



EVALUATION OF CONNECTICUT'S INSPECTION/MAINTENANCE PROGRAM

2019 ANNUAL REPORT

2018-2019 BIENNIAL REPORT

Prepared For

Connecticut Department of Energy and Environmental Protection
Connecticut Department of Motor Vehicles

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July, 2020

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1. Introduction

1.1. Executive Summary

As required by the Clean Air Act Amendments of 1990, the Connecticut Department of Energy and Environmental Protection (DEEP) in partnership with the Connecticut Department of Motor Vehicles (DMV) conducts periodic evaluations of its enhanced Motor Vehicle Inspection and Maintenance (I/M) Program. This report is written and submitted in fulfillment of the requirement to provide annual and biennial I/M reports per 40 CFR 51.366 to the U.S. Environmental Protection Agency (EPA). This report addresses data collected from January 1, 2019 through December 31, 2019. As evidenced by the high compliance rate, limited fraud and low waiver rate, this report demonstrates that Connecticut's I/M program effectively achieves the expected air quality benefits.

The EPA provided a checklist, which identified the data elements to be included in this report. Required data and reports for 2018 and earlier years have been submitted to EPA. The 2019 data elements are compiled in the main body and Appendix A and B of this report and correspond to the indexing system used in EPA's checklist. The requirements of EPA's checklist that are not applicable due to the structure of Connecticut's I/M program are addressed at the end of each applicable section of this report.

1.2. Major Findings

This report focuses on the current effectiveness of Connecticut's I/M program. Key program highlights include:

- Connecticut's I/M program correctly fails non-complying vehicles and strictly enforces I/M requirements:
 - Approximately 9.2% of vehicles failed their initial emissions test and 10% of these vehicles also failed their first retest in 2019. This is similar to failure rates in centralized, test-only programs, which EPA considers a benchmark.
 - DMV and its contractor, Applus, perform extensive quality assurance checks on the program. Evaluation of these quality assurance data demonstrates that the program performs accurate inspections.
- Connecticut's anti-fraud efforts are models for other I/M programs. Connecticut audits all stations as part of an extensive anti-fraud program. For example, Connecticut conducted 2,067 video surveillance audits and 741 covert audits during 2019. Covert and video audits address On-Board Diagnostics (OBDII), Acceleration Simulation Mode (ASM), Pre-Conditioned Two Speed Idle (PCTSI) and diesel opacity inspection performance. In addition, DMV and Applus run extensive trigger reports. Less than 0.04% of the inspections in Connecticut are suspect, which is far lower than the "suspect test" rate in most other states' I/M programs where suspect inspection rates are 0.3% or higher.¹
- In 2015, Connecticut implemented a new registration system – Connecticut Integrated Vehicle and Licensing System (CIVLS). CIVLS automated checking for I/M compliance makes it impossible for motorists to renew their registration via US Mail, in person or on the DMV website without first complying with I/M requirements. The DMV also checks each registration request for

¹ How are we approaching the ongoing issue of tampering?, I/M Solutions Forum, May 2016

compliance with I/M requirements. DMV provided data on registration renewal requests mailed to the Department – 98.46% of the registration requests were in compliance with I/M requirements when mail renewals were processed. Ultimately, 100% of the vehicles renewed are in compliance with I/M requirements.

Connecticut's ongoing analysis of inspection and enforcement data continues to demonstrate the program effectively produces air pollutant reductions. DEEP and DMV will continue to evaluate opportunities to improve the program and increase cost effective air quality benefits.

2. Program Overview

2.1. Introduction

The I/M program is an important part of Connecticut's overall clean air strategy to ensure the state is positioned to attain and maintain the National Ambient Air Quality Standard (NAAQS) for Ozone (i.e., smog). Ozone is formed by photochemical reactions between volatile organic compounds (VOCs) and oxides of nitrogen (NO_x). Connecticut's I/M program, which dates back to 1983, has a long history of effectively reducing vehicle VOC and NO_x emissions.

Connecticut's I/M program identifies vehicles that emit pollutants that exceed standards set by EPA and require such vehicles to be repaired in a timely manner to comply with emission standards. DMV oversees the I/M program operated by a private contractor; DEEP advises DMV on I/M standards and ensures that the program achieves the air quality benefits as outlined in Connecticut's State Implementation Plan (SIP) for Air Quality.

The emission reductions from the I/M program are an essential element of Connecticut's clean air strategy. On June 3, 2016, having determined that both the Greater Connecticut and the New York-Northern New Jersey-Long Island (NY-NJ-CT) nonattainment areas failed to attain the 2008 ozone standards by the July 20, 2015 attainment date, EPA reclassified those areas from marginal nonattainment to moderate nonattainment. This reclassification required the two areas to attain the 2008 standard by July 20, 2018. Neither area measured attainment as of that date and, as such, Connecticut was reclassified by EPA as serious nonattainment for 2008 standard as of September 2019. Additionally, on October 1, 2015 EPA strengthened the 2015 Ozone NAAQS to 70 parts per billion (ppb) from 75 ppb. Effective August 3, 2018, the Greater Connecticut nonattainment area is classified as marginal nonattainment (attainment date August 3, 2021) and the New York-Northern New Jersey-Long Island (NY-NJ-CT) nonattainment area is classified as moderate nonattainment (attainment date August 3, 2024). Upon implementation of the tighter 2015 standard and the serious classification under the 2008 standard, Connecticut will need to achieve even greater emission reductions from motor vehicles.

As part of the next ozone attainment demonstration, DEEP will need to evaluate additional measures to reduce emissions from the transportation sector as this sector accounts for about 67% of NO_x emissions in Connecticut. These strategies may include, but are not limited to: adopting the California aftermarket catalytic converter rule, promoting electric and alternative fueled vehicles by expanding the availability of electric vehicle charging stations and alternative fuel refueling stations, adopting programs that encourage the replacement of older diesel on and off road equipment with equipment that complies with the newest emission standards, and expanding the I/M program to include more medium and heavy duty trucks. Failing to effectively reduce transportation emissions to meet federal air quality standards in a timely manner may result in the need for additional control measures in the future.

Therefore, the existing I/M program should be viewed against the back drop of potential additional control programs necessary to achieve Connecticut's short term and long term air quality goals.

In January 2020, Connecticut issued a request for proposals (RFP) for the next generation of its I/M program. The submitted proposals in response to that RFP are currently being evaluated.

2.2. Emissions Tests Administered

Vehicles that are between 4 and 24 years old with a gross vehicle weight of 10,000 pounds or less are inspected in Connecticut by the following procedures on a biennial basis.

Gasoline Powered Vehicles (Including CNG, Propane and Hybrid Vehicles)

Below is a brief description of the criteria used to determine if a gasoline powered 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 cut points or emissions standards. For the ASM2525 test, HC, CO and NOx emissions are evaluated. For the PCTSI test, HC and CO emissions are evaluated. Connecticut uses EPA's recommended cut points for the ASM2525² and PCTSI³ tests.

Gas Cap Test: Vehicles fail if their gas cap cannot hold pressure. Only pre-1996 light-duty vehicles receive gas cap tests. The OBDII system adequately tests a vehicle's evaporative system on most 1996 and newer model year (MY) light-duty vehicles.

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

- Malfunction Indicator Lamp (MIL⁴) is commanded-on;
- MIL not working (Termed Key-On Engine-Off, KOEO, failure⁵);
- The number of readiness monitors that are not ready exceed EPA's limit⁶:
 - 1996-2000 MY light-duty vehicles: Two monitors are allowed to be not ready.
 - 2001 and later MY light-duty vehicles: One monitor is allowed to be not ready.

² Acceleration Simulation Mode Test Procedures, Emission Standards, Quality Control Requirements, and Equipment Specifications, July, 1996.

³ *Two speed idle test—EPA 81, 40 CFR 85.2214*

⁴ 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.

⁵ The Key-On Engine-Off (KOEO) determines if the MIL bulb is working. The bulb should illuminate when the vehicle is in the ON/RUN position but not started.

⁶ 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.

- OBDII Diagnostic Link Connector (DLC) damaged; or
- Vehicle could not communicate with the Connecticut inspection system.

Diesel Powered Vehicles

Diesel-powered vehicles with a GVWR of 10,000 lbs. or less are also tested in Connecticut's I/M program. Light-duty diesel vehicles equipped with OBDII systems receive OBDII tests. Otherwise, the vehicle receives a test designed to identify excessive exhaust smoke opacity. EPA regulations do not require the testing and reporting of diesel-powered vehicles.

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 (medium-duty vehicles and pre-1997 light-duty vehicles): With this test, the throttle is "snapped" (i.e., accelerator is quickly pressed and then released) and exhaust smoke opacity is measured. This test is performed with the vehicle being in "neutral". The average of three snaps is calculated, and compared to the standard recommended by the Society of Automotive Engineers (SAE).

