considered to be the major ozone pre-cursors.

road driving. If the vehicle could not be safely tested on a dynamometer, it received a pre-conditioned two-speed idle (PCTSI) test. In addition, the inspection included a gas cap pressure test to check to see if the gas cap holds pressure. Leaking gas caps are a major source of evaporative HC emissions. The inspection continued to include a visual emission control component check.

In 2003, DMV again made substantial revisions to the program. The inspection network was changed from a centralized system with about 25 inspection stations to a decentralized system with about 300 stations. The goals of these changes were to improve customer convenience to the public by decreasing the waiting time for emissions testing, directly involve the repair industry with emissions testing and enhance opportunities for small business development. In addition, 1996 and newer models started receiving on-board diagnostic equipment (OBDII) inspections[5], instead of ASM or PCTSI exhaust emissions tests. All 1996 and later model year light-duty vehicles sold in the United States contain the second generation of OBDII. OBDII systems monitor all components that make up the engine management and emission control systems. They can detect malfunctions or deterioration of these components, often well before the motorist becomes aware of any problem. Inspecting vehicles by reading the OBDII system codes can identify vehicles with serious emission control malfunctions more accurately and cost-effectively than traditional tailpipe tests, and help technicians diagnose and repair them. In the new program, diesel powered vehicles 10,000 lbs GVWR or less receive tests for excessive exhaust smoke, if they cannot receive OBDII tests.

The contract for Connecticut's current I/M program expires in 2010. Currently, 79% of the vehicles inspected in Connecticut receive OBDII inspections. This percentage increases each year as 1995 and older models without OBDII systems are dropped from the program. However, since older vehicles emit more pollutants per mile than newer vehicles, 1995 and older models account for a significant fraction of motor vehicle emissions now, and they are projected to be significant contributors to air pollution in the future. For example, in 2010, ASM-PCTSI emission tests on pre-1996 models are estimated to account for 25% of the I/M program benefits[6].

A few other states have added new features to improve customer service while maintaining cost effective inspections. For future programs, Connecticut may consider adopting such features including:

- Implementing innovative OBDII inspection systems such as self service kiosks and/or wireless OBDII testers as a pilot program to improve customer convenience.
- Reducing the number of stations with dynamometers[7] to maintain cost effective inspections.

In addition, the next program may place more emphasis on testing diesel

[5] 1997 and newer light-duty diesels (<8500 lbs GVWR) also get OBDII inspections.
[6] Based on MOBILE6.2 modeling of I/M program benefits. The model uses Connecticut specific data on fleet characteristics to estimate mobile source emission factors for Connecticut's fleet.
[7] The ASM test performed on 1995 and older models requires a dynamometer.

powered vehicles, as this portion of the motor vehicle fleet accounts for an increasing fraction of ozone precursor emissions and particulate matter emissions. Currently in Connecticut and some other states, emissions inspections of heavy-duty diesel vehicles (HDDVs) are limited to random roadside inspections for excessive exhaust smoke. In the future, Connecticut's I/M program may include OBDII inspections on heavy-duty vehicles as well as light-duty vehicles. EPA just finalized rules requiring heavy-duty diesel engines that are used in highway vehicles over 14,000 lbs GVWR to be equipped with OBDII systems beginning with the 2010 model year[8]. This rule opens the possibility of obtaining significant NOx emissions reductions by performing OBDII inspections on heavy-duty diesel vehicles. This is important since these vehicles account for a substantial portion of NOx emissions in Connecticut and other states.

1.2 Report Organization

de la Torre Klausmeier Consulting, Inc. (dKC) is under contract to the State to evaluate Connecticut's I/M program and identify options to consider as the program evolves to meet the future needs of the State. In accordance with dKC's Statement of Work, dKC has prepared this report on alternatives for Connecticut's next I/M program.

The following section identifies and analyzes options for the evolution of Connecticut's I/M program. Section 2 first presents current and planned I/M program design features in other North American jurisdictions. Emerging I/M program issues that are relevant to Connecticut are discussed. Then options for inspecting gasoline and diesel powered vehicles that will maximize environmental benefits and fulfill federal requirements are presented and analyzed. Conclusions are presented in Section 3.0.

[8] EPA-420-F-08-032 contains a summary of the heavy-duty engine OBDII rule.

2.0 ASSESSMENT OF I/M PROGRAM ISSUES

The purpose of this report was to evaluate the air quality benefits from a wide range of I/M designs that may be considered as part of a future strategy. The following resources were reviewed to assess these issues:

- Existing and planned I/M programs in other states and provinces.
- Emissions data from Connecticut and other states, and
- Results of I/M studies and audits.

This section contains two subsections. Section 2.1 contains a review of existing and planned I/M programs in the United States (U.S.) and Canada. Section 2.2 discusses options for gasoline and diesel powered vehicles. It specifically provides justification for continuing tailpipe tests in Connecticut's I/M program.

2.1 <u>Review of Existing and Planned I/M Programs</u>

Many states with I/M programs are evaluating the goals and benefits of their programs and how to meet evolving needs. Studying I/M programs in other areas provides useful information to evaluate different options for Connecticut's future I/M program. DEP is mainly concerned with programs in the U.S. because most I/M innovations have been developed here. This review addresses the following issues:

- Changes anticipated in U.S. I/M programs.
- Enforcement of other I/M programs compared to Connecticut's program.
- I/M innovations being developed and implemented.

Table 2-1 summarizes the status of North American I/M programs. This table shows the type of network, program coverage, the test or data collection network provider, type of tailpipe test currently performed, type of tailpipe test to be performed in future, coverage of diesels, and what emissions are measured. Test fees are not shown on Table 2-1 since they are strongly influenced by network design, program coverage and test type. All of the programs, except for Colorado's, enforce OBDII inspection requirements.

Note on Table 2-1 that several programs plan to switch from loaded-mode tests, such as the ASM, which is one test done in Connecticut, to pre-conditioned two-speed idle (PCTSI) tests or drop tailpipe tests completely. Some of the programs making these changes were surveyed to determine how they were planning to deal with backsliding. Backsliding occurs when the new program will result in fewer emissions reductions than the program it replaces. The United States Environmental Protection Agency (EPA) requires states to identify additional mobile or stationary source controls to make up the difference in environmental benefits if backsliding occurs[9].

As part of this review, I/M compliance in Connecticut was compared to other states. Two main aspects of compliance were analyzed: 1) enforcing compliance with proper test procedures and 2) enforcing motorist compliance with I/M requirements. Over 96% of the vehicles tested were in compliance with Connecticut's I/M program requirements for 2008.

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[9] 69 FR 23931

TABLE 2-1 – STATUS OF NORTH AMERICAN I/M PROGRAMS

State / Province	Existing Program Features[10]						
	Net-work Type (a)	Current Geographic Coverage	Test Contractor or Data Network Provider (b)	Current Tailpipe Test (c)	Future Tailpipe Test (c)	Diesels	Pollutants Measured
AK	T&R	Anchorage Fairbanks	None	PCTSI	PCTSI	No	HC, CO
AZ	TO	Phoenix, Tucson	Test: Gordon Darby	IM240 (AZ147)	IM240 (AZ147)	Yes	HC, CO, NOx
British Columbia	TO	Lower Fraser Valley	Test: ESP	IM240/ASM	IM240/ASM	Yes	HC, CO, NOx
CA	Hybrid	Statewide	Data: Testcom	ASM/PCTSI	ASM/PCTSI	Yes	HC, CO, NOx
CO	Hybrid	Front Range	Test: ESP	IM240/PCTSI	?	Yes	HC, CO, NOx
CT	T&R	Statewide	Test: Applus Data: Systech	ASM/PCTSI	ASM or PCTSI?	Yes (up to 10,000 # GVWR)	HC, CO, NOx
DC	TO	District-wide	None	IM240	?	No	HC, CO, NOx
DE	TO	Statewide	None	PCTSI	Curb Idle	Yes	HC, CO
GA	T&R	Metro Atlanta	Data: Verizon	ASM/PCTSI	ASM/PCTSI	No	HC, CO, NOx
IL	TO	Metro Chicago	Test & Data: Applus	None	None	No	?
IN	TO	Lake, Porter,Clark, Floyd,Courtier	Test & Data: ESP	IM240	IM240	No	HC, CO, NOx
MA	T&R	Statewide	Test & Data: Parsons	None	None	Yes	NA
MD	TO	Metro Balt.	Test & Data: ESP	IM240	Curb Idle	No	HC, CO, NOx
ME	T&R	Metro Portland	None	None	None	No	NA
MO	Hybrid	Metro St. Louis	Test & Data: SysTech	None (Just dropped IM240)	None	No	NA
NC	T&R	Raleigh, Charlotte	Data: Verizon	None	None	No	HC, CO
NH	T&R	Statewide	Gordon-Darby	None	None	No	NA
NJ	Hybrid	Statewide	Test: Parsons Data: Verizon	PCTSI	PCTSI	Yes	HC, CO, NOx
NV	T&R	Reno, Las Vegas	Data: Verizon	PCTSI	PCTSI	Yes	HC, CO
NY	T&R	Upstate: OBDII only	Data: Testcom	None	None	No	NA

[10] All of the programs listed, except for Colorado's program, enforce OBDII inspection standards.

