

MEMORANDUM

FROM: Joint State Government Commission (JSGC)
TO: Senator Wayne Langerholc, Jr.; Senator Elder Vogel, Jr.
DATE: January 18, 2019
CC: Glenn Pasewicz; Yvonne Hursh
RE: **Supplemental Information to SR168 (2017) Auto Emissions Report**

Senate Resolution 168 of 2017 (Printer's No. 1260) (SR168) was adopted October 24, 2017, directing the Joint State Government Commission appoint an advisory committee and to conduct "a thorough and comprehensive analysis of issues relating to the potential impact to the Commonwealth of removing each participating county of the third, fourth and fifth class, individually and collectively, from the [motor vehicle] emissions testing program;" and the impact on environmental credits and related financial aspects of the program. This report is due one year from the adoption of the resolution, or October 24, 2018.

The Commission appointed an advisory committee which included representatives of the Department of Transportation, the Department of Environmental Protection and others who possess knowledge of the vehicle emission inspection program and the federally-mandated State Implementation Plan (SIP) that implements the Federal Clean Air Act (CAA) in Pennsylvania. These persons included representatives of consumers, environmental advocates and inspection stations. The overwhelming consensus of the advisory committee was that revisions to the SIP suggested by SR168 that would remove certain counties from the vehicle emissions testing program are not authorized under the CAA. The driving factor in this conclusion is the fact that Congress included Pennsylvania in the Northeast Ozone Transport Region (OTR) under the CAA,¹ and the CAA imposes expanded geographical coverage for vehicle inspection and maintenance programs in OTR states. Additionally, a majority of the advisory committee was also of the opinion that removing any counties from the SIP was inadvisable for adverse public health and environmental reasons.

SR168 further directed that the final report for this study "include recommendations to make up for the loss of environmental credits associated with the approved SIP, the cost in actual dollars, historically and projected, to each of the respective departments, and any other potential financial aspects to the Commonwealth." Because the Advisory Committee determined that no counties should be removed, no potential environmental or other financial impacts were discussed in the report.

In short, the final report did not address two of the directives of the resolution, to wit:

RESOLVED, That the Joint State Government Commission, working with the advisory committee, conduct a thorough and comprehensive analysis of issues

¹ 42 U.S.C. § 7511a.

relating to the potential impact to the Commonwealth of removing each participating county of the third, fourth and fifth class, individually and collectively, from the emissions testing program; and be it further

RESOLVED, That the final report include recommendations to make up for the loss of environmental credits associated with the approved SIP, the cost in actual dollars, historically and projected, to each of the respective departments, and any other potential financial aspect to the Commonwealth; . . .

This memorandum, prepared by Joint State Government Commission staff, addresses these two aspects of SR168. The counties that are the subject of this report are identified in Table 1, below.

Table 1
Enhanced Inspection/Maintenance Program
Participating Third, Fourth and Fifth Class Counties

Region	County	Class
<i>Philadelphia</i>	Chester	Third
<i>Pittsburgh</i>	Beaver	Fourth
	Washington	Fourth
	Westmoreland	Third
<i>Northern</i>	Blair	Fifth
	Cambria	Fourth
	Centre	Fourth
	Erie	Third
	Lackawanna	Third
	Luzerne	Fifth
	Lycoming	Fifth
<i>South Central</i>	Mercer	Fifth
	Berks	Third
	Cumberland	Third
	Dauphin	Third
	Lancaster	Third
	Lebanon	Fifth
	Lehigh	Third
	Northampton	Third
York	Third	

Source: Compiled by JSGC staff.

Removal of Counties from the Enhanced Inspection/Maintenance Program

Removal of any state or part of a state from the OTR is a lengthy process that has not occurred historically, although the State of Maine began the process in 2018. However, removal of those counties from the enhanced I/M program may not require removal of the counties from the OTR. For reasons discussed later in this report, removal of some or all of the subject counties from the I/M program may be more readily justified and be more easily accomplished than removal from the OTR because leaving the I/M program would have a smaller impact on overall environmental conditions in the counties.

Inspection and maintenance programs are a type of pollution control measure authorized by the CAA.² The I/M regulations provide a method by which counties may be removed from the I/M program while remaining in the OTR:

(c) Requirements after attainment. All I/M programs shall provide that the programs shall provide that the program will remain effective, even if the area is redesignated to attainment status or the standard is otherwise rendered no longer applicable, *until the State submits and EPA approves a SIP revision which convincingly demonstrates that the area can maintain the relevant standard(s) without benefit of the emissions reductions attributable to the I/M Program* (emphasis added).³

In other words, a state can initiate removing an area from the I/M program by submitting a revised SIP to the EPA.

Section 110(l) of the CAA also provides that any SIP revisions demonstrate that the revision will not interfere with any attainment requirements or reasonable further progress⁴ toward attainment. In short, any effort to remove counties from the I/M Program must affirmatively demonstrate that the removal will not interfere with the area's ability to meet and maintain attainment standards.

Commensurate Emission Reductions

To the extent removal of certain counties from the I/M program would interfere with the area's ability to meet attainment standards, commensurate emission reductions may have to be demonstrated as part of the SIP revision application. States account for the impact of their I/M programs by modelling emissions reductions with software known as MOVES2014b. MOVES is the acronym for "Motor Vehicle Emissions Simulator." The software is downloadable from the EPA website.⁵ While theoretically any person could use the simulator to determine the impact of

² Sections 110 and 172; 42 U.S.C. §§ 7410 and 7502.

³ 40 C.F.R. § 51.350(c).

⁴ 42 U.S.C. § 6501(1). The term "reasonable further progress" means such annual incremental reductions in emissions of the relevant air pollutant as are required by this part or may reasonably be required by the Administrator for the purpose of ensuring attainment of the applicable national ambient air quality standard . . .

⁵ <https://www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves#download>.

removing counties from the I/M Program, it requires an experienced, trained individual. The User Guide introduction demonstrates the need for an individual with experience running the model and up-to-date access to local data, both within the purview of DEP.

In the modeling process, the user specifies vehicle types, time periods, geographical areas, pollutants, vehicle operating characteristics, and road types to be modeled. The model then performs a series of calculations, which have been carefully developed to accurately reflect vehicle operating processes, such as running, starts, or hoteling, and provide estimates of total emissions or emission rates per vehicle or unit of activity. Specifying the characteristics of the particular scenario to be modeled is done by creating a Run Specification, or RunSpec.