Loaded Mode Diesel (LMD) Test (medium-duty vehicles and pre-1997 light-duty vehicles): Vehicles are tested using a dynamometer to simulate driving at 30 mph. Exhaust smoke opacity is measured.

OBDII Inspection: 1997 and newer model year diesel vehicles with a GVWR of 8,500 lbs. or less are subject to OBDII inspection. The emissions test system is plugged into the OBDII connector and information on the status of the vehicle's OBDII system is downloaded. Diesel-powered vehicles will fail the OBDII inspection if they have any of the following problems:

- Malfunction Indicator Lamp (MIL) is commanded-on;
- MIL not working (Termed Key-On Engine-Off, KOEO, failure);
- The number of readiness monitors that are not ready exceed EPA's limit:
 - 1997-2000 MY light-duty vehicles: Two monitors are allowed to be not ready.
 - 2001 and later MY light-duty vehicles: One monitor is allowed to be not ready.
- OBDII Diagnostic Link Connector (DLC) damaged; or
- Vehicle could not communicate with the Connecticut inspection system.

3. Test Data Report

3.1. Vehicles Tested

40 CFR 51.366 (a)(1): The number of vehicles tested by model year and vehicle type

Tables 1 and 2 and Figure 1 present the number of passenger cars and trucks that were inspected at public and fleet stations. Overall, 1,123,147 vehicle inspections were done at public stations; 1,275 vehicle inspections were performed at fleet inspection facilities. In 2019, more odd model year vehicles were tested.

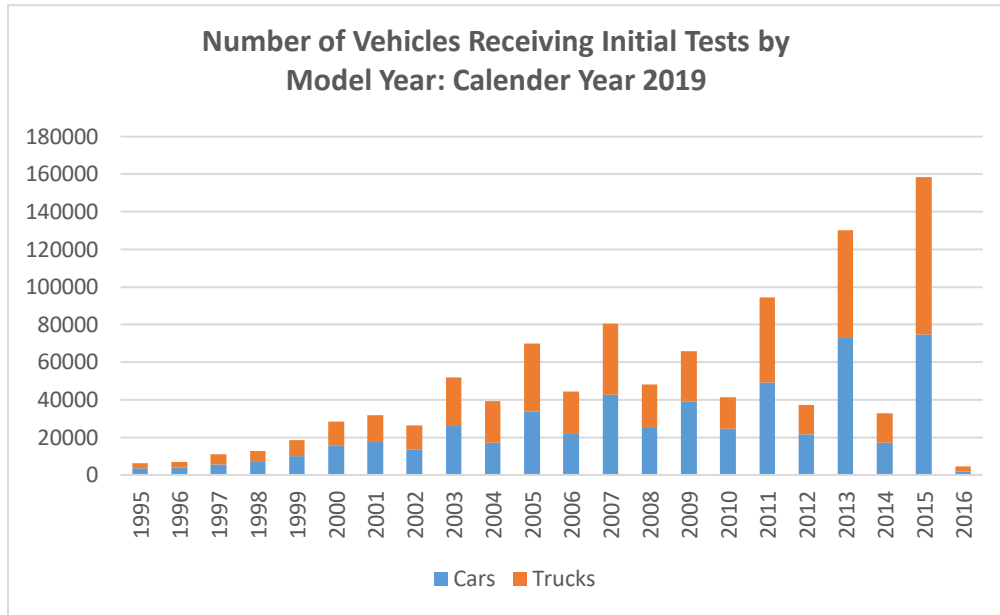
TABLE 1 - (A)(1) NUMBER OF VEHICLES TESTED BY MODEL YEAR AND VEHICLE TYPE (NETWORK TESTING)
INCLUDES INITIAL TESTS AND RETESTS

Model Year	Passenger Car (P)	Truck (T)	Total
1995	3,914	3,126	7,040
1996	4,314	3,690	8,004
1997	6,474	6,331	12,805
1998	8,051	6,845	14,896
1999	11,404	10,192	21,596
2000	18,151	14,386	32,537
2001	20,450	17,167	37,617
2002	16,222	16,024	32,246
2003	29,359	29,623	58,982
2004	20,156	25,517	45,673
2005	37,468	40,360	77,828
2006	24,972	25,119	50,091
2007	45,745	40,986	86,731
2008	27,287	25,409	52,696
2009	40,945	28,657	69,602
2010	25,981	17,891	43,872
2011	50,997	47,294	98,291
2012	22,690	16,684	39,374
2013	74,950	58,334	133,284
2014	17,687	16,392	34,079
2015	75,966	85,219	161,185
2016	1,971	2,747	4,718
Grand Total	585,154	537,993	1,123,147

TABLE 2 - (A)(1) NUMBER OF VEHICLES TESTED BY MODEL YEAR AND VEHICLE TYPE (FLEET TESTING)
 INCLUDES INITIAL TESTS AND RETESTS

Model Year	Passenger Car (P)	Truck (T)	Total
1999	3	2	5
2000	5	0	5
2001	0	3	3
2002	2	2	4
2003	6	3	9
2004	2	5	7
2005	9	9	18
2006	4	7	11
2007	11	27	38
2008	11	20	31
2009	5	14	19
2010	6	5	11
2011	21	8	29
2012	41	35	76
2013	209	106	315
2014	185	43	228
2015	156	283	439
2016	1	26	27
Grand Total	677	598	1,275

FIGURE 1 – NUMBER OF INITIAL TESTS BY VEHICLE TYPE AND MODEL YEAR (NETWORK TESTS)



3.2. Test Results

40 CFR 51.366 (a)(2): By model year and vehicle type, the number and percentage of vehicles:

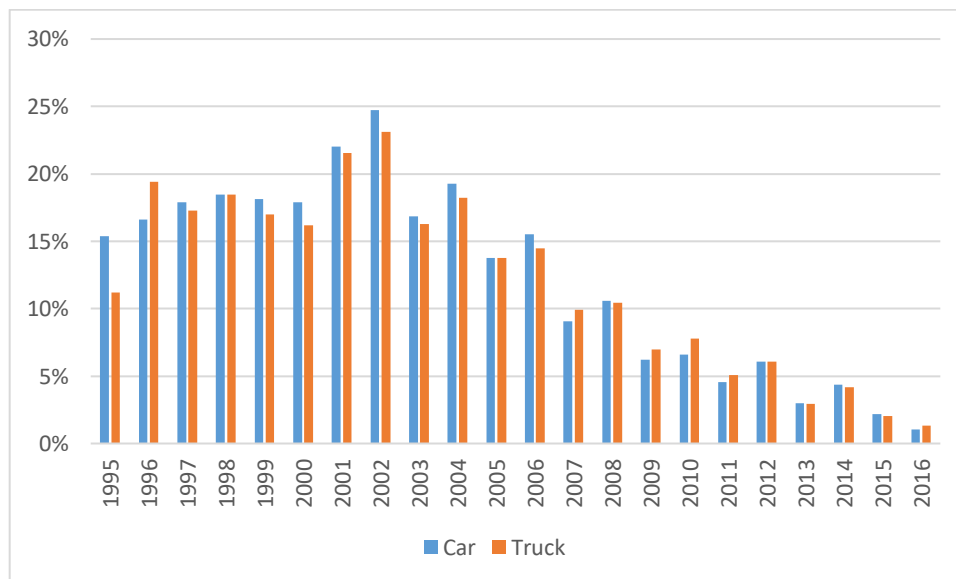
- (i) Failing initially, per test type;
- (ii) Failing the first retest per test type;
- (iii) Passing the first retest per test type
- (iv) Initially failed vehicles passing the second or subsequent retest per test type
- (v) Initially failed vehicles receiving a waiver
- (vi) Vehicles with no known final outcome (regardless of reason)

Table 3 presents the failure rate by test type and vehicle type. The failure rates in 2019 are very similar to the rates in 2018 and earlier years. As shown on Figure 2, due to more stringent pass/fail criteria for the OBD test, failure rates jump up in 2001, peaking in 2002. Appendix A presents details on failure rate trends by model year, test type, and vehicle type.

TABLE 3 - (A)(2)(i) INITIAL TEST FAIL RATE BY TEST TYPE AND MODEL YEAR (NETWORK TESTS)

Test Type	Cars			Trucks		
	Fail	Pass	% Fail	Fail	Pass	% Fail
1-OBD Gasoline	47,947	475,374	9.2%	42,908	408,672	9.5%
2-OBD Diesel	486	3,224	13.1%	284	1,421	16.7%
3-OBD Hybrid	600	12,314	4.3%	85	1,959	4.2%
4-PCTSI	60	347	14.7%	1,972	28,578	6.5%
5-ASM	481	2,596	15.6%	228	1,878	10.8%
6-MSA	0	16	0.0%	50	1,216	3.9%
7-LMD	6	93	6.1%	141	7,906	1.8%
Grand Total	49,580	493,964	9.1%	45,668	543,544	9.2%

FIGURE 2 - OVERALL INITIAL TEST FAIL RATE BY VEHICLE TYPE AND MODEL YEAR



Failure rates for the first retest and second and later retests are shown in Tables 4 and 5.