State / Province	Existing Program Features[10]						
	Net-work Type (a)	Current Geographic Coverage	Test Contractor or Data Network Provider (b)	Current Tailpipe Test (c)	Future Tailpipe Test (c)	Diesels	Pollutants Measured
NY	T&R	Metro NY	Data: Testcom	IM240	?	enhanced area only, >8500 GVWRR	HC, CO, NOx
OH	TO	Cleveland	Test & Data: ESP	ASM/PCTSI	?	Yes	HC, CO, NOx
Ontario	T&R	Southern Ontario Smog Zone	Test and Data: Protect-Air	ASM	?	Yes	HC, CO, NOx
OR	TO	Metro Portland	None	PCTSI (just switched from BAR31)	PCTSI	No	HC, CO
PA	T&R	Metro Phila. & Pittsburgh	Data: Verizon	ASM/PCTSI	ASM/PCTSI	No	HC, CO, NOx
RI	T&R	Statewide	Test & Data: SysTech	BAR31	BAR31	Yes, separate program	HC, CO, NOx
TX	T&R	DFW & Houston	Data: Gordon Darby as of 10/26/07	ASM	ASM	No	HC, CO, NOx
UT	T&R	Salt Lake, Weber, Davis and Utah Counties	SLC: Test & Data: SysTech, Other areas: none	ASM, IM240, PCTSI	ASM, IM240, PCTSI	Yes	HC, CO, NOx
VA	T&R	No. VA	Data: Testcom	ASM	?	97+LDDV w/OBDII	HC, CO, NOx
VT	T&R	Statewide	None	None	None	OBDII only	
WA	TO	Metro Seattle, Spokane	Test & Data: Applus	ASM	?	Yes	HC, CO
WI	TO	Metro Milwaukee	Test & Data: ESP	IM240	None	No	HC, CO, NOx

a. TO=test only, T&R=test and repair, Hybrid=combination of test only and test and repair.

b. Unless noted otherwise, the testing contractor also processes data. Most T&R programs only have a data contractor. The state usually manages test facilities.

c. PCTSI (Pre-conditioned Two Speed Idle), ASM (Steady-State Loaded-Mode Test), IM240 and BAR31 (Transient Loaded-Mode Test), Other

Based on a review of North American I/M Programs, the following observations can be made:

Inspection Procedures

- ***17 states including Connecticut currently perform OBDII and loaded-mode (e.g., ASM) inspections.***
    - Connecticut's inspection fee is comparable to fees in other states that perform loaded-mode and OBDII inspections.
- ***I/M programs in Illinois, Massachusetts, Wisconsin and Missouri have recently dropped or plan to drop tailpipe tests for pre-1996 vehicles. These programs plan to only perform OBDII inspections.***
    - These states must make-up the air quality benefits by performing more frequent inspections and/or requiring additional controls on stationary and area sources.
    - In summer 2008, Massachusetts stopped performing tailpipe tests on 1995 and older models. Massachusetts continued to perform OBDII tests on 1996 and newer models equipped with OBDII systems. Massachusetts changed the inspection frequency from biennial to annual to maintain the environmental benefits and prevent backsliding. The annual OBDII test is done at the same time as the required annual safety test.
    - In summer 2008, Illinois dropped tailpipe tests, and now only inspects 1996 and newer models with an OBDII test. Illinois did not claim full environmental benefits and emission reductions for the previous program that had tailpipe tests, so there's technically no backsliding. In reality, there will be an increase in emissions from those older models that are not properly maintained. The public raised concerns over the Illinois plan to exempt older vehicles, including gross polluters.
    - Missouri dropped tailpipe tests in spring 2008. Wisconsin is evaluating proposals to set-up an OBDII-only program in 2010. Wisconsin and Missouri have not yet publicized how they will make up for any backsliding.
- ***I/M programs in New Jersey, Maryland, and Oregon have recently switched or plan to switch from loaded-mode tests to pre-conditioned two-speed idle (PCTSI) or curb-idle tests for pre-1996 vehicles.***
    - New Jersey switched from the ASM test to the PCTSI test in spring 2009. Maryland has just awarded a contract for a new inspection system. In this system, which will be operational in summer 2010, pre-1996 vehicles will receive curb idle tests instead of IM240 tests. New Jersey and Maryland have not yet publicized how they will make up for any backsliding.

- Oregon dropped its loaded-mode test (BAR31) in favor of the PCTSI test in spring 2006. Oregon is attainment for ozone and thus is not subject to anti-backsliding requirements.

New Inspection Technologies for Gasoline and Diesel Powered Vehicles

- ***Some states are implementing innovative and drastically different approaches to vehicle inspections, such as self-service kiosks and wireless OBDII systems:***
  - Oregon is setting-up a self-service OBDII testing kiosk at one of its inspection stations where motorists can perform their own OBDII tests. The system has not been used for official inspections. Oregon has run into difficulties with credit card readers, license plate recognition systems, and user friendliness of system prompts. Originally envisioned to provide OBDII inspections on a 24/7 basis, the system now is likely to be used only during normal station operating hours. Oregon has not addressed fraud issues, except for recording OBDII vehicle identifiers such as communication protocol and OBDII VIN. Fraud prevention must be addressed before the system can be used for official inspections. The only method to prevent fraud that will be 100% reliable will be to require the vehicle to provide OBDII VINs[11]. Oregon's experience with kiosks should be evaluated for realistic cost and feasibility assessments of this technology before Connecticut considers such a strategy.
  - Oregon along with Utah plan to equip vehicles, on a voluntary basis, with wireless OBDII systems that will allow motorists to bypass conventional inspections. Wireless OBDII testers that continuously track the status of the OBDII system have been proposed as a means to increase the emission reductions from OBDII inspections. These systems can report to a central state database when a vehicle's check engine light is on. If the state requires motorists to respond immediately to these events, the state can claim additional emission reductions from the program. To get the most credit, the wireless devices must be installed on a significant fraction of the fleet, including older models. If the devices are installed only on relatively new vehicles, or if the state does not force motorists to get their vehicles fixed immediately when their check engine light comes on, the state can claim few additional credits from a wireless OBDII program.
  - New programs in Illinois and Wisconsin plan to offer self-service kiosks at some time in the future on a trial or pilot basis. Programs in Nevada, Maryland, and New Jersey are evaluating wireless systems. Although the traditional inspection format will likely be used for a majority of future inspections, self-service kiosks and

[11] OBDII VINs are provided as part of the OBDII data record. They should match the VIN for the registered vehicle. Manufacturers were not required to provide OBDII VINs until the 2005 model year, although many domestic manufacturers provided them starting with the 2001 model year.

wireless systems will be implemented to improve customer convenience, assuming fraud concerns and technical difficulties are addressed.

- ***Three states: Texas, Colorado, and Virginia are evaluating remote sensing devices (RSD) as a complement and/or alternative to conventional I/M tests.***
  - RSD is in essence a "radar" gun for emissions. Because RSD can perform a large number of emissions tests in an unobtrusive manner, it has been proposed as an alternative to traditional emission tests.
  - An audit performed on Colorado's remote sensing program[12] found that it's difficult to use RSD technology to identify specific high emitting vehicles. RSD flags many vehicles as high emitters that actually pass traditional I/M tests, while missing many vehicles that fail traditional tests. For this reason, as well as cost concerns, most states do not use RSD in their programs, except for meeting EPA's requirements for on-road emissions sampling[13].
- ***Many states inspect light and heavy-duty diesel powered vehicles in their I/M programs:***
  - Currently, states inspecting diesels primarily check for indications that the vehicle is emitting too much particulate matter (PM). No state is performing emissions tests to determine if the vehicle emits too much NOx.
  - Connecticut, Delaware, and Oregon currently perform OBDII inspections on light-duty gasoline and diesel vehicles.
  - Many states are likely to start performing OBDII inspections on heavy-duty vehicles once the fleet is equipped with OBDII systems.