In addition, the MOVES model includes a default database that summarizes emission relevant information for the entire United States. The MOVES team continually works to improve this database, but, for many uses, up-to-date local inputs will be more appropriate, especially for analyses supporting State Implementation Plans (SIPs) and conformity determinations.⁶

DEP is the Commonwealth department with the authority to submit a SIP revision, and would need to run simulations to show the precise impact of removing select counties on the overall emissions levels in those counties as part of the non-interference demonstration SIP. As the section titled “Factors Affecting Maintenance of Attainment Standards,” *infra*, indicates, the removal of some counties from the I/M Program could have a negligible impact on a county’s overall ability to maintain relevant emissions standards, and therefore, commensurate emission reductions from sources not monitored by the I/M program may not be necessary. MOVES2014b modelling could support that contention.

It should be noted that neither environmental credits nor motor vehicle emissions budgets (MVEB) apply to the I/M Program.

Environmental Credits

The states in the Ozone Transport Region (OTR) are required to participate in the OTR by federal law and receive no incentives or “environmental credits” for being a part of the OTR.⁷ Between 1999 and 2002, the EPA’s Ozone Transport Commission Nitrogen Oxide Budget Program applied to more than 1,000 large combustion sources (electric generating stations and other industrial units) in signatory states under a 1994 memorandum-of-understanding which

⁶ EPA MOVES2014a User Guide, EPA-420-B-15-095 (November 2015). <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100NNCY.pdf>, p 1-2. Note: the 2014a guide is also applicable to the 2014b versions of the simulator. <https://www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves>

⁷ 42 U.S.C. § 7511c(b).

created a market-based emissions trading program to reduce and cap regional NOx emissions. The NOx Budget Program did not apply to vehicles.⁸

The OTC's Budget Program was superseded in 2003 by the similar but geographically broader interstate trading program known as the Nitrogen Oxide Budget Trading Program (NBTP). Like the OTC budget program, it applied to large stationary sources, and not to vehicles. In 2008 this program was discontinued and replaced with a series of three similar interstate emission allowance trading programs. The first program was implemented under the Clean Air Interstate rule and operated from 2009 to 2014. The second program implemented under the Cross-State Air Pollution Rule (CSAPR) began operating in 2015, and the third trading program began operating under the CSAPR Update in 2017. These three programs apply to electric generating units, or EGUs, and large non-EGU boilers and turbines. They do not apply to vehicles.⁹

Motor Vehicle Emissions Budget (MVEB)

Air quality control regions are separate from the I/M Program regional designations. The CAA created 275 air quality control regions (AQCRs) nationwide.¹⁰ Pennsylvania is divided into 6 AQCRs, some of which include portions of other states.¹¹ Air quality control regions have “the primary responsibility for assuring air quality within the entire geographic area comprising such State by submitting an implementation plan for such State which will specify the manner in which national primary and secondary ambient air quality standards will be achieved and maintained within each air quality control region in such State.”¹² The MVEB is the portion of the total allowable emissions for any criteria pollutant or its precursor allocated to highway and transit vehicle use and emissions.¹³ Air quality planning for the AQCR encompasses air pollution from all sources (mobile and stationary, point and non-point) whereas the I/M Program only monitors some motor vehicle emissions (light-duty gasoline powered on-road vehicles). While the Philadelphia and Pittsburgh Emissions Regions are also contained in their respective area AQCRs, the remaining counties in the I/M Regions are divided among the four remaining AQCRs, so there is little overlap of programs in that area.

The MVEB relates to methods to reduce or control pollutants in transportation¹⁴ and is unrelated to the emissions inspection requirement under the OTR.¹⁵ According to the EPA,

⁸ United States Environmental Protection Agency. Ozone Transport Commission. “NOx Budget Program 1999-2002 Progress Report.” https://19january2017snapshot.epa.gov/airmarkets/ozone-transport-commission-nox-budget-program_.html.

⁹ Emissions Monitoring Provisions in State Implementation Plans Required Under the NOx SIP Call, 83 FR 48751 (September 27, 2018). Proposed Rule.

¹⁰ 42 U.S.C. §7407(b); 40 CFR part 81, subpart B.

¹¹ The AQCRs are: Metropolitan Philadelphia Interstate Air Quality Control Region, 40 CFR §81.15; Southwest Pennsylvania Intrastate Air Quality Control Region, 40 CFR § 81.23; Northeast Pennsylvania-Upper Delaware Valley Interstate Air Quality Control Region, 40 CFR § 81.55; Northwest Pennsylvania-Youngstown Interstate Air Quality Control Region, 40 CFR §81.74; Central Pennsylvania Intrastate Air Quality Control Region, 40 CFR § 81.104; and South Central Pennsylvania Intrastate Air Quality Control Region, 40 C.F.R. § 81.105.

¹² 42 U.S.C. § 7407(a).

¹³ 40 C.F.R. §93.100 et seq.

¹⁴ 42 U.S.C. § 7408(f).

¹⁵ See 40 C.F.R. § 93.118.

State and local air quality and transportation agencies estimate on-road vehicle emissions for a variety of different regulatory purposes. Inventories are required for reasonable further progress, attainment, and maintenance SIPs. These inventories may serve as the basis for the SIP motor vehicle emissions budgets, which are used in regional conformity analyses. Emission estimates are also created specifically for air quality modeling for attainment demonstrations. On-road emissions are calculated as part of the regional conformity analysis for transportation plan and transportation improvement program (TIP) conformity determinations as well as the regional emissions analysis associated with [transit/transportation] projects in isolated rural areas.”¹⁶

Factors Affecting Maintenance of Attainment Standards

Certain demographic changes and pollution control achievements in the subject counties may be sufficient to justify removal from the I/M Program with minimal impact on any county’s ability to maintain current emission standards.

Attainment Status

The CAA identifies six principal pollutants, referred to as “criteria pollutants,” that act as ambient air quality indicators. Acceptable concentrations of these criteria pollutants are set forth in the NAAQS. EPA designates areas where these pollutants consistently stay below these standards as being in “attainment.” Similarly, areas where air pollution levels exceed standards are designated as being in “nonattainment.” “Maintenance” areas are designated as those that had been in nonattainment, reached attainment status, and are currently working with an EPA-approved maintenance plan. The EPA is required to review a NAAQS periodically and can amend the requirements of the criteria pollutants’ concentration levels based on human health evaluations. A nonattainment area can have an EPA Clean Data Determination (CDD) when it has attained a NAAQS but may still be considered to be a nonattainment area until it has the EPA re-designation and an approved maintenance plan. A nonattainment area can have a CDD for a revised NAAQS even before it has an approved maintenance plan for a prior NAAQS.