TABLE 4 - (A)(2)(II,III) FIRST RETEST FAIL RATE BY TEST TYPE

Test Type	Cars			Trucks		
	Fail	Pass	% Fail	Fail	Pass	% Fail
1-OBD Gasoline	3,809	33,494	10.2%	3,483	31,631	9.9%
2-OBD Diesel	24	384	5.9%	11	207	5.0%
3-OBD Hybrid	47	417	10.1%	1	65	1.5%
4-PCTSI	10	40	20.0%	198	1,465	11.9%
5-ASM	74	178	29.4%	28	178	13.6%
6-MSA	0	0	0%	13	28	31.7%
7-LMD	0	3	0%	11	119	8.5%
Grand Total	3,964	34,516	10.3%	3,745	33,693	10.0%

TABLE 5 - (A)(2)(IV) SECOND AND LATER RETEST FAIL RATE BY TEST TYPE

Test Type	Cars			Trucks		
	Fail	Pass	% Fail	Fail	Pass	% Fail
1-OBD Gasoline	830	2,149	27.9%	737	2,217	24.9%
2-OBD Diesel	4	17	19.0%	2	7	22.2%
3-OBD Hybrid	12	24	33.3%	1	1	50.0%
4-PCTSI	2	9	18.2%	71	161	30.6%
5-ASM	40	43	48.2%	16	23	41.0%
6-MSA	0	0	0%	6	7	46.2%
7-LMD	0	0	0%	2	6	25.0%
Grand Total	888	2,242	28.4%	835	2,422	25.6%

The number and percent of vehicles receiving waivers are shown on Table 6. The overall waiver rate is very low; 0.16% of the failed vehicles receive waivers.

TABLE 6 - (A)(2)(V). WAIVERS ISSUED

Model Year	Passenger Car (P)	Truck (T)	Total # of Waivers	# of Failed Vehicles	% of Failed Vehicles Receiving Waivers
1995	1	0	1	855	0.12%
1996	1	1	2	1245	0.16%
1997	0	3	3	1,950	0.15%
1998	3	1	4	2,360	0.17%
1999	4	1	5	3,276	0.15%
2000	6	3	9	4,875	0.18%
2001	7	3	10	6,929	0.14%
2002	3	11	14	6,334	0.22%
2003	4	13	17	8,563	0.20%
2004	6	4	10	7,313	0.14%
2005	10	11	21	9,600	0.22%
2006	10	5	15	6,635	0.23%
2007	3	5	8	7,602	0.11%
2008	3	8	11	5,065	0.22%
2009	3	4	7	4,309	0.16%
2010	2	0	2	2,921	0.07%
2011	1	3	4	4,529	0.09%
2012	1	2	3	2,255	0.13%
2013	1	0	1	3,856	0.03%
2014	0	1	1	1,400	0.07%
2015	0	0	0	3,320	0.00%
2016	0	0	0	56	0.00%
Total	69	79	148	95,248	0.16%

Table 7 presents the estimated percent of vehicles without a passing result. This table presents the total number of initial failing tests and passing retests. Overall, the number of vehicles that pass retests is 77% of the number of vehicles that fail initial tests. From this, we conclude that 23% of initially failing vehicles do not have a passing result or 2% of all vehicles tested do not have a passing result.

TABLE 7 - (A)(2)(VI) VEHICLES WITH NO FINAL PASS

Model Year	Cars			Light Trucks			ALL
	# Fail Initial Tests	# Pass Retests	% of Initially Failed Vehicles with No Final Pass	# Fail Initial Tests	# Pass Retests	% of Initially Failed Vehicles with No Final Pass	% of Initially Failed Vehicles with No Final Pass
1995	541	268	50.5%	314	267	15.0%	37.4%
1996	632	424	32.9%	613	405	33.9%	33.4%
1997	1,010	679	32.8%	940	689	26.7%	29.8%
1998	1,282	893	30.3%	1,078	826	23.4%	27.2%
1999	1,780	1,298	27.1%	1,496	1,161	22.4%	24.9%
2000	2,832	1,951	31.1%	2,043	1,496	26.8%	29.3%
2001	3,825	2,582	32.5%	3,104	2,369	23.7%	28.5%
2002	3,278	2,458	25.0%	3,056	2,392	21.7%	23.4%
2003	4,348	3,090	28.9%	4,215	3,246	23.0%	26.0%
2004	3,329	2,458	26.2%	3,984	3,154	20.8%	23.3%
2005	4,641	3,358	27.6%	4,959	3,789	23.6%	25.6%
2006	3,434	2,499	27.2%	3,201	2,662	16.8%	22.2%
2007	3,856	2,843	26.3%	3,746	2,866	23.5%	24.9%
2008	2,644	2,097	20.7%	2,421	2,000	17.4%	19.1%
2009	2,428	1,833	24.5%	1,881	1,552	17.5%	21.4%
2010	1,620	1,285	20.7%	1,301	1,121	13.8%	17.6%
2011	2,233	1,829	18.1%	2,296	1,824	20.6%	19.3%
2012	1,300	1,191	8.4%	955	887	7.1%	7.8%
2013	2,185	1,741	20.3%	1,671	1,374	17.8%	19.2%
2014	740	640	13.5%	660	626	5.2%	9.6%
2015	1,622	1,334	17.8%	1,698	1,393	18.0%	17.9%
2016	20	7	65.0%	36	16	55.6%	58.9%
ALL	49,580	36,758	25.9%	45,668	36,115	20.9%	23.5%

40 CFR 51.366 (a)(2): By model year and vehicle type, the number and percentage of vehicles:
(xi) Passing the on-board diagnostic check
(xii) Failing the on-board diagnostic check

Table 8 presents the percent of vehicles that pass or fail the on-board diagnostic (OBD) test. Due to more stringent readiness criteria starting with the 2001 model year, the failure rate jumps up that year. Testing data shows an overall OBD failure rate of 9.1% for passenger vehicles and 9.5% for trucks. These numbers are within normal failure rates, there are no outliers. Please reference Appendix A, (a) (2) (xi, xii) for specific data.

TABLE 8 - (A)(2)(XI, XII) PERCENT FAILING OBD TESTS (NETWORK TESTS) ALL FUELS

Model Year	% Fail Cars	% Fail Light Trucks	% Fail All
1996	16.8%	19.0%	17.7%
1997	17.9%	19.1%	18.4%
1998	18.6%	18.9%	18.8%
1999	18.0%	17.9%	18.0%
2000	17.7%	17.2%	17.5%
2001	21.2%	22.4%	21.7%
2002	23.4%	22.6%	23.0%
2003	16.3%	17.0%	16.6%
2004	18.5%	18.8%	18.6%
2005	13.5%	14.3%	13.9%
2006	15.2%	15.2%	15.2%
2007	9.1%	10.3%	9.6%
2008	10.4%	10.8%	10.6%
2009	6.3%	7.2%	6.6%
2010	6.7%	7.8%	7.1%
2011	4.6%	5.1%	4.8%
2012	6.0%	6.3%	6.1%
2013	3.0%	3.0%	3.0%
2014	4.3%	4.2%	4.2%
2015	2.2%	2.0%	2.1%
2016	1.0%	1.5%	1.3%
All	9.3%	9.6%	9.4%

40 CFR 51.366 (a)(2): By model year and vehicle type, the number and percentage of vehicles:
(xix) MIL is commanded on and no codes are stored
(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

MIL light illumination, or lack of readiness, results in an automatic failure of the I/M test. As such MIL "command on" and "not ready" status is reported. In 2019, 4.9% of the vehicles had MILs commanded-on with DTCs and 0.01% had MILs commanded on with no codes stored. In 0.14% of the tests, the test system could not communicate with the OBD system. Specific data can be found in Appendix A, (a) (2) (xix, xxi, xxii).

Overall, 5.3% of the vehicles had diagnostic monitors that were not ready on their initial test. Model year vehicles from 1996 to 2000 are allowed to have two monitors not ready; 2001 and newer models are allowed to have one monitor not ready. Due to the more stringent readiness requirement starting with 2001 model year vehicles (one monitor vs two allowed to be not ready), the percent of vehicles that are not ready increases for that model year. Specific data can be found in Appendix A, (a) (2) (xxiii).