I/M Program Enforcement

- ***Connecticut's decentralized test-and-repair I/M program has compliance levels equal to or better than all other I/M programs, both centralized test-only and decentralized test-and-repair I/M programs.***
  - **Trigger Reports and Video Audits –** DMV runs extensive trigger reports and audits to assure that inspection stations follow proper test procedures. Connecticut promptly investigates all significant cases of possible inspection fraud. Trigger reports look for anomalies in data recorded during inspection that might indicate that a passing vehicle has been substituted for the vehicle that should be inspected. DMV employs two full-time video auditors who are constantly monitoring inspections during station operating

[12] Performance Audit of Colorado's AIR Program, November 2006.

[13] EPA's enhanced I/M performance standard requires that states sample 0.5% of the vehicles tested in their I/M programs in independent on-road emissions tests. Most states, including Connecticut, meet this requirement by contracting with an RSD tester to set-up and record emissions tests for about a week.

hours. If video auditors detect anomalies, inspections are halted. No other state does more thorough trigger or video audits and follow-up actions.

- **Registration Denial –** DMV denies registration for vehicles that do not comply with I/M requirements. This is the most stringent way to assure that motorists comply with I/M requirements.

2.2 Connecticut's Present I/M Program and Future Options

This section outlines procedures used in Connecticut's current program and evaluates options for Connecticut's next I/M program. The primary goal was to identify options providing emissions benefits that are equal to or greater than the current program. This section addresses alternative I/M options for two major vehicle groups:

- Gasoline powered vehicles.
- Diesel powered vehicles.

Emission reductions are estimated and implementation issues are discussed. Options for gasoline powered vehicles covered by the current program are presented first. Options for diesel powered vehicles are then presented.

2.2.1 Current Inspection Procedures in Connecticut's I/M Program

Connecticut currently tests all vehicles with GVWRs 10,000 lbs or less and between 4 and 25 years old. These vehicles receive the following inspections:

a) **Gasoline Powered Vehicles:**

i) 1996+: OBDII-only tests[14].

ii) Pre-1996:

(1) 8,500 lbs GVWR or less. Gas cap test plus ASM: ASM is the loaded-mode test that is currently used. It evaluates HC, CO, and NOx emissions under moderate load at 25 MPH. Vehicles are tested while being driven on a stationary treadmill-like device termed a dynamometer.

(2) Greater than 8,500 lbs and 10,000 lbs GVWR or less. Pre-Conditioned Two-Speed Idle (PCTSI): Test of HC and CO emissions at idle and high idle (2500 rpm) conditions

b) **Diesel Powered Vehicles:**

i) 1997+: OBDII-only tests[15].

ii) Pre-1997:

[14] Connecticut tests up to 10,000 lbs GVWR. Vehicles that are greater than 8500 lbs GVWR receive the appropriate tailpipe test.
[15] IBID

(1) 8,500 lbs GVWR or less. Loaded-Mode Diesel (LMD): LMD is a test using a dynamometer to simulate driving at 30 mph. Exhaust smoke opacity is measured.

(2) Greater than 8,500 lbs and 10,000 lbs GVWR or less. Modified Snap Idle (MSA): MSA is a modified version of the SAE J1667 test, to make the test suitable for light-duty diesels. Exhaust smoke opacity is measured.

2.2.2 I/M Options for Gasoline Powered Vehicles

I/M options can be broken into two parts:

1) Options for Inspection Procedures
2) Network (Test System) Options

The type of inspection performed directly impacts the emission benefits for an I/M program, while the network impacts customer convenience.

Inspection Procedure Options

Based upon a review of North American I/M programs, the following inspection procedure options are available for gasoline powered vehicles in Connecticut's enhanced I/M program:

1) **Option 1: Current Test Procedure:** Continue to perform gas cap and ASM or PCTSI tests on most pre-1996 models and OBDII inspections on 1996 and newer models.
2) **Option 2: OBDII + PCTSI:** Similar to current program except that all pre-1996 vehicles get PCTSI tests.
3) **Option 3: OBDII-Only Program:** Only perform OBDII inspections on 1996 and newer models. Exempt pre-1996 vehicles or 1996 and newer vehicles without OBDII systems from testing.

With Option 1, the State would contract for the same emissions test procedures that are currently performed. Connecticut's current program provides the greatest emissions benefits for the vehicles covered by the program. Maintaining this testing option at least until 2020, when an OBDII-Only Program results in the same emission reductions, and will maximize air quality benefits. Furthermore, performing tailpipe tests on older vehicles ensures that gross polluters cannot be registered.

Option 2 is similar to Option 1, except that the loaded-mode (ASM) test is replaced by Pre-Conditioned Two-Speed Idle (PCTSI) test. Unlike the ASM test, the PCTSI test only evaluates HC and CO emissions; it does not evaluate NOx emissions. Therefore, this option gets fewer NOx emissions reductions than the current test schedule. Like Option 1, Option 2 also prevents gross polluters from being registered.

Option 3, which drops the tailpipe test for vehicles without OBDII systems, gets fewer HC and NOx reductions than the current program. Also, with this option gross polluting vehicles can be registered.

Network Options

Three basic options are available for inspection networks:

1) Decentralized System: Inspections are performed in licensed private facilities. Connecticut's current program is decentralized. Inspections are performed in approximately 250 facilities spread throughout the state.
2) Centralized System: Inspections are performed centralized inspection facilities. Connecticut's previous program was centralized. Inspections were performed in approximately 25 facilities spread throughout the state.
3) Hybrid System: Inspections are performed in a network composed of licensed private facilities and centralized test facilities.

All options may include innovative OBDII inspection systems such as self service kiosks and/or wireless OBDII testers. These systems potentially could improve customer convenience, but would require more DMV administrative oversight. They are being piloted in Oregon and Utah.

- Any options must primarily consider maintaining the air quality benefits presently achieved by the current program, as necessitated by the Clean Air Act's requirements.

In the next program, fewer facilities may be equipped with dynamometers, assuming the State continues to require loaded-mode tests for pre-1996 vehicles.

Emission Reductions for Alternative Inspection Procedure Options

In this subsection, we explore the emission reductions for future inspection procedure options for Connecticut's I/M program. We focus on HC and NO_x emissions as they are the primary ozone precursors. EPA's mobile source emission factor model, MOBILE6.2, was run to estimate the emission reductions for the three I/M options. States must use MOBILE6.2 to develop vehicle emissions factors for different control scenarios. Table 2-2 presents the emission reductions for the options relative to the current program. This analysis assumes that the newest four (4) model years and vehicles more than 25 years old will continue to be exempted from testing and that inspections will continue to be done a biennial basis. These constraints are established by State statute.

Table 2-2 – Emissions Reductions for Inspection Procedure Options

Option	% of Reductions from Current Program			
	2012		2015	
	HC	NOx	HC	NOx
1. Continue current test schedule	100%	100%	100%	100%
2. Continue performing tailpipe tests, but switch to PCTSI tests from the current loaded-model test.	96%	91%	98%	95%
3. Drop Tailpipe Tests from Current Program (OBDII-Only Program)	84%	88%	93%	95%

The current inspection schedule (Option 1) gets the greatest emission reductions. Connecticut's State Implementation Plan (SIP) for ozone states that the I/M program will result in 19 of the 200 tons per day of HC plus NOx reductions needed to demonstrate attainment[16]. Connecticut needs the emissions reductions it is getting from the current program to demonstrate attainment of the ozone standard.

If vehicles are subject to less stringent inspection criteria (e.g. PCTSI instead of ASM) or they are exempted from inspections (e.g., 1995 and older models under an OBDII-only scenario), backsliding becomes an issue. EPA requires states to prevent backsliding when making changes to their I/M programs. EPA regulations prohibiting backsliding are discussed in the 8-hour I Ozone Implementation Rule published April 30, 2004[17]. Backsliding occurs when the new program results in fewer emissions reductions than the program it replaces. If backsliding occurs, states must identify additional mobile or stationary source controls to make up the difference in I/M program benefits.