As Table 9 of the Advisory Committee Report indicates, most of the 20 counties examined in this report are in attainment or maintenance status for most criteria pollutants. Parts of Beaver County are in nonattainment for sulfur dioxide and lead. Parts of Berks County are in nonattainment for lead, and Lebanon County has a CDD for particulate matter. No counties in the Northern Region are in nonattainment status for any criteria pollutant.

¹⁶ United States Environmental Protection Agency, Assessment and Standards Division, Office of Transportation and Air Quality, “MOVES2014, MOVES2014a, and MOVES2014b Technical Guidance: Using MOVES to Prepare Emission Inventories for State Implementation Plans and Transportation Conformity.” August 2018. <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100V7EY.pdf>.

In 2018, The EPA finalized designations for the 2015 ozone standard at 70 parts per billion (ppb¹⁷). The new standard is a decrease from the 2008 ozone standard of 75 ppb. All of the counties included in this study have tested as being in attainment according to the 2018 standards, with the exception of Chester County. Previously, under the less stringent 2008 ozone standard, Beaver, Berks, Lancaster, Lehigh, Northampton, Washington, and Westmoreland Counties were considered nonattainment. Despite the documented improvement, the EPA has not re-designated them as in attainment according to the 2015 standard. Further, the 2008 standard has not yet been rescinded by the EPA. While this may be simply an administrative delay, both the 2015 and 2008 ozone standards technically still apply.

It is important to note that testing of emissions of subject vehicles under the I/M program addresses only a portion of the pollution control efforts occurring in Pennsylvania. Emissions are monitored and controlled for fire, mobile, and stationary sources. Within those categories, different standards are applied to wildfires and prescribed fires (Fire); on-road and non-road (Mobile); and fuel combustion – electric generation, fuel combustion – other, and industrial and other processes (Stationary). Gasoline-powered light duty motor vehicles are subject to the I/M program – a subset (gasoline-powered) of a subset (light duty motor vehicles) of a subset (mobile sources). These vehicles’ role in maintaining attainment status can be significant to non-existent, depending on the criteria pollutant under consideration. For example, lead is non-existent as an on-road mobile source according to the EPA. Aircraft, locomotives, and commercial marine vessels are the only sources cited. Others vary by criteria pollutant.

Reduced On-road Emissions

Pennsylvania’s total emissions from on-road mobile sources of criteria pollutants, with the exception of a slight increase from 2011 to 2014 in sulfur dioxide, have been declining since 2002, as displayed in Table 2. These declining emissions include, particulate matter less than 2.5 μ in diameter, sulfur dioxide, and the ozone precursors nitrogen oxides and volatile organic compounds. It should be noted the EPA’s NEI data shows only lead pollution from non-road mobile sources.¹⁸

¹⁷ Parts per billion (ppb) is the number of units of mass of a contaminant per 1000 million units of total mass. <https://www.greenfacts.org/glossary/pqrs/parts-per-billion.htm>.

¹⁸ “Non-road” (also called “off-road”) sources include vehicles, engines, and equipment used for construction, agriculture, recreation, and many other purposes. EPA, Emissions Standards Reference Guide, “Overview of Mobile Sources.” <https://www.epa.gov/emission-standards-reference-guide/basic-information-about-emission-standards-reference-guide-road>

Table 2
Pennsylvania On-road Mobile Emissions
Select Pollutants, Triennial National Emissions Inventory
2002-2014

Year	Carbon Monoxide	Nitrogen Oxides	PM2.5	Sulfur Dioxide	VOCs	Total Emissions
2002	1,960,389.24	357,255.08	11,789.46	8,620.17	152,661.78	2,490,715.73
2005	1,537,534.02	278,352.72	10,856.58	6,033.12	127,070.32	1,959,846.77
2008	1,169,532.43	223,670.56	7,758.97	1,081.72	110,174.19	1,512,217.87
2011	938,664.57	204,073.06	6,488.20	938.52	101,106.37	1,251,270.70
2014	798,980.72	174,231.07	6,321.38	1,040.67	80,517.43	1,060,091.27

Source: EPA, NEI Dashboard, Pennsylvania Multi-Pollutant Emissions by NEI Year.
https://edap.epa.gov/public/extensions/nei_report_2014/dashboard.html#trend-db. Amounts measured in tons.

Emissions from Motor Vehicles Covered by the I/M Program

The EPA collects emissions data from states every three years in its National Emissions Reports. The most recent year available is 2014.¹⁹ The 2014 inventory uses the category “Mobile Sources,” which includes the following subcategories: aircraft; locomotives; commercial marine vessels; non-road diesel, gasoline and other non-road vehicles; on-road diesel heavy and light duty vehicles; and on-road non-diesel and non-diesel light vehicles. The I/M program in the subject counties of this report only covers gasoline-powered motor vehicles and light duty trucks with a GVWR of 9,000 pounds or less.²⁰ The EPA defines light duty vehicles and trucks as those with a GVWR of 8,500 pounds or less.²¹ Table 3 shows the percentage of all mobile source emissions of each pollutant in 2014 that are attributed to non-diesel light duty vehicles that are gasoline-powered passenger cars and trucks, the only vehicles tested under the I/M Program.

Overall, the amount of mobile emissions per subject county that are attributable to light duty vehicles ranges from 42.59 percent in Westmoreland County to 55.89 in Blair County. Within the category of mobile emissions, the amount of each criteria pollutant varies. Light duty vehicles in most of the counties reviewed were only responsible for 15-20 percent of particulate matter pollution (PM2.5) from mobile sources and approximately one-third of nitrogen oxides. Onroad emissions nationwide are the smallest category of producers of PM2.5 and the second smallest producer of VOCs.

While on-road sources are the biggest source of carbon monoxide and nitrogen oxides in the country, and the second biggest sources of volatile organic compounds, emissions from subject vehicles do not account for all such emissions. Sulfur dioxide tends to be the largest portion of mobile source emissions from subject vehicles, hovering in the 60-75 percent range. Carbon monoxide from subject vehicles accounts for 50-60 percent of all mobile emissions in the subject

¹⁹ 2017 data is still being collected and collated.

²⁰ 67 Pa. Code § 177.51.

²¹ Passenger cars and light trucks: minivans, passenger vans, pickup trucks, and sport-utility vehicles. EPA, Emissions Standards Reference Guide, “Overview of Mobile Sources.” <https://www.epa.gov/emission-standards-reference-guide/basic-information-about-emission-standards-reference-guide-road>

counties, while five counties were in the high 40s. VOCs had a wider range, with about half of the counties hovering in the 50 percent to low 60 percent group, seven counties had contributions in the low 40 percent range, and three were in the low 60 percent range. If modeling would show a negative impact on pollution control standards, Improving emissions controls on other mobile sources and improving stationary source controls could help offset and change the ability of the subject counties to maintain standards.