40 CFR 51.366 (a)(3): The initial test volume by model year and test station
(a)(4): The initial test failure rate by model year and test station

Appendix A, (a)(3&4) contains a breakdown of initial test volume and fail rate by model year and test station.

3.3. Inapplicable Requirements

The following requirements from 40 CFR 51.366 (a) regarding test data reports are not applicable to Connecticut's I/M program:

- 40 CFR 51.366 (a)(2)(xiii-xv)
- 40 CFR 51.366 (a)(2)(xvi-xviii)
- 40 CFR 51.366 (a)(2)(xx)
- 40 CFR 51.366 (a)(5)

4. Quality Assurance Report

4.1. Inspection Stations

40 CFR 51.366 (b)(1): The number of inspection stations and lanes:
 (i) Operating throughout the year
 (ii) Operating for only part of the year

Table 9 presents the number of inspection stations that operated in 2019.

TABLE 9 - (B)(1) QUALITY ASSURANCE 2019 – NUMBER OF INSPECTION STATIONS

	Beginning of Year	Left Program	Added to Program
No. of Inspection stations/lanes operating throughout 2019	220	8	8

4.2. Inspectors

40 CFR 51.366 (b)(5): The number of inspectors licensed or certified to conduct testing

Table 10 presents the number of certified test inspectors (CTIs) that were active in 2019.

TABLE 10 – (B)(5) QUALITY ASSURANCE – NUMBER OF CERTIFIED TEST INSPECTORS (CTIs)

Total CTIs Actively Testing Part of Year	402
Total CTIs Actively Testing All Year	610
Total CTIs Testing	1012

4.3. Overt performance audits

40 CFR 51.366 (b)(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

EPA requires that overt audits be performed twice per year per station. DMV meets these requirements through use of the Emission Test Monitoring Report (ETMR). Connecticut prepares ETMRs more frequently than required by EPA. Every two months, at least one ETMR is performed on each station. In addition, Applus also performs overt audits. Connecticut also checks more items than required by EPA, such as checking the operational status of test equipment and peripherals (e.g., cameras). Connecticut is continuing to evaluate the auditing process to build upon the program’s success. Table 11 summarizes the results of overt performance audits.

TABLE 11 - (B)(2) QUALITY ASSURANCE 2019 – OVERT AUDITS -- 2019

Parameter	Beginning of Year	Left Program/Joined Program
Receiving overt performance audits in 2019	220	8/8
Not Receiving overt performance audits in 2019	1	
2019 Overt Audits - Emissions Test Monitoring Report (ETMR)		
Parameter	2019 Value	
Total Overt Audits Performed	852	
No. of Stations Audited	219	
No. of Times Each Station Was Audited (range)	1 to 5	
No. of Stations That Had No Violations for the Entire Year	194	
Total Number of Audits for which One or More Violations Were Reported	32	
No. of stations at which violations were reported	26	
No. of stations at which one (1) violation was reported	21	
No. of stations at which two (2) violations were reported	5	
Motor Vehicle Agents	2019 Value	
No. of Agents That Performed Overt Audits During the Course of the Year	3	
No. of Agents That Are No Longer Performing Overt Audits	0	
No. of Agents That Are Currently Assigned to Perform Overt Audits	3	
No. of Overt Audits per Agent (range)	255-323	
No. of Station Issues Reported per Agent (range)	3-26	

4.4. Digital Checks / Trigger audits / Camera / Video

Based on the results of trigger audits, Connecticut is a model for other states in how to enforce proper I/M test procedures. Connecticut actively looks for cases where inspectors may be performing improper inspections and passing vehicles that otherwise should fail. The following is a summary of how Connecticut ensures that stations perform proper inspections.

Trigger Audits

DMV and Applus run extensive trigger audits to assure that inspection stations follow proper test procedures. DMV requires Applus to maintain quality assurance measures, which they meet by conducting additional audits. Specifically, Applus performs a large number of digital audits and quality assurance reviews on a daily, weekly, and monthly basis. Many of the reports are automated by the Applus vehicle inspection database (VID), and distributed, via email, to DMV and Applus QA staff. In addition, the reports are available on the program dashboard for review at any time, and they are available for any time frame.

Trigger audits look for anomalies in data recorded during inspection. Reporting the outcome of these audits help DMV to identify if stations are performing fraudulent or inaccurate inspections. Trigger audits 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 frequently to identify stations performing improper inspections. Connecticut promptly investigates all significant cases of possible inspection fraud. Following is a list of some of the trigger reports:

- OBDII Testing Triggers:
 - PID/PCM Mismatch;
 - Monitor Mismatch;
 - All OBDII Monitors Unsupported;
 - A/C Monitor Ready or Not Ready;
 - OBDII Short Time Test, less than 30 minutes;
 - OBDII VIN Mismatch;
- ASM/PCTSI Triggers:
 - ASM Short Time Test, less than 30 minutes;
 - Looser ASM Cut Points;
 - Vehicles with GVWR greater than 8,500 pounds;
- Other Triggers:
 - VIN Entry Type;
 - Inspector ID Entry;
 - Offline Percentage;
 - RPM Bypass;
 - No Saturday/Holiday Testing; and
 - Missing Video/Test Image.

Applus' VID also generates the following automated alerts:

- Weather (temperature, humidity, pressure);
- EDBMS Offline;
- CDAS Offline;
- Test Center Not Testing; and
- Failed/Expired Calibrations Report.

A new quality assurance process was put in place to identify any station that either performs the minimum amount of calibrations or fails to contact Applus for service when one of the calibrations fails. Each day, Applus performs a Failed/Expired Calibration Report to ensure that the entire network is in compliance with calibrations. Any test center with failed calibrations, no open service tickets, or with expired calibrations is immediately locked out to prevent use of the analyzer. This process was put in

place to discourage test centers from waiting until a motorist arrives to complete the remaining calibration (ASM, PCTSI, opacity tests).

Special Triggers for Diesel Opacity Tests

All diesel-powered vehicles receive either OBDII, loaded-mode diesel (LMD) or modified snap idle (MSA) tests, based on GVWR and model year. Because inspectors are accustomed to performing PCTSI tests on non-diesel-powered vehicles over 8,501 lbs. GVWR, most assumed the larger diesel vehicles would require the equivalent stationary diesel test (MSA). The MSA test does not utilize a dynamometer. Unlike the ASM tests, which require authorization to switch a vehicle from ASM to PCTSI test, opacity tests require no such authorization to switch from LMD to MSA. In 2014, Applus implemented new quality assurance procedures to identify these vehicles and inspectors for corrective action. In 2014, 18% of the diesel-powered vehicles received MSA tests. This percentage dropped to 5% in 2018, but increased to 9% in 2019 even though the new procedures were effective in reducing the number of vehicles that received MSA tests when they should have received LMD tests. Applus will investigate why this occurred and implement corrective measures, such as training, if necessary.

Camera Audits

There are three video cameras connected to the emissions analyzer. If anyone of them fail or are unplugged, the emissions analyzer will set a lockout to prevent the use of the workstation. In addition, the Applus VID will generate non-compliance report for any emissions test transmitted with a missing test and video file. However, during the normal operations at the test centers, cameras may become misaligned or obstructed. Using the program dashboard, Applus and DMV perform camera audits of all three cameras, at each test center. Each camera is turned on to ensure it operates as it should, the viewing angle is verified with no obstructions and a test video is recorded. If an issue is identified that requires an onsite visit at the test center, a service ticket is generated and dispatched to the Applus field service. In 2019, Applus performed 2,214 test center camera audits. DMV audits the cameras when it performs a video audit. In 2019, 87 service tickets were opened to address alignment/refocusing issues.

Fraudulent Test Rate

A key parameter that's recorded during an OBD test is the OBD VIN – the vehicle identification number (VIN) that's part of the OBD test record. The percent of tests in Connecticut where the OBD VIN did not match the DMV VIN for the vehicle under test was calculated to be 0.02%. This mismatch could be due to clean scanning (substituting a problem free vehicle for the vehicle under test), changing the vehicle's onboard computer, or a data entry error in the DMV VIN. Connecticut has historically had low VIN mismatch rates and no individual stations in Connecticut had high OBD VIN mismatch rates.

Not all vehicles provide OBD VINs as part of the test record, so mismatches between expected and recorded communication protocol were also analyzed. OBD systems can use one of seven protocols; tests where the recorded protocol mismatches expected protocol are considered suspect. Only 0.02% of the tests (93 tests) are suspect in Connecticut. No stations had high protocol mismatch rates.

This analysis indicates that inspection fraud is not a serious problem in Connecticut.