The reduced effectiveness of Options 2 and 3 would create problems demonstrating equivalency under EPA regulations. Switching from ASM tests to PCTSI tests for pre-1996 vehicles (Option 2) results in significant backsliding for NOx, because, as mentioned earlier, the PCTSI tests does not evaluate NOx emissions. Based on MOBILE6.2, Option 2 achieves 91% of the NOx reductions in 2012 and 95% of the NOx reductions in 2015.

The OBDII-Only scenario (Option 3) results in significant backsliding in HC and NOx. Based on MOBILE6.2, in 2012, an OBDII-only inspection achieves 84% of the tons per day HC reductions and 88% of tons per day NOx reductions that the current program achieves. In 2015, Option 3 achieves 93% and 95% of the HC and NOx reductions respectively.

It may be possible to increase the benefits of an OBDII-only program and eliminate backsliding by increasing the frequency of testing to an annual inspection frequency. While Massachusetts plans on this approach, Massachusetts already requires annual vehicle safety inspections, so motorists there are accustomed to visiting inspection stations each year. In addition, cost

[16] Revision to Connecticut's State Implementation Plan Enhanced Motor Vehicle Inspection and Maintenance Program, Connecticut Department of Environmental Protection, December 19, 2007

[17] 69 FR 23931

impacts are minimized when an OBDII inspection is added to an existing safety inspection. This is not the case in Connecticut. Switching to an annual OBDII test will increase the overall cost for Connecticut's I/M program to motorists by 40%[18]. Obviously, inspection fees for owners of 1996 and newer vehicles will double, while owners of pre-1996 models will pay nothing. Also, changing to annual test frequency is not authorized by State statute.

Currently, the State does not get SIP credits for performing OBDII tests on light-duty diesels, which are diesel powered vehicles less than 8500 lbs GVW. These credits were explored as a potential mitigation measure to NOx backsliding from option 2. The Texas Commission on Environmental Quality (TCEQ) studied the potential HC and NOx benefits from performing OBDII tests on light-duty diesels[19]. Based on the diagnostic trouble codes (DTCs) recorded in light-duty diesel OBDII tests, OBDII tests are estimated to reduce HC emissions from 1996 and newer light-duty diesels by 4% and NOx emissions by 0.6%. When these reductions are projected across the fleet, the benefits do not significantly reduce NOx backsliding from the Options 2 or 3.

Although OBDII inspections on light-duty diesels do not offer significant NOx SIP credits, OBDII inspections on heavy-duty diesel powered vehicles may have significant NOx benefits in the future. This option is discussed in section 2.2.3

By the end of 2009, EPA will require states to use its new mobile source emissions factor model, MOVES, for SIP planning, instead of MOBILE6.2. This model is in the developmental phase and is being tracked carefully by DEP. There is some indication that I/M emission credits for OBDII inspections may be reduced, thus suggesting that eliminating tailpipe tests and only doing OBDII inspections will reduce SIP credits and result in backsliding environmental benefits gained through the program.

Identification of Gross Polluters

Identification and repair or removal of gross polluters provides significant emissions benefits, and addresses the public's concern over high emitting vehicles. Gross polluters typically are older models with excessive emissions, usually because they have worn-out or malfunctioning emission control systems. Based on the last on-road emissions survey, about 5% of the vehicle fleet is gross polluting. These vehicles account for over 50% of the HC emissions[20]. A majority of the gross polluters were 1995 and older models. In addition to creating a problem with backsliding, OBDII-only scenarios allow older vehicles that may potentially have excessive emissions to be registered and operated. This situation can erode public support of the program, in addition to harming air quality.

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[18] Based on projections of inspection and repair costs performed by dKC.

[19] Estimates of Emission Reductions from Performing OBDII Tests on 1997 and Newer Light-Duty Diesel Vehicles, Texas Commission on Environmental Quality (TCEQ), August 11, 2005.

[20] EPA's enhanced I/M performance standard requires that states sample 0.5% of the vehicles tested in their I/M programs in independent on-road emissions tests. Every other year, Connecticut's I/M contractor commissions an on-road emissions survey using remote sensing devices (RSD). The last survey was done in summer 2007. Gross polluters in this analysis are defined as vehicles that exceed 3% CO, 500 ppm HC, and 2000 ppm NOx.

Continuing testing of pre-1996 vehicles with PCTSI or ASM protocols will address the concern over gross polluters. The PCTSI test should be adequate to identify most gross polluters. Most gross polluters exceed HC standards by a much larger fraction than they exceed NOx standards, because engine wear and improper maintenance tend to increase HC more than NOx emissions.

Theoretically, gross polluters could be identified by using remote sensing devices (RSD). RSD is in essence a "radar" gun for emissions. Because RSD can perform a large number of emissions tests in an unobtrusive manner, it has been used by many states, including Connecticut, to measure on-road vehicle emissions. RSD has been proposed as an alternative to traditional emission tests. As discussed earlier, an audit performed on Colorado's remote sensing program[21] found that it's difficult to use this technology to identify specific high emitting vehicles. Although RSD is an excellent tool to characterize fleet emission trends, due to variability in operating conditions, RSD has difficulty identifying individual high emitters[22]. In addition, it's difficult to get RSD readings on a majority of the vehicle population, especially older models which would be the target of an RSD program (1996 and newer models will get OBDII tests). RSD is limited to single lane sites such as highway on ramps where vehicles are being driven under moderate loads. Setting up enough RSD sites to get valid readings on a majority of 1995 and older models registered in Connecticut will cost more than requiring these vehicles to be tested biennially, based on Colorado's experience with RSD. Appendix A has a summary of the results of Colorado's audit on its remote sensing program.

As a supplement to a PCTSI or ASM test, Connecticut could require inspection stations to check all vehicles for visible smoke. Many vehicles, particularly the older models, can pass a tailpipe emission test and still emit visible smoke. Smoky vehicles are a public nuisance, so it makes sense to check for smoke during periodic inspections. Another possibility is to set up a program where motorists can call in the plates of vehicles emitting too much smoke. These vehicles could be required to visit a DMV facility and undergo an emissions test. Texas has had success with its "Smoky Vehicle" program. Motorists can report smoky vehicles from their cell phone by dialing "***smoky**". In the Dallas/Ft Worth area alone, more than 6,800 smoky vehicles were reported in 2007. In addition, police actively enforce compliance. If a vehicle is smoking and it has been reported, it is subject to an immediate fine. Adopting such a program would require legislative authority.

Cost Effectiveness of Alternative Options

The cost of the different options were estimated in terms of $ per ton of HC+NOx removed from the environment. 2012 is used as the evaluation year. Total costs are based on projected inspection fees, average repair costs and failure rates by test type.

Inspection Fees – The current $20 fee is established by statute, so for this analysis we assume the fee will be $20 for all the options. Total fees assume that

[21] Performance Audit of Colorado's AIR Program, November 2006.
[22] Appendix A discusses the correlation between RSD and IM240 test results.

that the newest four (4) model years and vehicles more than 25 years old will continue to be exempted.

Repair Costs – Total repair costs are based on estimated repair costs per vehicle times the number of vehicles failing inspection. Repair costs per vehicle are based on surveys performed by DMV. Table 2-3 shows repair costs derived from the most recent survey, broken down by inspection type. For this analysis, we are using the median repair cost. The percent of vehicles failing inspection is based on inspection results for 2008. For OBDII, the failure rate for the MIL-Status and MIL-Bulb checks are combined. We did not include costs to repair readiness failures, since usually the fix is to drive the vehicle.

Table 2-3-- Repair Costs by Test Type

Test Type	Estimated Repair Costs[23]			
	Median	**Average**	**Min**	**Max**
OBDII	$269	$352	$0	$4,097
ASM	$235	$315	$0	$1,771
TSI	$200	$369	$0	$3,846

Cost-Effectiveness – Cost-effectiveness is calculated by dividing total costs by total emission reductions. Total tons per day emission reduction estimates were based on current summer daily vehicle miles traveled (VMT) times the estimated benefits in g/mi. Key assumptions in the cost-effectiveness analysis are shown on Table 2-4. Table 2-5 presents the results of this analysis.