Table 3
Percentage of Mobile Emissions of Criteria Pollutants
from Light Duty Vehicles in Select Pennsylvania Counties
2014

County	Pollutant	Total Mobile Emissions²²	Emissions Attributable to I/M Program Vehicles	Percent of Total Mobile Emissions
<i>Beaver</i>	Carbon Monoxide	14,338.32	7,797.33	54.38
	Nitrogen Oxides	3,732.16	775.05	20.77
	PM2.5	158.80	28.20	17.76
	Sulfur Dioxide	13.48	8.82	65.43
	VOCS	1,454.19	742.40	51.05
TOTAL		19,696.95	9,351.80	47.48
<i>Berks</i>	Carbon Monoxide	40,967.79	22,517.68	54.96
	Nitrogen Oxides	8,066.68	2,558.96	31.72
	PM2.5	364.17	70.56	19.38
	Sulfur Dioxide	44.83	29.38	65.54
	VOCS	4,059.43	2,145.40	52.85
TOTAL		53,503.10	27,321.98	51.07
<i>Blair</i>	Carbon Monoxide	12,398.76	7,439.23	60.00
	Nitrogen Oxides	2,514.27	854.45	33.98
	PM2.5	116.01	24.35	20.99
	Sulfur Dioxide	13.37	9.56	71.50
	VOCS	1,106.02	698.52	63.16
TOTAL		16,148.43	9,026.11	55.89
<i>Cambria</i>	Carbon Monoxide	13,684.08	7,727.79	56.47
	Nitrogen Oxides	2,852.07	873.21	30.62
	PM2.5	120.18	25.43	21.16
	Sulfur Dioxide	23.94	9.24	38.60
	VOCS	1,476.38	779.74	52.81
TOTAL		18,156.65	9,415.41	51.86
<i>Centre</i>	Carbon Monoxide	15,331.49	7,944.82	51.82
	Nitrogen Oxides	3,895.40	948.02	24.34

²² Total mobile source emissions include the pollutant lead. However, the only sources reported by the EPA for lead in mobile emissions are aircraft, locomotives and commercial marine vessels, and are accordingly not included in this table.

County	Pollutant	Total Mobile Emissions ²²	Emissions Attributable to I/M Program Vehicles	Percent of Total Mobile Emissions
	PM2.5	173.94	26.29	15.11
	Sulfur Dioxide	19.88	11.03	55.48
	VOCS	1,620.53	691.45	42.67
TOTAL		21,041.24	9,621.61	45.73
<i>Chester</i>	Carbon Monoxide	54,568.00	23,165.55	42.45
	Nitrogen Oxides	7,276.36	2,543.71	34.96
	PM2.5	418.27	70.87	16.94
	Sulfur Dioxide	47.04	33.98	72.24
	VOCS	4,601.35	1,993.26	43.32
TOTAL		62,309.97	27,807.37	44.63
<i>Cumberland</i>	Carbon Monoxide	28,608.59	16,143.68	56.43
	Nitrogen Oxides	7,348.29	1,902.85	25.90
	PM2.5	294.99	50.21	17.02
	Sulfur Dioxide	33.08	22.27	67.32
	VOCS	2,696.45	1,366.75	50.69
TOTAL		38,981.40	19,485.76	49.99
<i>Dauphin</i>	Carbon Monoxide	34,820.71	16,559.29	47.56
	Nitrogen Oxides	6,958.40	1,917.80	27.56
	PM2.5	296.75	53.15	17.91
	Sulfur Dioxide	50.11	22.80	45.50
	VOCS	3,646.18	1,459.25	40.02
TOTAL		45,772.15	20,012.29	43.72
<i>Erie</i>	Carbon Monoxide	30,309.08	14,695.26	48.48
	Nitrogen Oxides	6,311.59	1,527.48	24.20
	PM2.5	266.86	47.53	17.81
	Sulfur Dioxide	33.45	13.31	39.79
	VOCS	3,130.79	1,325.98	42.35
TOTAL		40,051.77	17,609.56	43.97
<i>Lackawanna</i>	Carbon Monoxide	20,349.84	11,905.43	58.50
	Nitrogen Oxides	3,667.55	1,344.50	36.66
	PM2.5	160.39	42.17	26.29
	Sulfur Dioxide	21.77	16.01	73.54
	VOCS	1,765.76	1,089.56	61.70
TOTAL		25,965.31	14,397.67	55.45
<i>Lancaster</i>	Carbon Monoxide	57,920.51	28,711.80	49.57
	Nitrogen Oxides	9,377.72	3,333.66	35.55
	PM2.5	460.83	84.40	18.31
	Sulfur Dioxide	55.96	37.24	66.55
	VOCS	6,330.39	2,649.32	41.85
TOTAL		74,145.41	34,816.42	46.96
<i>Lebanon</i>	Carbon Monoxide	13,988.59	7,751.40	55.41

County	Pollutant	Total Mobile Emissions ²²	Emissions Attributable to I/M Program Vehicles	Percent of Total Mobile Emissions
	Nitrogen Oxides	3,275.60	896.40	27.37
	PM2.5	152.58	23.63	15.49
	Sulfur Dioxide	15.14	10.04	66.31
	VOCS	1,527.76	741.09	48.51
TOTAL		18,959.67	9,422.56	49.70
<i>Lehigh</i>	Carbon Monoxide	36,948.62	18,822.09	50.94
	Nitrogen Oxides	4,151.66	2,252.86	54.26
	PM2.5	291.37	63.81	21.90
	Sulfur Dioxide	42.04	26.38	62.75
	VOCS	3,207.89	1,827.10	56.96
TOTAL		44,641.58	22,992.24	51.50
<i>Luzerne</i>	Carbon Monoxide	34,242.41	17,890.72	52.25
	Nitrogen Oxides	6,453.31	2,029.19	31.44
	PM2.5	278.78	68.27	24.49
	Sulfur Dioxide	36.55	23.25	63.61
	VOCS	3,371.86	1,680.48	49.84
TOTAL		44,382.91	21,691.91	48.87
<i>Lycoming</i>	Carbon Monoxide	12,560.00	7,222.74	57.51
	Nitrogen Oxides	2,312.94	846.37	36.59
	PM2.5	101.17	23.04	22.77
	Sulfur Dioxide	13.66	9.52	69.69
	VOCS	1,346.21	670.12	49.78
TOTAL		16,333.98	8,771.79	53.70
<i>Mercer</i>	Carbon Monoxide	14,493.00	7,499.55	51.75
	Nitrogen Oxides	3,434.53	833.18	26.26
	PM2.5	163.25	23.66	14.49
	Sulfur Dioxide	12.75	7.43	58.27
	VOCS	1,611.19	617.00	38.29
TOTAL		19,714.72	8,980.82	45.55
<i>Northampton</i>	Carbon Monoxide	26,432.59	14,883.10	56.31
	Nitrogen Oxides	4,375.96	1,629.95	37.25
	PM2.5	202.91	47.26	23.29
	Sulfur Dioxide	25.15	17.92	71.25
	VOCS	2,563.10	1,498.45	58.46
TOTAL		33,599.71	18,076.68	53.86
<i>Washington</i>	Carbon Monoxide	20,153.29	10,617.67	52.68
	Nitrogen Oxides	4,394.30	1,118.83	25.46
	PM2.5	204.51	36.19	17.70
	Sulfur Dioxide	19.16	12.32	64.30
	VOCS	1,781.84	914.02	51.30
TOTAL		26,553.10	12,699.03	47.83