4.5. Covert audit process overview

EPA requires that covert audits be performed at least once per year per station. The requirements and frequency for covert audits are detailed in 40 CFR 51.363(a)(4) and include remote visual observation of inspector performance, site visits using covert vehicles, and documentation of the audits. DMV performs video surveillance audits on a periodic and random basis. It's easier to perform video audits clandestinely, since the inspector usually does not know an audit is being performed. During 2019, DMV performed 741 covert audits and 2,067 video surveillance audits, which exceeds EPA's requirements.

Warnings are routinely issued for false passes if DMV finds that the CTI did not intentionally or negligently falsely pass a vehicle. Suspensions are usually associated with violations found from trigger reports and data audits. Most false passes are for minor procedural errors, such as failing to perform the visual MIL check correctly. Unless the station repeats these errors, they are issued warnings rather than being suspended.

As stated in the Applus contract, and in the Applus Station Agreement, a CTI is suspended (pending an investigation) when it is determined that the false pass was the result of “Intentionally improperly passing a failing vehicle.” Most errors identified by covert and video surveillance audits were determined to be unintentional and due to poor attention to detail. However, a second occurrence of an unintentional error, such as missing or incorrectly answering the MIL question, results in an automatic suspension.

4.6. Covert audit results

40 CFR 51.366 (b)(8): The total number of covert vehicles available for undercover audits over the year;
(b)(9): The number of covert auditors available for undercover audits.

40 CFR 51.366 (b)(2): The number of inspection stations and lanes operating throughout the year:
(iii) Receiving covert performance audits in the year;
(iv) Not receiving covert performance audits in the year;

40 CFR 51.366 (b)(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

Table 12 summarizes the results of covert performance. Table 13 presents the results of video audits. Video audits identify a lot more test discrepancies than covert audits.

Appendix B page (b)(3) contains a list of covert audits performed on each station.

TABLE 12 - (B)(2)(III, IV) & (3,8,9) QUALITY ASSURANCE – COVERT AUDITS – 2019

No. of Inspection stations operating throughout 2019 that received the following:	All Test Types (OBD, ASM, TSI)	OBD Tests	ASM Tests	TSI Tests	LMD	MSA
Receiving Covert Audits	741*	229	232	221	55	4
Not Receiving Covert Audits	1**	3**	2**	5**	0	0
Conducted with vehicle set to fail	681***	229	232	220	0	0
Conducted with vehicle set to fail any combination of two or more types	0	0	0	0	0	0
Resulting in a False Pass	83	79	0	4	0	0
Resulting in a False Pass for any combination of two or more test types	0	0	0	0	0	0
Total number of Covert vehicles available for undercover audits in 2019	8	3	2	2	1	0
Total number of Covert auditors available for undercover audits in 2019	4	0	0	0	0	0
Total # of Video Surveillance Audits	2,067	Not Available	Not Available	Not Available	Not Available	Not Available

*(74) of the recorded Covert visits did not result in generating a Pass/Fail test result for the vehicle presented.

** (1) Station entered the network in mid-December of 2019 or had left program and had not been covert audited.

*** (6) vehicles set to fail emissions test, they were used a total in 607 tests. (aborts and turn aways are not counted because no official test records were created.)

TABLE 13 - 2019 VIDEO SURVEILLANCE RESULTS

# of Video Audits	Passing audit	Failing Audit
2067	1792	292

4.7. Inspector and Station Disciplinary Actions

40 CFR 51.366 (b) (4): The number of inspectors and stations:
(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

40 CFR 51.366 (b) (2): The number of inspection stations and lanes operating throughout the year
(v) That have been shut down as a result of overt performance audits

Table 14 presents the number of suspensions that resulted from covert audits. “Other” reasons for station suspensions include:

- Failing to meet calibration requirements,
- Insurance/DMV license issues
- Failing to comply with compliance assessments (payment)
- Administrative issues such as failure to settle financial responsibilities, and unable to reach the responsible station representative

“Other” reasons for inspector suspensions include:

- Failing to comply with compliance assessments (payment)
- DMV request/Inspector investigation

Table 15 presents the number of suspensions that resulted from overt audits.

TABLE 14 - (B)(4)(i & ii) QUALITY ASSURANCE – COVERT AUDITS -- SUSPENSIONS

Parameter	Stations	Inspectors
Suspended as a result of covert audits	3	1
Suspended as a result of video audits	16	10
Suspended for other reasons	141	43

TABLE 15 - (B)(2) QUALITY ASSURANCE – OVERT AUDITS -- SUSPENSIONS

Parameter	Beginning of Year
Receiving overt performance audits in 2019	219
Not Receiving overt performance audits in 2019	1
That have been shut down as a result of overt performance audits	0

4.8. Hearings

40 CFR 51.366 (b) (6): The number of hearings:
(i) Held to consider adverse actions against inspectors and stations
(ii) Resulting in adverse actions against inspectors and stations

When necessary, Applus administers hearings to resolve disputes regarding actions against inspection stations. In 2019, no hearings were held due to revision of the Compliance Action Plan in 2017. The 2017 revision added language to help resolve disputes where there was no sufficient explanation or

substantive evidence, such as claims of “human error”, “can’t afford to pay”, “sorry”, “never do it again” and simply stating “I dispute this.” Monetary assessments are based on substantive evidence, which Applus provides with the inspector’s and test center’s letters. This has helped to reduce the frivolous disputes. All rejected disputes are advised that they may seek external binding arbitration, at her or his expense.

4.9. Fines collected

40 CFR 51.366 (b)(4)(iii): The number of inspectors and stations... that received fines;

40 CFR 51.366 (b)(7): The total amount collected in fines from inspectors and stations by type of violation

Table 16 presents a summary of compliance actions that were assessed against inspectors and stations in 2019.

TABLE 16 - (B)(4), (7) COMPLIANCE ACTION ASSESSED AGAINST TESTING INSPECTOR OR STATIONS IN 2019

Inspector Violations	Occurrences	Assessment Amount
Failure to enter correct test or repair data (wrong VIN entries or wrong vehicle tested)	30	\$3,750
Performing an improper inspection (wrong GVWR resulting in the wrong test, converter/RPM verification, dual exhaust, etc.)	127	\$15,875
Creating a false test record (four cases - all gas cap related)	6	\$3,000
Total	163	\$22,625
Station Violations	Occurrences	Assessment Amount
Failure to comply with DMV direction regarding Test Center Standards (Calibration issues, failed to calibrate, modifying expiration dates, parking signs, viewing monitor, etc.)	21	\$4,750
Creating a false test record (accompanying the four cases listed above)	6	\$3,000
Exceed wait time standard (identified via covert audit – failure to start inspection within program time allotment)	7	\$1,250
Improper refusal to perform an Inspection (identified via covert audit – requiring registration documents for inspection)	20	\$2,850
Failure to maintain service during mandatory operating hours (identified via covert audit)	2	\$250
Performing an improper inspection	0	\$0
Total	56	\$12,100

4.10. Inapplicable Requirements

The following requirements from 40 CFR 51.366 (b) regarding data analysis and reporting are not applicable to Connecticut’s I/M program:

- 40 CFR 51.366 (b)(3)(ii)
- 40 CFR 51.366 (b)(3)(iv)
- 40 CFR 51.366 (b)(4)(iii)
- 40 CFR 51.366 (b)(6)
- 40 CFR 51.366 (b)(7)

5. Quality Control Report

5.1. Equipment Audits

40 CFR 51.366 (c): 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.

Equipment Audits Performed by Connecticut DMV

EPA requires that equipment audits be performed twice per year per station. DMV meets these requirements through the QA Audits. 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 OBDII testing. Therefore, no stations were totally shut down due to a failed gas equipment audit. Results are presented in Table 17. In 2011, 67% of the stations failed equipment (gas) audits, while in 2019 this percentage dropped to 14%. The drop is likely due to the roll out of new, more reliable emission test benches in the new program. Appendix B, page “(c)(1,2,3,4)” contains results of equipment audits of each inspection station.

TABLE 17 – (C)(1,2,3,4) RESULTS OF EQUIPMENT AUDITS*

Parameter	2019 Result
No. of Inspection stations/lanes operating throughout 2019	220
Total Equipment Audits**	459
Total Stations that Failed Equipment Audit ***	64
Percentage of stations that failed an equipment (gas) audit	13.94%
Number of stations totally shut down as a result of a failed equipment (gas) audit	0
Percentage of stations shut down as a result of failed equipment (gas) audit	0.00%

* Every time an analyzer gas bench is changed, it is audited and is counted as an initial audit

** Initial gas audits only, not reinspections of failed audits

*** Failures of initial gas audits only

Final Technical Guidance (EPA 420-B-04-011, July 2004) provides that high-volume stations are required to be audited monthly. High volume stations are those that perform 4,000 or more emissions tests per year. The Connecticut Vehicle Inspection Program, by Federal guidance, does not have any emissions testing stations that perform the number of emissions tests necessary to be classified as high volume.