Table 2-4 -- Assumptions Used in Cost Effectiveness Analysis

Parameter	Assumed Value
# Tested per Biennium	2,100,000
Daily Summer VMT	102,016,019
2012 Inspection % by Year	
Pre-1996	6.4%
1996+	93.6%
% Fail	
OBDII	7%
ASM	11%
TSI	10%

[23] DMV surveyed inspection stations in 2006 to determine repair costs for specific vehicles that failed inspection.

Table 2-5 -- Cost Effectiveness of Alternative I/M Options – 2012

Options for I/M Test Procedures	I/M Benefit (tons/day HC+NOx)	$/ton HC+NOx
1. OBDII+ASM (Current Program)	22.8	$4,965
2. OBDII+TSI	21.2	$5,269
3-OBDII-Only	19.5	$5,364

Preliminary assessment of these options suggests that maintaining the present program would be the most cost effective strategy for the future. The cost effectiveness of Connecticut's I/M program compares favorably with costs of other control strategies for HC and NOx[24].

Legal and Implementation Issues

Following is a brief review of legal and implementation issues for the three options:

Legislative Authority -- New legislative authority likely will not be needed to implement Options 1 and 2, but new legislation would be needed for Option 3 (OBDII-only program)[25]. If Connecticut elects Option 3, changing the test frequency from biennial to annual frequency may be considered, in order to maintain the emissions reductions needed for attainment. Massachusetts successfully shortened the test frequency to annual, but their preexisting requirement for annual safety testing facilitated implementing this change. New legislative authority would be required to switch to an annual program, but would be accompanied by increased inconvenience and cost. Current regulations have standards for the PCTSI test as well as the ASM test, so Options 1 and 2 will not require legislative changes.

Ease of Implementation-- With both tailpipe test options (Options 1 and 2), existing analyzer systems, termed Connecticut Decentralized Analyzer System (CDAS), could be upgraded for the new program. For Option 1, continuing the current test procedure, the following maintenance and upgrades could be needed to CDAS at each inspection station:

- Refurbish existing emissions analytical benches (HC/CO/CO2/O2 bench, NOx bench, and weather station)
- Refurbish dynamometer
- Refurbish opacity meter
- New computer and peripherals

[24] Based on the Texas Emission Reduction Plan (TERP), most controls on diesel powered vehicles cost between $5,000 and $6,000 per ton of HC+NOx removed from the atmosphere. The cut-off for California's Carl Moyer program, which funds strategies available to reduce NOx, is $13,600 per ton of NOX removed from the atmosphere.

[25] Connecticut General Statutes Section 14-164c specifies the inspection frequency (biennial), vehicle coverage (4-25 year old vehicles), inspection type (ASM, PCTSI, and OBDII), and inspection fees ($20 per biennium).

- New OBDII interface
- New Gas cap tester

For Option 2 – PCTSI instead of ASM, the following maintenance and upgrades could be needed to CDAS:

- Removal of existing emissions analytical benches (HC/CO/CO2/O2 bench, NOx bench, and weather station)
- Install new HC/CO/CO2/O2 bench
- Refurbish opacity meter
- Removal of dynamometer
- New computer and peripherals
- New OBDII interface
- New Gas cap tester

As mentioned earlier, Connecticut could consider reducing the number of stations that perform exhaust emissions tests. By 2010, less than 15% of the vehicles inspected will receive tailpipe tests, so the number of stations that provide tailpipe tests could be reduced. The I/M contractor would need to guarantee maximum travel times and waiting times, to assure that motorists driving 1995 and older models are not inconvenienced and to comply with federal I/M requirements.

Current inspection fees should be sufficient for all the options. The cost for upgrading existing equipment will be significantly lower than the cost for equipping inspection stations with new CDAS in 2003. In addition, inspection times should be much lower, because most vehicles will receive OBDII inspections which take much less time than tailpipe tests.

2.2.3 I/M Options for Diesel Powered Vehicles Greater Than 10,000 Pounds GVWR

Diesel powered vehicles 10,000 lbs GVWR or less receive exhaust smoke opacity checks or OBDII inspections (1997 and newer models with GVWR less than 8500 lbs) in the current decentralized inspection and maintenance program. However, these vehicles account for a very small fraction of diesel emissions. Heavy-duty diesel vehicles (HDDV), those vehicles with a GVWR of greater than 14,000 lbs, account for over 30% of NOx emissions from the mobile source category[26]. In addition, HDDVs account for a large fraction of toxic pollutant and particulate matter (PM) emissions from mobile sources. HDDVs are not included in the current program. This section reviews inspection options for HDDVs.

Inspection Procedures for HDDVs

The large and increasing contribution of HDDVs to NOx emissions opens up the possibility of obtaining significant NOx emission reductions from inspecting and requiring the repair of high emitting HDDVs. To date, I/M tests for HDDVs

[26] This percentages is expected to increase when MOVES is used for SIP modeling.

attempt to identify vehicles emitting excessive amounts of PM. The most common test for this purpose is the snap-idle test per SAE specification J1667. This test measures exhaust opacity when the throttle is briefly snapped to the wide-open position. Connecticut and many other states use the snap idle test to determine if a vehicle emits too much smoke. Most states perform snap idle tests during random roadside inspections, usually at weigh stations. Currently, a small fraction of the HDDVs that are operated in Connecticut receive snap idle tests as part of DMV's random roadside inspection program[27]. Also, some owners of diesel-powered fleets participate in DMV's voluntary fleet inspection program, where they again receive snap idle tests.

Currently, nowhere in the U.S. are HDDVs being inspected for excessive NOx emissions. California researched tailpipe emissions tests to reduce NOx emissions from HDDVs. Appendix B has a summary of this study. California has concluded that about 15 percent of the HDDV population may have excess NO_X emissions, but it is difficult to clearly identify high emitters with repairable problems. Loaded-mode tests, like the ASM test used on light-duty gasoline powered vehicles, do not consistently identify HDDVs with high NOx emissions. California concluded that it will be difficult to develop a NO_X screening test, because average per vehicle emission reductions from repair appear to be small and no clear criteria exists to identify repairable high emitters.

EPA's final rule requiring OBDII systems on HDDVs makes effective I/M tests on HDDVs a possibility. OBDII inspections will be the most effective and easiest way to identify HDDVs emitting too much NOx, when these vehicles are equipped with OBDII systems. OBDII systems will be required on federally certified HDDVs beginning with the 2010 model year[28]. For diesel engines used in highway vehicles over 14,000 pounds GVWR, EPA is requiring that one engine family per manufacturer be certified to the OBDII requirements in each model year from 2010 through 2012. Beginning in 2013, all highway engines for all manufacturers would have to be certified to the OBDII requirements. Diesel vehicles less than 8,500 lbs GVWR have had OBDII systems since the 1997 model year and are covered in the current light-duty I/M program. Beginning with the 2007 model year, diesel powered vehicles with GVWRs between 8,500 and 14,000 are equipped with OBDII systems.

Theoretically, Connecticut could reduce NOx emissions from HDDVs by identifying and requiring reprogramming, or reflashing, of the computers of some 1993-1998 HDDVs to correct engine calibration that improves fuel economy, but also increases NO_x emissions during highway driving. Detecting and reflashing HDDVs that should have been reflashed, but were not, may reduce NO_x emissions by 20 to 30%. However, such a program would most likely be voluntary since legal authority to mandate reflash is limited.

Emission Reductions from an I/M Program for Diesel Powered Vehicles

Currently, the State will have difficulty claiming SIP credit for an I/M Program for Diesel Powered Vehicles. Diesel-powered vehicles always meet their NO_X

[27] In 2007 about 900 random roadside tests were done on HDDVs in Connecticut.
[28] EPA-420-F-08-032

emission standards when their emissions are modeled with MOBILE6.2, since this model assumes that diesel engines have little to no deterioration (increase) in their NO_X emission rates over time. Therefore, there's no way to model I/M benefits for diesel powered vehicles, nor would EPA provide additional SIP credit for a state's attainment demonstration. EPA's next mobile source emission factor model, MOVES, is likely to account for NO_X emission deterioration, but to date, there are no plans to estimate SIP benefits for OBDII inspections on diesel powered vehicles in fleets, even in the future, when a significant fraction of the heavy-duty fleet has OBDII systems[29]. Irrespective of SIP credits, inspecting more diesel powered vehicles for PM will reduce toxic pollutant and PM emissions and help eliminate nuisance smoke emissions.