County	Pollutant	Total Mobile Emissions ²²	Emissions Attributable to I/M Program Vehicles	Percent of Total Mobile Emissions
<i>Westmoreland</i>	Carbon Monoxide	36,703.10	17,029.62	46.40
	Nitrogen Oxides	7,384.49	1,764.41	23.89
	PM2.5	340.07	57.49	16.91
	Sulfur Dioxide	31.68	19.16	60.48
	VOCS	3,484.17	1,549.87	44.49
TOTAL		47,943.51	20,420.55	42.59
<i>York</i>	Carbon Monoxide	42,649.19	24,924.17	58.44
	Nitrogen Oxides	7,240.73	2,788.71	38.51
	PM2.5	348.96	75.67	21.68
	Sulfur Dioxide	43.97	30.97	70.43
	VOCS	3,988.93	2,446.51	61.33
TOTAL		54,271.78	30,266.03	55.77

Source: Total mobile source emissions compiled from the EPA's NEI 2014 Dashboard search, with search criteria by county, by pollutant, from Sector One - mobile sources. Emissions attributable to I/M Program Vehicles compiled from NEI 2014 Dashboard search, with search criteria by county, by pollutant, from Sector One – mobile sources, Sector Two – on-road, non-diesel light duty vehicles; Source Classification Code Level 2 – highway vehicles-gasoline; Source Classification Code Level 3 – passenger cars and trucks. The following link connects to the Pennsylvania statewide mobile sources of the six criteria pollutants. The searches used to compile this data by Commission staff were initiated at this level.
https://edap.epa.gov/public/extensions/nei_report_2014/dashboard.html.

Failure Rates, Declining Populations and Retirement of Older Vehicles

These issues were discussed at length on pages 44-48 of “*Motor Vehicle Emissions Testing: Pennsylvania’s Program*,” The Advisory Committee Report (October 2018) and provide further justification that the removal of the counties designated in SR 829 would have a minimal impact on the overall effectiveness of the I/M Program statewide. Seven of the subject counties: Beaver, Blair, Cambria, Lackawanna, Luzerne, Lycoming and Mercer, have experienced declining populations for decades. The percentage of older vehicles (1975-1995 model year), which tend to be the greater polluters, averages less than 4.4 percent overall in the subject counties, from 2.9 percent in Chester County to 5.7 percent in Lebanon County. Statewide failure rates on emissions testing fell from 4.27 percent in 2009 to 3.27 percent in 2017. Failure rates were below 3.0 percent for all of the counties in the Northern Region.

As of December 31, 2017 there were 9,615,432 light duty motor vehicles registered in Pennsylvania, including 8,048,151 passenger vehicles, 449,840 trucks weighing 5,000 pounds or less, 847,462 trucks weighing between 5,001 pounds and 7,000 pounds, and 233,979 trucks weighing 7,001 to 9,000 pounds in the Commonwealth. Forty-two percent (4,012,901) of the total light duty motor vehicles in the Commonwealth are found in the subject counties of this report.²³ Table 4 below shows the percent of total light duty motor vehicles in the Commonwealth registered in each I/M county.

²³ Commonwealth of Pennsylvania, Department of Transportation, Bureau of Motor Vehicles. “Report of Registrations for Calendar Year 2017.”

Table 4
Percent of All Light Duty Motor Vehicles Statewide
Found in Enhanced I/M Program Counties
December 31, 2017

County	Subject Vehicles	Percent of Total Light Duty Motor Vehicles
Subject Counties		
Beaver	126,715	1%
Berks	310,879	3
Blair	93,793	1
Cambria	104,425	1
Centre	92,334	1
Chester	374,687	4
Cumberland	191,488	2
Dauphin	215,826	2
Erie	175,223	2
Lackawanna	140,856	1
Lancaster	392,723	4
Lebanon	109,497	1
Lehigh	261,858	3
Luzerne	226,958	2
Lycoming	85,186	1
Mercer	77,838	1
Northampton	236,361	2
Washington	163,050	2
Westmoreland	269,440	3
York	363,764	4
SUBTOTAL – All Subject Counties	4,012,901	42
<i>I/M Counties Not Part of Study</i>		
Allegheny	780,415	8
Bucks	413,812	4
Delaware	353,519	4
Montgomery	591,708	6
Philadelphia	686,061	7
TOTAL	2,825,515	29

Source: Data compiled JSGC staff from information in Commonwealth of Pennsylvania, Department of Transportation, Bureau of Motor Vehicles. "Report of Registrations for Calendar Year 2017."

Total number in Commonwealth: 9,615,432 light duty motor vehicles

Preservation of Other Emission Reduction Technologies and Activities

Emissions in most of the subject counties have been declining for years, and while the modeling potentially may indicate a slight increase in on-road emissions from light duty passenger vehicles and trucks as a result of removing certain counties from the I/M Program, it is not unreasonable to expect that the overall pattern of declining emissions levels will compensate for a brief "bump" in levels. Further, regulatory and technological developments are expected to contribute to lowering emissions. The EPA's Tier 3 Motor Vehicle Emission and Fuel Standards impose more stringent new motor vehicle emissions standards beginning with model year 2017,

and new gasoline sulfur standards became effective January 1, 2017.²⁴ The use of onboard refueling vapor recovery technology and the increasing availability of electric vehicles may also contribute to lower on-road mobile emissions.²⁵ Other technologies that are required of emissions sources of various types in the OTR would remain in place. It is anticipated that the SIP revision to remove any counties from the Enhanced I/M Program would move them to a visual inspection only as part of their annual safety inspection, as is done in the 42 counties not currently part of the I/M Program. In this manner, their emissions systems would still be reviewed for any visible mechanical problems that could affect their emissions control function.