Equipment Audits Performed by Applus

DMV’s contractor, Applus, performs comprehensive overt and equipment audits biennially, at each facility that participates in the inspection program. These unannounced audits include:

- The visual inspection and physical condition of the testing equipment;
- Equipment integrity checks using traceable/certified audit equipment; and

- Observation of the proficiency of at least one inspector.

The contractor's auditor evaluates the physical condition, functionality, and inventory of all the required emissions components and any ancillary safety items (restraining straps, wheel chocks, dynamometer tie down hooks, etc.). The emissions analyzer must pass calibrations (leak check, gas bench, dynamometer, gas cap, OBDII, and opacity, if equipped).

In addition, there are several system components that are audited using National Institute of Standards and Technology (NIST) certified and traceable audit equipment:

- Gas Bench(s) Audit – NIST traceable audit gas
- Weather Station Audit - Certified temperature/humidity/pressure probes
- Opacity Audit - Reference filters (20%, 35%, 50%, and 75%)
- OBDII System Audit – EASE OBDII Verification Tester

In accordance with the Quality Assurance and Quality Control Plan, the contractor's auditor uses a pre-printed checklist to inventory and record the physical condition of the test equipment. All non-conforming items are addressed immediately; the auditor's van is equipped to replace missing station inventory at the time of the audit. If an issue is identified that cannot be addressed by the auditor, he or she will create a service ticket for Applus field service.

6. Enforcement Report

6.1. Overview of I/M Enforcement in Connecticut

The Connecticut Integrated Vehicle and Licensing System (CIVLS), which has been in use since August 2015, checks for emissions compliance during every registration renewal transaction. This means that if the renewal is attempted by mail, website, or in person, the transaction cannot go forward unless the vehicle is in compliance with the emissions program. Compliance is confirmed during every renewal transaction via a real time data transfer from DMV CIVLS to the Applus Electronic Database system (EDBMS). Details of web, mail-in, and over the counter actions are presented below:

Mail in renewals: When a mail-in renewal is denied because of an emissions compliance issue, the registration fees are put into an escrow account. The motorist is mailed a letter stating that the payment has been received, but the transaction cannot be processed until the vehicle is emissions compliant. Once the vehicle has an emissions test and is in compliance, the funds are automatically taken out of escrow and the registration is renewed.

Web renewals: If the vehicle is not in compliance when a renewal is attempted online, the transaction is stopped and the motorist receives a screen message stating the vehicle is not emissions compliant.

In-Person renewals: Renewals are not allowed if, during the automatic compliance check, the status of the vehicle is that it is "not in emissions compliance." Registration renewal is rejected and the customer is instructed to return after the vehicle is in compliance.

Before implementation of CIVLS the DMV examiner physically reviewed electronic records or paperwork provided by the motorist to confirm compliance.

6.2. Vehicles subject to inspection

40 CFR 51.366(d)(1)(i): An estimate of the number of vehicles subject to the inspection program, including the results of an analysis of the registration data base

Based on an analysis by DMV on the registration database, 1,262,868 vehicles were subject to I/M tests in 2019. This number includes vehicles that may no longer be operating in Connecticut.

6.3. Overall compliance with testing requirements

40 CFR 51.366 (d)(1)(ii): The percentage of motorist compliance based upon a comparison of the number of valid final tests with the number of subject vehicles

Percent of Vehicles Receiving Notifications That Were Tested

Table 18 presents the number of vehicles that received test notifications and the number of vehicles that were tested. Overall, 89% of the vehicles that received notifications were tested in 2019. This means that 11% of the vehicles subject to testing are no longer registered in Connecticut or are operating with expired registrations, since a vehicle must pass inspection (or receive a waiver) before it can be registered in the state. This parameter (89%) is different than the program compliance rate which is based on outcomes of vehicles that have been tested.

TABLE 18 - (D)(1)(II) ESTIMATED % OF VEHICLES SUBJECT TO I/M THAT WERE TESTED

Parameter	2019 Value
# of Notification Letters	1,262,868
# of Vehicles Tested	1,124,412
% of Notifications that were tested	89%

Percent of Failed Vehicles That Ultimately Pass

To estimate whether vehicles that failed their emissions test ultimately pass, this report analyzed the outcome of vehicles that failed their I/M test in 2019. As Connecticut has done in previous reports per EPA recommendations, these results are calculated as the percentage of vehicles that initially failed and do not receive a final pass. Subject vehicles, which failed the I/M test in January 2019, were tracked through December 31, 2019 to determine their final outcome. 30% of the failures during this period had not yet received a passing result or waiver. Results are shown in Table 19. Table 7 which was presented in Section 3 indicates that the number of vehicles that do not pass after initially failing equals 23% of the number that initially fail. Table 7 more accurately reflects the “no final pass” rate, since it does not have a time constraint.

TABLE 19 - VEHICLES TESTED JANUARY 2019 WITH NO FINAL PASSING RESULT

Model Year	Initial Fail	Final Retest Pass	% No Final Pass
1995	55	40	27%
1996	85	53	38%
1997	159	99	38%
1998	194	122	37%
1999	267	170	36%
2000	273	161	41%
2001	418	236	44%
2002	567	337	41%
2003	611	409	33%
2004	625	413	34%
2005	677	488	28%
2006	579	394	32%
2007	535	368	31%
2008	445	323	27%
2009	306	243	21%
2010	273	191	30%
2011	335	275	18%
2012	232	184	21%
2013	310	272	12%
2014	144	117	19%
2015	390	371	5%
Grand Total	7,480	5,266	30%

Waivers Issued

Another aspect related to enforcement is the number of waivers issued. Program effectiveness is inversely proportional to the waiver rate. As Table 6 in Section 3 showed, only 0.16% of the vehicles that failed received waivers, indicating that the waiver program is not being abused. Connecticut’s I/M SIP committed to a waiver rate of 1% or less.

6.4. Registration File Audits and Compliance with Deadlines

40 CFR 51.366 (d)(2)(ii): The number of registration file audits, number of registrations reviewed, and compliance rates found in such audits.

Connecticut’s SIP commits the State to achieve a 96% compliance rate for the vehicles subject to I/M requirements. Registration audits indicate that over 99% of the vehicles being registered comply with I/M requirements.

Registration Audits

Connecticut audits each registration for I/M compliance. Table 20 presents the number of registration applications that were mailed to DMV that were denied for failure to meet the requirement of the I/M

program. In 2019, 556,148 renewal applications were sent to DMV and 8,562 were denied due to I/M compliance status. The result is a 98.46% compliance rate for vehicles that are being registered. These compliance rates are similar to those reported in previous years' reports. Ultimately, 100% of the vehicles registered comply with I/M requirements.

TABLE 20 - (D)(2)(II) REGISTRATION AUDITS -- 2019

Registrations Checked	Denied Registration Renewal Count	Percent of Mail In Registrations that Comply
556,148	8,562	98.46%

6.5. Motorist Time extensions

40 CFR 51.366 (d)(1)(v): The number of time extensions and other exemptions granted to motorists

Table 21 presents the number of time extensions and late fee assessments in 2019. Table 22 presents a breakdown of tests relative to testing deadlines.

TABLE 21 - (D)(1)(V) TIME EXTENSIONS AND LATE FEES

Parameter	Annual Total
Time Extension and Other Exemptions	2,595
# of Late Fees Assessed	272,846
Late Fees (\$)	\$5,456,920

TABLE 22 - (D)(3)(I). # AND % OF SUBJECT VEHICLES THAT WERE TESTED BY THE INITIAL DEADLINE*

Deadline	# of Vehicles	% of Vehicles
On Due date	29,669	3.23%
Tested Early	576,034	62.68%
1-30 days late	95,834	10.43%
31-60 days late	59,217	6.44%
61-90 days late	22,963	2.50%
91-120 days late	13,074	1.42%
> 120 days late	122,217	13.30%

* Figures based on 'Noticed' vehicles/tested volume of 919,008

6.6. Station Compliance Documents

40 CFR 51.366 (d) (1) (iii): The total number of compliance documents issued to inspection stations
(iv) The number of missing compliance documents

The Compliance Action Plan (CAP) was updated and issued to all active inspection stations in 2018.

6.7. False registrations

40 CFR 51.366 (d)(2) Registration denial based enforcement programs shall provide the following additional information:

(i): Registration denial based enforcement programs shall provide 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

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

Preventing Circumvention of Connecticut's, I/M Requirement

EPA requires states to implement measures that 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. As shown below, it's very difficult for vehicle owners to circumvent Connecticut's I/M requirements.