Inspection Implementation Options

Gasoline and diesel powered vehicles 10,000 lbs GVWR or less could continue to be tested in the Connecticut's decentralized I/M program.

Connecticut could consider the option of increasing the GVWR limit of the current I/M program from 10,000 lbs to 14,000 lbs for both diesel and gasoline vehicles, if these vehicles can be tested at existing inspection stations. These vehicles could receive OBDII tests, if so equipped, snap-idle tests or PCTSI tests. Since these vehicles tend to be driven more in urban areas, increasing the universe of vehicles inspected to include those up to 14,000 lbs GVWR would result in an environmental justice benefit. Vehicles between 10,000 and 14,000 GVWR also could be tested as part of DMV's voluntary fleet inspection program, if it were expanded to include diesel vehicles greater than 10,000 lbs GVWR. The fleet inspection stations could be equipped with OBDII inspection equipment to inspect 2007 and later models equipped with OBDII systems.

HDDVs could be inspected using the following network configurations:

1) Expand fleet self certification, if funding for technology, training and personnel is available.[30]
2) Continue to inspect HDDVs using random roadside snap idle tests. Expand the test to include OBDII inspections when a sufficient fraction of the fleet is equipped with OBDII systems. As mentioned earlier, EPA is requiring engines used in HDDVs to be equipped with OBDII systems, beginning with 2010 model year.
3) Either in addition to or in lieu of a roadside inspection, and after HDDVs are equipped with OBDII systems, they could be inspected in the following manner:
    a) Perform OBDII tests in DMV's voluntary fleet certification program on HDDVs with OBDII systems.

[29] EPA-420-F-09-019 indicates that MOVES recognizes that diesel powered vehicles undergo significant deterioration in vehicle emissions levels, and consequently, future emission levels are expected to be higher than what is predicted by MOBILE6.2. This leads to the possibility of significant I/M benefits for OBDII I/M programs that inspect HDDVs.

[30] DMV should insert a brief explanation of the current fleet certification program to provide context.

b) Perform OBDII inspections at certified inspection facilities, e.g. diesel repair facilities certified by DMV.

c) Allow HDDVs with OBDII systems to be self inspected by their owners. In order to pass inspection, owners would have to prove that their vehicles have no emissions faults. OBDII systems for HDDVs will have even more anti-fraud provisions than light-duty OBDII systems, e.g. permanent DTCs[31], which will make it very difficult for an owner to cheat on an OBDII inspection.

Because of the potential for high mileage accumulation rates for these vehicles Connecticut could consider annual instead of biennial test frequencies and eliminating model year exemptions for HDDVs with OBDII systems, to maximize the opportunity to identify high emitting vehicles. However, this would require legislative authority.

[31] Permanent DTCs (diagnostic trouble codes) could significantly enhance the effectiveness of an OBDII only inspection because they can only be cleared by the OBDII system itself, not by technicians or consumers. The permanent DTC can only be cleared once the monitor responsible for setting that DTC has indeed run and passed enough times to confirm that the fault is no longer present. When this feature is implemented, motorists or technicians will not be able to clear codes just prior to inspection to try and avoid repair.

3.0 CONCLUSIONS CONCERNING FUTURE I/M PROGRAM DESIGNS

Following are conclusions about Connecticut's next I/M program:

1. ***Connecticut's current I/M program is an extremely effective strategy to reduce emissions of ozone precursors.*** Connecticut's current program provides the maximum benefits possible from an I/M program for the vehicles that are tested and is running very well.

2. ***Even though some states are dropping tailpipe tests, continuing tailpipe tests on pre-1996 vehicles maintains the air quality benefits necessary due to Clean Air Act requirements and statutory restrictions.*** The emission reductions from tailpipe emission tests on 1995 and older models are needed in Connecticut to maintain compliance with benefits claimed in its State Implementation Plan. Continuing tailpipe testing is the most cost-effective way to maintain I/M benefits and avoid backsliding, at least until the benefits from only conducting OBD testing are equal to the present testing strategy. In addition, dropping tailpipe tests on 1995 and older models eliminates the opportunity to identify gross polluters. Switching to a preconditioned two-speed idle (PCTSI) test from the current loaded-mode (ASM) test is a possible option, if the State can make up for backsliding in NOx reductions.

3. ***Remote sensing devices (RSD) cannot be used as an alternative to periodic I/M tests.*** Use of RSD has been proposed as an alternative to tailpipe tests. However, RSD have severe drawbacks that limit their potential as an alternative to traditional tailpipe or OBDII emissions tests. These drawbacks include the following:

    a. RSD is not a reliable method to identify individual high emitting vehicles.

    b. Obtaining RSD emission measurements on a majority of the fleet will cost much more than performing periodic I/M tests.

    Although RSD is not a feasible alternative to periodic I/M tests, it is a valuable tool to characterize fleet emissions trends. Connecticut should continue to use RSD to meet EPA requirements that states sample 0.5% of the vehicles on the road.

4. ***OBDII inspections are the most promising approach to inspect light and heavy-duty diesel powered vehicles.*** Connecticut could continue to perform OBDII inspections on 1997 and newer diesel powered light-duty vehicles less than 8500 lbs GVWR. In the future, Connecticut could consider performing OBDII inspections on diesel and gasoline powered medium-duty vehicles up to 14,000 lbs GVWR[32], assuming vehicles greater than 10,000 lbs GVWR can be safely tested in existing facilities and that additional benefits can be quantified to obtain SIP credits. OBDII

[32] Connecticut could consider expanding the current GVWR limit for the I/M program from 10,000 lbs to 14,000 lbs. This assumes that there are enough facilities with test bays large enough for the largest of the vehicles.

inspections on heavy-duty diesel vehicles (HDDVs) greater than 14,000 lbs GVWR could be considered as an additional feasible alternative once these vehicles have OBDII systems. Engine manufacturers will start phasing OBDII systems in diesel engines used in heavy-duty vehicles beginning with the 2010 model year[33].

5. ***Customer convenience might be enhanced by implementing innovative OBDII inspection strategies when this technology is proven reliable.*** Self service kiosks, wireless OBDII and other innovative ways to perform OBDII inspections could be incorporated into Connecticut's next I/M program on a trial or pilot basis. The jury's out on whether or not these systems will be commercially viable and able to prevent fraudulent tests. Connecticut must closely evaluate Oregon's experience with kiosks and wireless OBDII inspection systems and develop realistic cost and feasibility assessments of this technology. Traditional inspection stations will likely be used inspect most vehicles.

[33] For diesel engines used in highway vehicles over 14,000 pounds GVWR, EPA is requiring that one engine family per manufacturer be certified to the OBDII requirements in each model year from 2010 through 2012. Beginning in 2013, all highway engines for all manufacturers would have to be certified to the OBDII requirements.

Appendix A

2006 Audit of Colorado's I/M Program – Review of Remote Sensing

Since 2002, Colorado has been operating a comprehensive remote sensing program, termed Rapid Screen. The Rapid Screen Program uses remote sensing devices to measure emissions as vehicles drive past roadside monitors. Remote sensing devices (RSD) measure vehicle emissions remotely by passing an infrared or ultraviolet light beam across a highway to a source detector on the other side. When a vehicle passes through the light beam, the changes in the intensity of the transmitted light indicate the pollutant concentrations of the exhaust gases. The source detector measures absolute concentrations of HC, CO, NO, and carbon dioxide (CO_2) in the diluted exhaust. From these measurements, exhaust concentrations of HC, CO, and NO in the undiluted exhaust are calculated. Remote sensing offers the opportunity to obtain a large number of vehicle emissions measurements quickly with minimum inconvenience to motorists. In 2006, dKC was contracted by the Colorado State Auditing Office (SAO) to audit Colorado's I/M program, including the Rapid Screen component.

Ability of Remote Sensing Devices (RSD) to Identify High Emitters

Currently Rapid Screen is used to identify vehicles that should pass the traditional emissions test and thus meet Colorado's I/M requirements without going to regular I/M test station. Colorado House Bill 2006-1302 requires the State to develop a plan to use Rapid Screen to identify high-emitting vehicles. Table A-1 shows an assessment of the ability of Rapid Screen to identify high emitting vehicles. dKC evaluated Rapid Screen using three sets of standards for identifying high emitters: most stringent, moderately stringent, and least stringent.

dKC found that even when using the most stringent standard, Rapid Screen identified only 225 (or 37 percent) of the 607 vehicles in our sample that failed the traditional emissions test. Using the least stringent standard, Rapid Screen identified only 38 (or 6 percent) of the 607 vehicles that failed the traditional emissions test. If Colorado had Rapid Screen observations on every vehicle in the fleet, at most 37% of the vehicles that currently fail the traditional emissions test would be identified. (see Table A-1).