Potential Costs of County Removals from the I/M Program

PennDOT Expenditures

Potential costs of removing certain counties from the I/M Program depend upon the party involved. PennDOT uses a subcontractor to administer the I/M Program. Since 2011, the program administrator has been Parsons Commercial Technology (Parsons), located in Harrisburg. The original five-year contract began on April 4, 2012, and was renewed in 2016 for an additional two years, to end on April 8, 2019. The total cost for the original 5-year contract period was \$55,270,345.97. The program administrator's original contract included a "fee or profit" component for nine of the 12 tasks covered by the contract in the amount of \$2,055,392.85 (see Table 6, below). This profit amount is in addition to a separately listed cost of \$1.3 million for "other overhead costs." These "other overhead costs" are in addition to charges for direct labor, labor overhead, travel, subcontractors, supplies/materials, and other direct costs. All of these costs were passed on to consumers as a \$1.47 per vehicle Program Management Fee (PMF) collected each time the vehicle received an emissions test. In 2017, this charge was increased to \$1.65 per vehicle to recoup technology improvements. The PMF is collected by the service station performing the test and remitted to the Commonwealth via the program administrator. Theoretically, the program is funded by the owners of subject vehicles, and there is no net cost to the Commonwealth. However, PennDOT pays Parsons \$1,000 per month under its Driver and Vehicle Services appropriation for "operational expense – professional services – unspecified." Additionally, a fee of \$54,000 was paid at the time the two-year extension was executed.²⁶

The current contract with the program administrator is designed to include payments for all subject vehicles in all subject counties. To the extent that some counties are removed from the program, PennDOT would stand to lose the \$1.65 per vehicle per year program management fee. This could range from \$128,432.70 if Mercer County, with the smallest number of subject vehicles, were the only county removed from the program, to \$6,621,128.60 if all 20 subject counties were removed.

²⁴ Commonwealth of Pennsylvania, Independent Regulatory Review Commission. Regulatory Analysis Form. IRRC No. 3162, "Repeal of Gasoline Volatility Requirements". p. 15.

²⁵ *Ibid.* p. 17.

²⁶ RFP 3510804, Addendum 4, Appendix P Cost Proposal, November 28, 2011. PA Treasury, Contracts E-Library. (2012). *Parsons Emissions Program Management, Addendum 4*, Retrieved from <http://contracts.patreaury.gov/View.aspx?ContractID=249110>.

Table 5
Selected Costs of Program Administration Contract
Pennsylvania Inspection/Maintenance Program
2012-2017

Task	Fee or Profit	Other Overhead Costs
A: Provide for the storage and handling of all PA I/M Program-related Data	\$315,842.59	\$274,634.38
B: Perform oversight activities of the I/M Program (Overt Audits)	980,245.69	412,700.27
B: Perform oversight activities of the I/M Program (Covert Audits)	294,493.88	440,884.64
C: Establish and conduct an inspection station and public information and education program	11,581.99	15,036.92
D: Deliver waivers and operate referee program	50,420.57	52,735.23
E: Hold I/M hearings and issue suspensions	54,401.37	21,473.56
F: Motorist compliance enforcement	33,520.51	16,504.90
G: On-road testing (Remote Sensing Device)	13,389.51	14,356.26
I: Manage the delivery, installation and certification of emission inspection equipment	52,119.31	20,268.14
L: Electronic collection of safety inspection data (PMF Calculation)	249,377.43	490,238.62
Total	2,055,392.85	1,325,071.79

Source: RFP 3510804, Addendum 4, Appendix P Cost Proposal, November 28, 2011. PA Treasury, Contracts E-Library. (2012). *Parsons Emissions Program Management, Addendum 4*, Retrieved from <http://contracts.patresury.gov/View.aspx?ContractID=249110>

Department of Environmental Protection Expenditures

Commission staff was unable to find specific budget items related to the I/M Program in DEP's appropriations. DEP is responsible for preparing SIP revisions through the Bureau of Air Quality in the Office of Waste, Air, Radiation and Remediation. Revisions would include EPA conducting the emissions simulations needed to demonstrate the impact of changes to the I/M Program. Otherwise, DEP fulfills its responsibilities for motor vehicle emissions inspections through PennDOT's Drive Clean Pa Program. Costs to DEP for preparing SIP revisions appear to be limited to payroll costs of the employees assigned to conduct simulations and draft SIP documents, or subcontractor fees charged to conduct simulations on DEP's behalf.

Economic Impact to Consumers and Service Stations

Costs savings to consumers and corresponding losses to the emissions inspection service stations are more significant. Table 6 below shows the annual economic impact to each county if the enhanced emissions inspection program is eliminated in that county. Savings to consumers would be roughly offset by the loss of income to the inspection stations. An exact one-to-one exchange by county cannot be calculated. While motor vehicle owners in a particular county might be expected to use an inspection station in that county, they may use a station located in another county, including the first and second class counties in the I/M Program that are not part of this study.

Table 6
Total Costs of Motor Vehicle Inspections per Subject County
July 15, 2018

County	Subject Vehicles	Average Cost of Inspection	Economic Impact
Beaver	125,960	\$39.43	\$4,966,602.80
Berks	311,072	35.95	11,183,038.40
Blair	93,269	28.16	2,626,455.04
Cambria	103,948	29.61	3,077,900.28
Centre	93,372	33.11	3,091,546.92
Chester	375,724	47.26	17,756,716.20
Cumberland	191,111	37.69	7,202,973.59
Dauphin	224,450	36.83	8,266,493.50
Erie	173,635	31.00	5,382,685.00
Lackawanna	142,029	32.68	4,641,507.72
Lancaster	392,455	36.54	14,340,305.70
Lebanon	108,045	39.57	4,275,340.65
Lehigh	253,656	37.60	9,537,465.60
Luzerne	229,480	29.84	6,847,683.20
Lycoming	90,407	32.38	2,927,378.66
Mercer	77,478	31.10	2,409,565.80
Northampton	236,746	38.55	9,126,558.30
Washington	162,904	38.91	6,338,594.64
Westmoreland	268,173	37.60	10,083,304.80
York	360,096	32.65	11,757,134.40

Source: Data compiled by PennDOT Bureau Motor Vehicles as of July 15, 2018

Removal of Certain Vehicles from the I/M Program in all Subject Counties

Regardless of which counties can be removed from the I/M Program, DEP can prepare a SIP revision to implement existing Pennsylvania regulations that allow counties to be removed from the program or moved to a biennial inspection when the number of 1975-1995 model year cars falls below certain percentages. This provision was included in Pennsylvania's regulations at the inception of the enhanced I/M program, but the EPA specifically declined to adopt it as part of the original SIP. Table 7 below shows the number of vehicles per county that would be removed from the I/M Program if the removal of all 1975-1995 cars occurred in the subject counties, and the annual savings to consumers/loss to inspection stations of such a SIP revision.