- **Circumventing I/M Tests in Connecticut** – Circumventing I/M tests in Connecticut is nearly impossible. First, Connecticut implements the I/M program on a statewide basis. Second, Connecticut tests all fuel types, including hybrids, so motorists cannot avoid inspection by changing fuel type, unless the fuel type of the vehicle is inadvertently categorized as “electric”. It may also be possible to avoid inspection by registering the vehicle with a GVWR greater than 10,000 lbs. 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 registration 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** – Historically, 99% of the vehicles subject to emissions testing in Connecticut are in the Passenger, Commercial or Combination classifications. Incidents of motorists falsely modifying a vehicle's registration classification to an emissions exempt class are rare, most likely because of the added expense, documentation and inspection requirements.
- **Vehicles registered in Connecticut that are operated out-of-state** – DMV does not allow blanket extensions for vehicles registered in Connecticut that are operated out-of-state. Vehicles that are out-of-state at the time they are due for their emissions testing are allowed to apply for an extension. Applicants need to provide evidence that the vehicle is physically not present in Connecticut. This is done by means of a VIN verification form (CT form #AE-81) being completed by a law enforcement authority in the state where the vehicle is physically located. This completed VIN verification form along with a written request by the motorist is submitted to our office for processing for the appropriate time extension. Additionally, DMV accepts passing emission test results from states that operate an I/M program using the same pass/fail criteria.

As noted above in Section 6.3, Connecticut reviews every registration application for evidence that the motorist complies with inspection requirements. In 2019, 556,148 renewal applications were sent to DMV and 8,562 were denied due to I/M compliance status. This means that 98.46% of the registration

requests were in compliance with I/M requirements when mail renewals were processed. These compliance rates are similar to those reported in previous year's reports.

6.8. Inapplicable Requirements

The following requirements from 40 CFR 51.366 (d) regarding enforcement reports are not applicable to Connecticut's I/M program:

- 40 CFR 51.366 (d)(1)(vi)
- 40 CFR 51.366 (d)(3)
- 40 CFR 51.366 (d)(4)

7. Biennial Reporting Requirements / Program Changes in 2018-2019

40 CFR 51.366 (e): 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.

7.1. Program Improvements in 2018

The following improvements were implemented in 2018:

Improvements to Scheduling of DMV Audits and Vendor Audits and Maintenance.

- Ensures all stations receive the same number of each type of station visit throughout the year.
- The schedule system requires Overt, Q/A, vendor and covert audits to be performed in different months. This allows one type of audit to be performed every 30 days for more consistent yearly oversight of each test station.
- The new audit plan includes a template designed for ease of tracking activity and improved reporting methods for the annual report.

Reduced the Number of Audit Forms and Implemented Scanning of Documents

- Rewrote and streamlined audit procedures reducing the number of pages of paper required to perform each audit reducing the amount of time it takes to perform an audit.
- Scan waiver and time extension documents and save them electronically instead filing and storing paper copies.
- Estimated savings of over 10,000 pages of paper/year.

OBDII Simulator - Prevention/Tracking

- Emissions testing analyzer software was modified to address situations when an OBD simulator is detected.
- The prompt that warned the inspector previously was removed.
- If detected, the test completes normally; however, the result of the test is a fail regardless of simulator settings.
- The Vehicle Inspection Report message indicates:
“Incorrect OBD Parameters. Contact the Department of Motor Vehicles (DMV) at (860) 263-5333.”
- When contacted, DMV meets the customer, inspects the vehicle and observes a free re-inspection of the vehicle.

OBDII Simulator – Emissions Data Base Management System Processing

- To prevent additional attempts at other Test Centers, a new web service looks for the “OBD Simulator Detected” alert. This process is done immediately after the test record is uploaded to the EDBMS Vehicle Information Data Base.
- If found, the database process blocks the vehicle VIN from further testing.
- If a test VIN is attempted at another location, the test is aborted, and the motorist is provided a document that indicates:
“This vehicle has been identified by the Department of Motor Vehicles (DMV) as requiring special handling. This vehicle may require a supervised emissions test or inspection by DMV. Please advise the motorist to contact DMV at (860)263-5611 or (860)263-5333 for further details.”
- An automated email is triggered with the specific vehicle information and sent to the appropriate DMV and Applus groups.
- The hold on the VIN can only be released by the DMV.

Blocking/Tracking – EDBMS (VID) Function

- DMV was provided access on the EDBMS (VID) to block specific vehicles from emissions testing, regardless of test type. These vehicles may require an inspection by DMV or supervised testing. The same message listed above is provided on a document for the motorist.
- DMV now has the ability to track specific vehicles by VIN; an automated email is triggered and sent to the appropriate DMV/Aplus group.

OBDII VIN Mismatch Prompt Logic

- The error prompt provided by the analyzer for inspector confirmation regarding OBD VIN mismatches was enhanced.
- The prompt no longer provides the entered or scanned VIN on the screen.
- When a VIN mismatch occurs, the inspector is now required to manually enter the last six (6) digits of the public VIN on the vehicle. If the last six (6) numbers entered by the inspector do not match the VIN entered or scanned initially, the test is aborted.

- This was put in place to deter errors with manual entry and mistakenly scanning the VIN from an incorrect document.

Gas Bench Lockout

A lockout that prevents stations from calibrating or performing ASM/TSI testing after gas bench audit failure was put in place.

Adjacent Cities Printed on List of Certified Emissions Repair Facilities

The EDBMS (VID) and analyzer software were modified to allow for names, addresses, and phone numbers of certified emissions repair facilities located in cities and towns adjacent to the town to where the emissions test is performed to automatically print every time an emissions test result is Fail. This was done to provide motorists in rural areas with additional Certified Emissions Repair Facility options/locations.

OBD Clearinghouse Website

The analyzer software was modified to allow Test Center access to the new updated OBD clearinghouse website for recall information.

Stant Fuel Cap Guide

The latest lookup guide was incorporated in the analyzer software.

Program Website

Emission Testing Time Extensions web page was overhauled and updated with the most current information. In addition, a new PDF document with active links replaced the previous table. The PDF document allows for easier updating.

7.2. Program Improvements in 2019

The following improvements were implemented in 2019:

Quality Assurance (Q/A) Equipment Audit

The following Q/A equipment auditing improvements decreased the amount of time it takes to perform each equipment audit and reduced the amount of pages printed and stored per audit:

- Prior to each OBDII emissions test, the Connecticut Decentralized Analyzer System (CDAS) requires the test inspector to plug the analyzer OBDII cable into a Diagnostic Link Connector (DLC) port on the analyzer. The analyzer then performs an OBDII automated self-check. The self-check confirms that the OBDII device and cabling are in proper working condition. If the self-check fails, the OBDII test automatically aborts and the analyzer is locked out from further OBDII testing until repairs are made.
- In addition to the audits and self-checks, every 72 hrs. stations must perform the OBDII port self-check regardless of how many OBDII tests are performed.
- In keeping with the high auditing standards that Connecticut requires, DMV auditors use their state audit vehicle as a test vehicle to perform a training test to verify the system is operating correctly and consistently throughout the network.

Analyzer software improvements

- Added the following VIN Validation to help reduce VIN entry errors:
 - The lane software now disallows 17-digit VIN, which contains the letters “I,” “O” or “Q.”
 - The lane software requires additional verification for VINs entered with less than 17-digits, the inspector must confirm it’s a State assigned VIN.
- To discourage inspectors from looking for the catalytic converter off-camera, or not at all, two acknowledgment statements were added during the verification process.
- To help reduce inspector confusion, the gas cap testing screens were consolidated from up to four screens to two with improved language.
- The suggested gas cap color adapters were updated for all testable vehicles (TSI/ASM).
- The process that looks for the gas cap removal was moved from the end of the overall test to the end of each gas cap test.

Training Update

- The Compliance Action Plan was integrated into a dedicated chapter in the Inspector Training/Operations Manual now called Program Sanctions.
- The stand-alone VIN Verification process was also integrated into a dedicated chapter in the Inspector Training/Operations Manual and highlights were added to the DMV presentation.

Policy Change

- Retests for failed gas caps on vehicles with two gas tanks. Inspectors are now required to test both gas caps to avoid the confusion of which one failed or to address motorists who may swap gas caps between the two gas tanks.

There were ancillary updates to the dashboard and program website, including the anti-tampering language added to the Program website.

7.3. Comparative Statistics: 2018 vs 2019

Table 23 presents a summary of program statistics in 2018 and 2019. The number of vehicles inspected, failure rates, and waiver rates were similar in both years. The primary difference between 2018 and 2019 are in the results of covert audits. In 2019, in response to EPA’s comments on the 2017 report, more vehicles were set to fail for covert audits (681 vehicles vs. 47 vehicles). This resulted in about twice as many inspection stations and inspectors receiving enforcement actions in 2019.