In the next area, dKC looked at whether Rapid Screen is failing vehicles that really should be passing. Table A-2 shows the accuracy of Rapid Screen in identifying vehicles that should fail their traditional emissions test. When using the most stringent standards, dKC found that 1,038 of the 1,263 vehicles failed by RS passed their traditional emissions test. In this case there are 1,038 false fails. When using the least stringent standards, dKC found that 45 of the 83 vehicles failed by Rapid Screen passed their traditional emissions test.

Table A-1 – Effectiveness of Rapid Screen in Identifying High Emitting Vehicles – Two Rapid Screen Observations Within One Year

EVALUATION CRITERIA	Most Stringent[1]		Moderately Stringent[2]		Least Stringent[3]	
	Number	Percent	Number	Percent	Number	Percent
Vehicles Failing the Traditional Emissions Test[4]	607	n/a	607	n/a	607	n/a
Vehicles Failing both Rapid Screen and the Traditional Emissions Test	225	37%	98	16%	38	6%

Source: Department inspection station and Rapid Screen data for 2005

Notes: Vehicles exceeded the standards during both observations

[1] *Carbon monoxide emissions cannot exceed 1 percent; hydrocarbon emissions cannot exceed 300 parts per million; oxides of nitrogen cannot exceed 2,000 parts per million*

[2] *Carbon monoxide emissions cannot exceed 3 percent; hydrocarbon emissions cannot exceed 500 parts per million; oxides of nitrogen cannot exceed 3,000 parts per million*

[3] *Carbon monoxide emissions cannot exceed 5 percent; hydrocarbon emissions cannot exceed 1,000 parts per million; oxides of nitrogen cannot exceed 5,000 parts per million*

[4] *For the purpose of this analysis, traditional emissions test failures includes only those vehicles that failed the IM240 or two-speed idle test and does not include vehicles that failed their gas cap pressure tests*

Table A-2 –Effectiveness of Rapid Screen in Minimizing False Fails – Two Rapid Screen Observations Within One Year

EVALUATION CRITERIA	Most Stringent		Moderately Stringent		Least Stringent	
	Number	Percent	Number	Percent	Number	Percent
Vehicles Failing Rapid Screen	1,263	n/a	376	n/a	83	n/a
Vehicles Failing Rapid Screen that Passed the Traditional Emissions Test[4] (False Fails)	1,038	82%	278	74%	45	54%

Source: Department inspection station and Rapid Screen data for 2005

Notes: Vehicles exceeded the standards during both observations

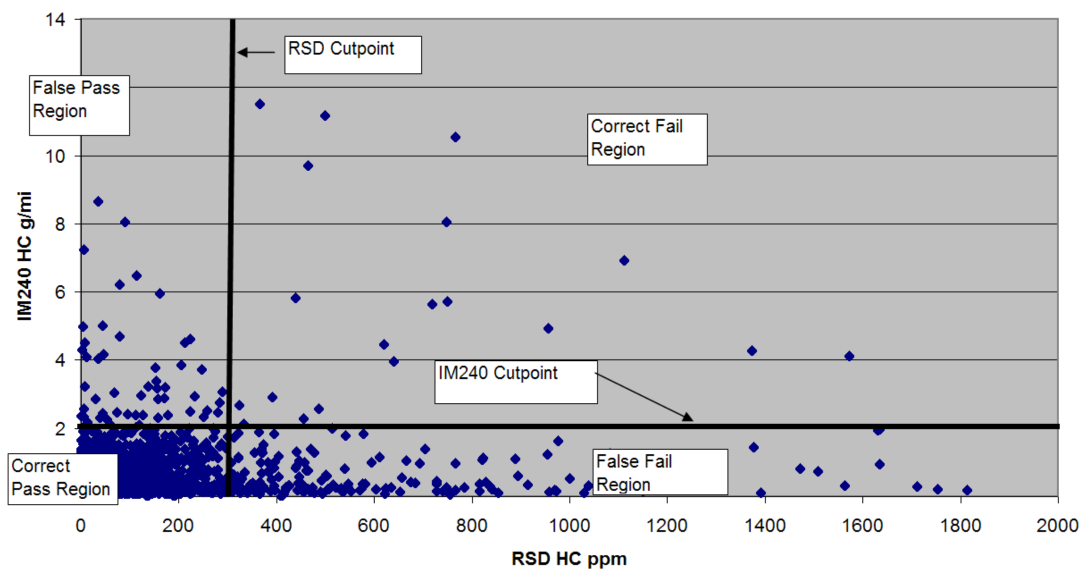
These results indicate that Rapid Screen cannot reliably identify vehicles that should fail their emissions tests. This problem is highlighted on the Figure A-1. Figure A-1 shows the distribution of false passes and false fails for 5,800 passenger cars in our sample. To generate this chart, dKC identified 1995 passenger cars that received a Rapid Screen test before they received an IM240 test. EACH DOT represents a vehicle. The dots in the upper left quadrant represent FALSE PASSES. These vehicles exceed IM240 emissions levels but have RS levels below cutpoints. The dots in the lower RH quadrant represent

FALSE FAILS. These vehicles have IM240 emissions levels below the cutpoints but have RS levels above cutpoints.

These data mean that Rapid Screen is not only ineffective at identifying high-emitting vehicles, **but it also** may not reduce inconvenience for motorists. This is because the majority of motorists who fail their Rapid Screen tests would have to travel to an emissions station for a traditional emissions test, only to find out that their vehicles actually passed.

Conclusion: The audit concluded that Rapid Screen cannot reliably identify vehicles that will pass or fail tailpipe or OBDII inspections. RSD is not an effective replacement for traditional I/M programs.

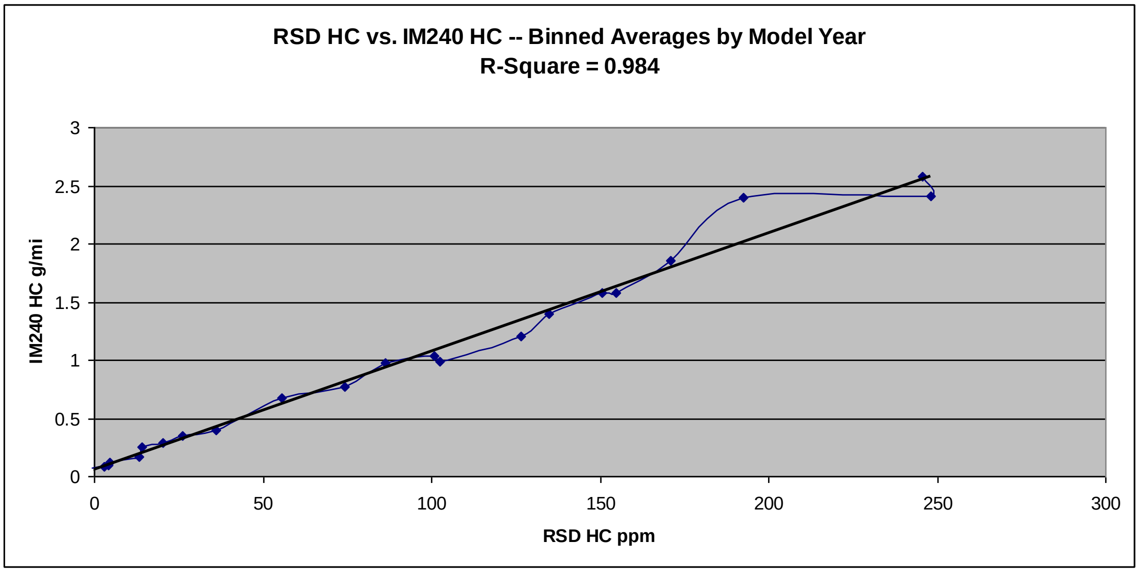
Figure A-1 -- Correlation Between IM240 Test Results and Rapid Screen Results for 1995 Model-Year Passenger Vehicles



Using RSD to Characterize Fleet Emissions

Although individual Rapid Screen results do not correlate well with individual IM240 results, Rapid Screen results do provide an accurate measure of vehicle emissions trends. This is shown on Figure A-2, which correlates average Rapid Screen results by model year with average IM240 results. Looking at averages is termed binning. Binned Rapid Screen results for HC correlate well with binned IM240 results. R-square equals 0.984; a perfect correlation has an R-square of 1.0. From this analysis, we conclude that average RSD levels provide an accurate measure of fleet emissions trends. Using RSD to characterize emission trends is not bound to the limitations over vehicle coverage. All that is needed is an adequate sample size. This is why EPA encourages states to meet its on-road testing requirements with RSD.