Table 7
Total Costs of Motor Vehicle Inspections per Subject County
For Model Year 1975-1995 Motor Vehicles
July 15, 2018

County	Subject Vehicles	Average Cost of Inspection	Economic Impact
Beaver	5,029	\$39.43	\$198,293.47
Berks	16,621	35.95	597,524.95
Blair	4,713	28.16	132,718.08
Cambria	4,486	29.61	132,830.46
Centre	3,744	33.11	123,963.84
Chester	11,007	47.26	520,190.82
Cumberland	8,117	37.69	305,929.73
Dauphin	12,045	36.83	443,617.35
Erie	5,470	31.00	169,570.00
Lackawanna	4,800	32.68	156,864.00
Lancaster	18,529	36.54	677,049.66
Lebanon	6,131	39.57	242,603.67
Lehigh	11,085	37.60	416,796.00
Luzerne	10,050	29.84	299,892.00
Lycoming	4,792	32.38	155,164.96
Mercer	3,310	31.10	102,941.00
Northampton	10,902	38.55	420,272.10
Washington	6,060	38.91	235,794.60
Westmoreland	10,668	37.60	401,116.80
York	18,577	32.65	606,539.05
TOTAL	176,136		6,339,672.52

Source: Data compiled by PennDOT Bureau Motor Vehicles as of July 15, 2018

Suggested Counties for Removal

For purposes of determining which counties could be removed from the I/M Program with minimal effects on their ability to maintain current emissions standards, attainment status is a favorable factor in all of the subject counties except Beaver County. While parts of Beaver and Berks Counties are not in attainment for lead, that particular pollutant is not a criteria pollutant found in mobile emissions from light duty vehicles.²⁷ However, Beaver County's sulfur dioxide emissions remain relatively high however, and thus the county is probably not a good candidate for removal.

Overall declining emissions, extremely low emissions failure rates, declining populations, the low numbers of older vehicles (1975-1995 model years), and the overall small percentage of the Commonwealth's total light duty vehicles found in each county all provide justification for a finding that removal of any particular county from the program would have a minimal impact on the county's ability to maintain current pollution control standards. On-road mobile emissions overall in Pennsylvania have been in a steady decline since 2002, as set forth in Table 2. Failure rates statewide have declined from 4.27 percent in 2009 to 3.27 percent in 2017, as set forth in

²⁷ See n. 27.

Table 12 of the Advisory Committee Report. Populations have been declining for more than 30 years in 8 counties, as shown in Table 10 of the Advisory Committee Report. The statewide average of the number of subject vehicles that are model years 1975-1995 is 4.4 percent, as shown in Table 11 of the Advisory Committee Report. Light duty vehicles in the 20 subject counties combined account for 42 percent of all light duty vehicles in the Commonwealth, but as demonstrated in Table 5 of this memorandum, each individual county contains 4 percent or less of the total number of light duty vehicles in the Commonwealth.

Combining those factors, the counties have been ranked on the basis of which could be removed from the I/M Program with the least impact on the environment. Removing all 20 together would have the greatest impact, and would probably require other control measures to maintain standards. There are seven counties which have the greatest combination of favorable factors to indicate that their removal, either singularly or in various combinations, could possibly be accomplished with minimal need for compensation with other emission controls. Those counties are: Blair, Cambria, Lackawanna, Luzerne, Lycoming, Mercer, and Westmoreland.

Effectiveness of Inspection/Maintenance Programs

While not dispositive of the question as to whether removal of counties from the I/M Program could be accomplished without a significant environmental impact, recent studies on the overall effectiveness of I/M Programs lend some credence to the notion that they may not be accomplishing their pollution control goals.

In 2018, the U.S. EPA's Office of Inspector General conducted an audit to determine whether the agency's oversight has ensured that vehicle inspection and maintenance programs are effective and efficient in reducing vehicle emissions in enhanced inspection and maintenance areas.²⁸ Regulations implemented pursuant to the Clean Air Act's Inspection/Maintenance Program require that states submit annual report data obtained in the areas of test data, quality assurance, quality control, and enforcement. The information must be transmitted by the state to its respective EPA region. States must also issue biennial reports, which should discuss the weaknesses or problems identified in the program within the two-year reporting period, the steps taken to correct those problems, the result of those steps, and any future planned efforts.²⁹

The EPA's Office of Inspector General had conducted a similar study in 2006 and concluded that, from 1999 through 2004, the EPA was not able to obtain sufficient information to verify that states were meeting their inspection and maintenance program commitments. In response to the deficiencies outlined by the 2006 report, the EPA implemented "corrective actions that included the development of a checklist for 40 CFR § 51.366 reporting requirements, which states can use to prepare their annual submissions."³⁰

²⁸ United States Environmental Protection Agency, Office of Inspector General, "Collecting Additional Performance Data from States Would Help EPA Better Assess the Effectiveness of Vehicles Inspection and Maintenance Programs," Report No. 18-P-0283, September 25, 2018. <https://www.epa.gov/office-inspector-general/report-collecting-additional-performance-data-states-would-help-epa-better>.

²⁹ 40 CFR Part 51, Subpart S.

³⁰ EPA Office of Inspector General, Collecting Additional Performance Data, *supra* note 31, p. 8.

During the course of this audit, the EPA Office of Inspector General discovered that the EPA “lacked the required performance data to assess the effectiveness of many state inspection and maintenance programs.”³¹ For instance, nine states with enhanced inspection and maintenance programs did not conduct the required biennial program evaluations. A further five states conducted limited evaluations that did not fully comply with regulatory requirements, and four states did not conduct required on-road testing.³²

The report also noted that 14 states did not conduct biennial program evaluations that included estimates of the emission reduction benefits of the program, as they are required to do by regulation. Additionally, four states did not conduct the mandated on-road testing. This on-road testing can be done by a remote-sensing device or a roadside pullover test. If a state does not conduct the on-road testing, it will lack on-road emissions data to assess the accuracy or effectiveness of the on-board (OBD) testing results. Of the four states that did not conduct these statutorily-required tests, one state asserted in its SIP that remote sensing or road-side emissions measurement was not an accurate way to determine if OBD systems were functioning properly, and thus did not conduct the on-road testing. Another state indicated that such testing would do little to improve vehicle emission estimates given the existing data and modeling software, and therefore could not justify the additional costs of conducting on-road testing.³³