TABLE 23 – SUMMARY STATISTICS FOR CONNECTICUT I/M PROGRAM BETWEEN 2018 AND 2019

Area	Parameter	2018	2019	
Vehicle Inspections	Number of vehicles subject to I/M	1.3 million	1.3 million	
	Number of vehicles receiving emissions test	1,107,216	1,124,412	
	<u>Percentage of Emissions Test Types Administered:</u>			
	• OBD emissions test	95.2%	95.6%	
	• PTC SI	2.9%	3.0%	
	• ASM	1.0%	0.5%	
	• MSA	0.1%	0.1%	
	• LMD	0.8%	0.8%	
	<u>For Non-Diesel Vehicles</u>			
	• Initial OBD emissions tests	969,900	989,859	
	• Failed initial OBD emissions tests	90,406	91,540	
	• Initial PTC SI emissions tests	29,862	30,957	
	• Failed initial PTC SI emissions tests	2,014	2,032	
	• Initial ASM emissions tests	10,034	5,183	
	• Failed initial ASM emissions tests	1,160	709	
	<u>For Diesel Vehicles</u>			
	• Initial OBD emissions tests	4,305	5,415	
	• Failed initial OBD emissions tests	642	770	
	• Initial MSA tests	1,271	1,282	
	• Failed initial MSA tests	41	50	
• Initial LMD tests	8,107	8,146		
• Failed initial LMD tests	135	147		

Area	Parameter	2018	2019
	Number of Waivers	113	148
	Number of Economic Hardship Extensions	0	0
	Number of Vehicles with No Known Outcome	21,924	22,375
Stations and Inspectors	<u>Inspection Stations</u>		
	<ul style="list-style-type: none"> Number of stations inspecting vehicles 	221	220
	<ul style="list-style-type: none"> Number of overt audits of inspection stations 	1,194	852
	<ul style="list-style-type: none"> Number of enforcement actions against stations 	75	141
	<u>Inspectors</u>		
	<ul style="list-style-type: none"> Number of licensed inspectors performing at least one test during the year 	1,038	1,012
	<ul style="list-style-type: none"> Number of enforcement actions against inspectors 	21	43
	Total Value of Penalties Imposed against Stations and Inspectors	\$31,750	\$34,725
	<u>Covert audits</u>		
	<ul style="list-style-type: none"> Number of covert audits 	691 (47 set to fail)	741 (681 set to fail)
<ul style="list-style-type: none"> Number of false positive (failing) covert audits 	6	83	
Equipment	<u>Equipment Audits</u>		
	<ul style="list-style-type: none"> Number of equipment audits 	444	459
	<ul style="list-style-type: none"> Number of failed equipment audits 	75	64

8. EPA Comments

The following addresses EPA's comments in a letter dated May 31, 2019 on Connecticut's 2016-2017 Biennial I/M Program Evaluation Report:

- 1) EPA encourages states to improve I/M program performance by reducing the number of vehicles with no known final outcome. On Table (a)(2)(vi) of the 2016-2017 biennial report's Appendix B, Connecticut illustrates that over 21% of initially failed vehicles have no known final outcome. EPA continues to be concerned with I/M programs where the percentage of initially failed vehicles with no known final outcome exceeds the national average. Historically, the national average of initially failed vehicles with no known final outcome was about 12%. However, as EPA continues its analysis of I/M programs nationwide, it is likely that the national average is about 18%.

EPA recommends that states with I/M programs consider developing a Vehicle Identification Number (VIN)-based database for vehicles that fail an I/M test and do not receive a final pass. This data may possibly already be collected and would just need to be filtered from the inspection database when the time comes. We suggest Connecticut explore sharing this data with other states. Potential reciprocity agreements allowing the sharing of such data among states may further reduce the number of vehicles with no known outcome.
 - a. **Response:** Connecticut lacks the resources to identify vehicles that are registered out-of-state due to emissions non-compliance. Connecticut looks forward to EPA's leadership in developing partnerships with other jurisdictions to improve the program by addressing regional I/M non-compliance.
- 2) EPA recognizes the improvements made to Connecticut's I/M program with the adoption of the Connecticut Integrated Vehicle and Licensing System (CIVLS). EPA commends Connecticut on addressing the functional issues exhibited by the initial implementation of CIVLS in order to appropriately meet the registration denial/suspension requirements at 40 CFR 51.361 of the federal I/M rule.
 - a. **Response:** Connecticut appreciates EPA's acknowledgement of its efforts to improve the enforcement of its I/M program.
- 3) The covert audit requirements of the federal I/M rule (40 CFR 51.363), call for covert audits consisting of remote visual inspections of at least once per year per inspector for high-volume stations and at least one covert audit utilizing a covert vehicle for each test and repair station. To satisfy this requirement Connecticut relies mostly on video surveillance audits and meets part of the requirement by testing each station at least once. Connecticut should also incorporate conducting covert audits utilizing covert vehicles at least once per each "test and repair" station. Appendix B to the biennial report lists that four (4) covert vehicles were available for undercover audits, yet no covert audits were conducted with vehicle set to fail. In addition, since an OBD test is the appropriate inspection test, for a majority of the Connecticut motor vehicle fleet subject to I/M, Connecticut should focus on also incorporating OBD tests as part of the covert audit practices by utilizing vehicles "set to fail" an OBD test.
 - a. **Response:** In response to EPA's comment on OBD tests, Connecticut reduced audits of ASM and TSI tests and performed more covert OBD tests using vehicles set to fail.

Connecticut conducted 741 covert audits in 2019, which equates to more than two per year per station. In 681 of the covert audits, the vehicle was set to fail.

The following addresses EPA’s comments in a letter dated May 11, 2020 on Connecticut’s 2018 Annual I/M Program Evaluation Report:

- 4) In the Annual Report page 10, Figure 1 displays the number of initial tests by vehicle type and model year. The number of initial tests fluctuates with a high number of vehicles tested that are even model years and a low number of vehicles tested that are odd model years.

For example, as illustrated in Table 1 of page 8 of the annual report:

Number of Vehicles Tested by Model Year and Vehicle Type:

Model Year	Total Vehicles (Cars and Trucks)
...2014	146,896
2013	35,261
2012	126,226
2011	49,128
2010	90,540
2009	37,750
2008	96,940
2007	55,530
2006	88,853
2005...	53,358

What causes this fluctuation where so many more even-model-year vehicles are tested than odd-model-year vehicles?

- a. **Response:** When Connecticut implemented its biennial I/M program, even model year vehicles initially were tested in even years; odd model year vehicles initially were tested in odd years. Consequently, more even model year vehicles were tested in 2018. Note, the opposite occurred in 2019, as expected.
- 5) EPA encourages states to improve I/M program performance by reducing the number of vehicles with no known final outcome. On page 14 of the annual report, Connecticut illustrates that over 23% of initially failed vehicles have no known final outcome.

EPA continues to be concerned with I/M programs where the percentage of initially failed vehicles with no known final outcome exceeds the national average. Historically, the national average of initially failed vehicles with no known final outcome was about 12%. However, in more recent years, as EPA continues its analysis of I/M programs nationwide, a more appropriate national average is about 18%.

EPA recommends that states with I/M programs consider developing a Vehicle Identification Number (VIN)-based database for vehicles that fail an I/M test and do not receive a final pass. This data may possibly already be collected and would just need to be filtered from the inspection database when the time comes. We suggest

Connecticut explore sharing this data with other states. Potential reciprocity agreements allowing the sharing of such data among states may further reduce the number of vehicles with no known outcome.

- a. **Response:** Same as response to EPA comment #1.

9. Conclusions

Following are the key conclusions from this annual review of Connecticut's I/M program:

- Connecticut's I/M program correctly fails non-complying vehicles and strictly enforces I/M requirements:
 - Approximately 9.2% of vehicles failed their initial emissions test and 10% of these vehicles also failed their first retest in 2019. This is similar to failure rates in 2018.
 - DMV and Applus perform extensive quality assurance checks on the program. Evaluation of these quality assurance data demonstrates that the program performs accurate inspections.
 - Connecticut's anti-fraud efforts are models for other I/M programs. Connecticut conducted audits at all stations as part of an extensive anti-fraud program. For example, Connecticut conducted 2,067 video surveillance audits and 741 covert audits during 2019. Covert audits addressed On-Board Diagnostics (OBDII), Acceleration Simulation Mode (ASM) and Pre-Conditioned Two Speed Idle (PCTSI) inspection performance. In addition, DMV and Applus run extensive trigger reports.
- As noted in Section 7, Connecticut implemented numerous improvements to its I/M program in 2018 and 2019. DMV and Applus continue to look for ways to further improve the program.