Figure A-2 – Correlation Between Average IM240 Readings by Model Year and Average RSD readings by Model Year



Source: de la Torre Klausmeier Consulting, Inc analysis of AIR and Rapid Screen program data

Contribution of Pre-1996 Vehicles Based on Remote Sensing Data from Connecticut

Remote sensing data provide an alternative way to estimate the contribution of different types and ages of vehicles to overall HC and NOx emissions. EPA requires that 0.5% of the tested vehicle population receive independent on-road emissions tests. Connecticut meets this requirement by using Remote Sensing Devices (RSD). Connecticut's I/M contractor, Applus, is required to conduct on-road emission tests using remote sensing devices (RSD), in order to meet EPA's on-road test requirements.

dKC analyzed results of the August 2007 RSD survey to estimate the contribution of 1995 and older models – the models that get tailpipe tests. dKC summed RSD emissions levels by model year to estimate the impact of pre-1996 vehicles on total vehicle emissions. The number of observations by model year can be used to estimate VMT by model year. Figure A-3 shows VMT and emissions for pre-1996 vehicles as a percent of total emissions. Older models account for a significant fraction of vehicle emissions, even though far fewer of them were seen in the survey. The 2010 and 2012 values are projections based on 2007 values. Table 2-5 shows the percent of HC and NOx emissions from 1995 and older vehicles for 2007, 2010, and 2012. Currently, pre-1996 vehicles account for 56% of the HC emissions and 40% of the NOx emissions, based on the 2007 RSD survey. These percentages drop to 26% and 17% in 2010 and 17% and 9% in 2012.

Figure A-3 – Emissions and VMT for 1995 and Older Vehicles Based on 2007 Remote Sensing Study in Connecticut -- % of Total Emissions

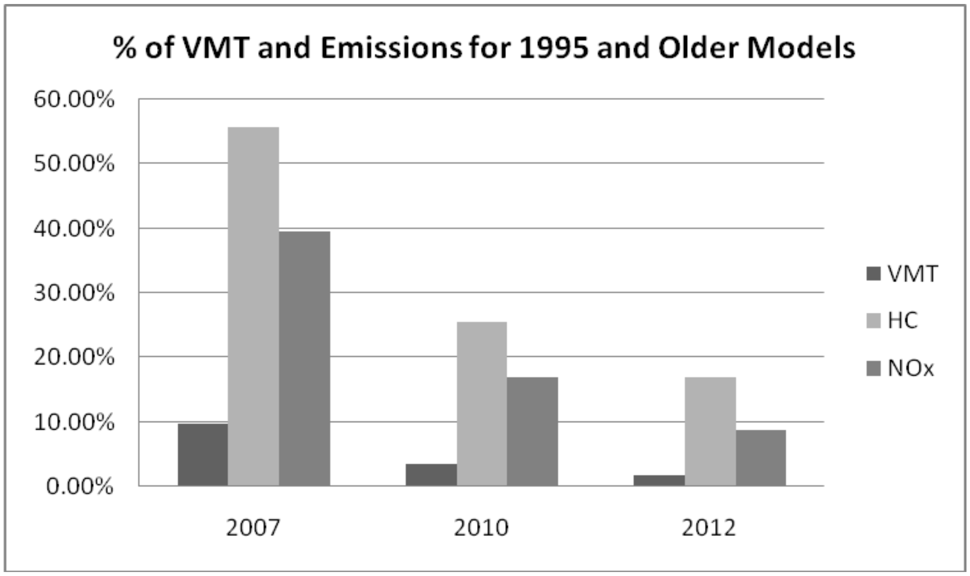


Table A-3 – Percent of VMT and Vehicle Emissions Attributed to 1995 and Older Models Based on Remote Sensing Data

		% of Total Emissions from Pre-96 Vehicles	
Year	**VMT**	**HC**	**NOx**
2007	9.70%	55.62%	39.51%
2010	3.50%	25.56%	16.88%
2012	1.66%	16.99%	8.72%

Appendix B

Results of California Study on Reducing In-Use NOx Emissions from Heavy-Duty Diesel Powered Vehicles

The California Air Resources Board (CARB) performed extensive research in reducing in-use NO_X emissions from on-road heavy-duty diesel vehicles. These efforts are in support of SIP measure M17, which calls for a ten ton/day reduction in in-use NO_X emissions from on-road heavy-duty diesel vehicles operated in the South Coast Air Basin. SIP measure M17 has the following elements:

- Heavy Duty Diesel Engine (HDDE) NO_X field screening program
- HDDE in-use compliance program
- Heavy duty on-board diagnostic program
- NO_X reduction incentive program

As part of SIP measure M17, CARB developed a NO_X screening test for high emitters. A heavy-duty dynamometer was set up at CARB's Stockton Laboratory and emission tests were conducted on heavy-duty trucks. The trucks were primarily tractors[34] (Class 8a and 8b) and were rented from used truck facilities. High emitting trucks were sent to factory authorized repair facilities for repairs and then retested. The diesel vehicle screening program attempted to answer the following questions:

- Are there excess NO_X emissions in the vehicle population that are caused by tampering and improper maintenance?
- Is there a practical field test that can identify those vehicles with high NO_X emissions?
- Can excess NO_X emissions be reduced through repairs and maintenance?
- Can NO_X reductions be made cost-effectively?

CARB tested 101 heavy duty diesel vehicles (HDDVs), 32 of which were sent out for repairs and retested afterwards. Following are the key results of CARB's research (CARB, 2003b):

- About 15 percent of the HDDV population may have excess NO_X emissions, but it is difficult to clearly identify high emitters with repairable problems.
- Many of the vehicles showing the largest emission reduction had on-board computer reprogramming, termed reflash, listed as one of the repair items[35]. Repairs involving reflash reduced NO_X emissions by 20 percent at an average repair cost of $1,098[36] per vehicle.

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[34] The lightest truck tested was "medium heavy duty" at a gross vehicle weight rating (GVWRR) of 34,000 lbs.

[35] Many engines built since 1990 were designed to advance the injection timing during steady-state highway operation' thereby improving fuel economy, but also greatly increasing NO_x emissions during this mode. Heavy-duty diesel powered vehicles frequently operate under steady-state highway conditions, so this practice caused NO_x emissions to be higher than previously expected. The heavy-duty diesel engine manufacturers were sued by USEPA because of these alleged defeat devices. The suit was settled by a

- NO_X reductions for vehicles that had repairs other than reflash were not significant, even though the repairs cost an average of $1,150 per vehicle.
- Other than reflash, there is no clear trend as to which repairs would be cost-effective, as many of the repairs had no impact on NO_X emissions, or resulted in an increase in NO_X emissions, and cost more than $1,000. Repairs that included engine tune-ups and servicing of the charge air cooler (CAC) sometimes significantly reduced NO_X emissions. Many vehicles received tests of the CAC, but only a few received repairs. The few vehicles with repaired CACs did show reductions in NO_X emissions. For these diesel engines, an engine tune-up involved replacing the air filter and fuel filters, checking the timing and checking for leaks.
- CARB concluded that it will be difficult to develop a NO_X screening test because average per vehicle emission reductions from repair appear to be small, and no clear cutpoint exists to screen repairable high emitters.

Consent Decree whereby the engine manufacturers agreed to make reflash kits available at no cost to retard timing during highway operation, thereby reducing NO_x emissions. Subsequent court decisions have limited manufacturer's responsibility to providing free reflash kits only when engines are rebuilt. Detecting and reflashing vehicles that should have been reflashed, but were not, should reduce NO_x emissions by 20 to 30% for the heaviest engines operating over freeway cycles.

[36] This cost does not include the very real costs of time out of service, which can be quite significant for truck owners and operators.