According to the EPA Office of Inspector General, the EPA and states lack “program performance data to determine whether the program is achieving projected emission reductions.”³⁴ Further, the absence of on-road data renders modeling for OBD testing, the emissions inventory, and the vehicle inspection and maintenance program that is potentially erroneous. This inadequacy, in turn, inhibits the states’ ability to plan for meeting the required ozone standards.³⁵

The audit also revealed that reports provided by the states are not formatted uniformly. The discrepancies are attributed to different states adopting different ways of calculating annual reporting numbers because states differ in their interpretations of what is required by each statistical metric, such as “number of initially failed vehicles.”³⁶ Further, when summarizing states’ data, the EPA would occasionally miscalculate information from the states or the EPA regions. There is no regulation that requires states to revise their original data. Thus, the lack of consistency combined with differing interpretations by the states causes the EPA to incorrectly summarize a state’s data in its summary report. The EPA Office of Inspector General also raised concerns about the levels of waivers and “no known outcome” vehicle statuses being reported by the states, which further erodes the reliability of results and conclusions that the program is not achieving its projected emission reductions.³⁷ In short, the EPA cannot know for sure if a program is working.

³¹ *Id.* at p. 9.

³² *Id.* at pp. 11 and 13.

³³ *Id.* at p. 13.

³⁴ *Id.* at p. 14.

³⁵ *Id.*

³⁶ *Id.* at p. 18

³⁷ *Id.* at pp. 18-19.

A law review article by Professor Arnold W. Reitze of the University of Utah's S.J. Quinney School of Law examined the cost effectiveness of I/M programs, with particular attention paid to Utah's program.³⁸ He noted that such programs are utilized to implement three other policy strategies:

1. They can be used to assure that the emission controls that were manufactured into the vehicle continue to function properly for the life of the vehicle;
2. The I/M program can be used to identify manufacturers that use "defeat devices" to avoid complying with the Clean Air Act's provision for motor vehicle emissions standards;
3. The I/M program can be used to catch motorists who attempt to disable or tamper with the emissions control components of their vehicles.³⁹

Examining the impact the I/M programs had on each one of these policy strategies, the author concluded that they had minimal effect regarding detecting or preventing manufacturers from building vehicles with defective emissions control devices or engaging in outright fraud, the author presented the lengthy history of manufacturer attempts to engineer work-arounds of emissions controls, including Volkswagen's recent scandal involving diesel engines in its automobiles. The article concluded that the only value an I/M program could have would depend on its ability to reduce emissions from in-use vehicles.⁴⁰

Regarding the reduction of emissions from in-use vehicles, the I/M program's benefits are derived from either ensuring that the equipment is continuing to function as intended by the manufacturer, or that it prevents tampering or removal.⁴¹ The author noted that Title II of the CAA provides only civil penalties for tampering with motor vehicle emissions controls. Further, I/M programs are administered by and are the responsibility of the states; most states provide only civil penalties or misdemeanor charges for penalties for I/M violations.⁴² In Pennsylvania, tampering with an emissions control device is a summary offense.⁴³

However, the author noted that, with the development of more sophisticated technology and the use of OBD-based testing, it has become more difficult to cheat on I/M testing.⁴⁴ This is a departure from the pre-OBD testing days, when cheating was rampant and the tests were easy to thwart. Thus, the author concluded that I/M programs are only effective in preventing emissions from malfunctioning emissions control devices in in-use vehicles. It should be noted that

³⁸ Reitze, Arnold W., *The CAA Motor Vehicle Inspection and Maintenance Program: Is it Cost Effective?* (2017). 47 ELR 10877; University of Utah College of Law Research Paper No. 226. <https://ssrn.com/abstract=3046884> or <http://dx.doi.org/10.2139/ssrn.3046884>.

³⁹ *Id.*

⁴⁰ *Id.* at p. 10882.

⁴¹ *Id.* at p. 10886.

⁴² *Id.*

⁴³ 75 Pa.C.S. § 6502(a).

⁴⁴ *Supra*, note 38, at p. 10891.

installation of such devices is a requirement of manufacturers, and is not part of I/M programs administered at the state level.⁴⁵

The author also conducted a cost-benefit analysis of I/M testing in his home state of Utah. In conducting his analysis, the author assumed the average cost of such a test to be \$25 and multiplied this figure by the 686,672 I/M tests conducted in Salt Lake County, Utah in 2015, arriving at a cost estimate of \$17,166,800. He then calculated the value of the driver's time to be \$15 an hour and the length of a test to be an average of one hour. The product of this time-value figure and the number of tests conducted yielded an additional cost of \$10,299,780 to Utah drivers in 2015. The total of both direct costs and time-cost is \$27,466,850. The failure rate of I/M testing in Salt Lake County, Utah was 4.6 percent in 2015, making the pre-repair cost of the county's I/M program approximately \$869 per failed vehicle. These figures do not account for the cost of repairing failed vehicles or administering and enforcing the I/M program.⁴⁶

Another cost estimate was derived by dividing the reduction in the pollutants principally at issue – nitrogen oxide and volatile organic compounds (VOCs) – by the estimated cost of the I/M program. Citing Utah Division of Air Quality data showing an estimated decrease of 851 tons per year of nitrogen oxide and 653 tons per year of VOCs in Salt Lake County, the author concluded that the cost of the I/M program in terms of pollutant reduction was \$18,000 per ton.⁴⁷

Although costs can be calculated, the benefits are not as easily quantifiable. The benefits primarily consist of preventing malfunctioning emissions control devices from expelling extra quantities of pollutants into the air. When they began in the 1970s, the original conception of I/M programs was to prevent cheating and device-tampering, concerns that are less prevalent now that OBD control technology is standard. The author concludes that there is little evidence to either support or reject the efficacy of federally-mandated state-run inspection and maintenance regimes.⁴⁸

Conclusion

Removing counties from the enhanced inspection/maintenance program is possible. To do so requires the Department of Environmental Protection to file a SIP revision with the EPA that demonstrates that removal of a particular county can be accomplished without negatively impacting the area's ability to meet and maintain attainment standards. This memorandum provides evidence to the fact that at least for some areas, removal from the I/M program could have a minimal/negligible impact on the environment, given their minor role in contributing to Pennsylvania's mobile emissions as a whole. In order to "prove" that contention, DEP would need to use the EPA's modeling program to demonstrate the projected impact of these removals.

⁴⁵ *Id.* at p. 10880.

⁴⁶ *Id.* at p. 10890.

⁴⁷ *Id.*

⁴⁸ *Id.* at p. 1077 and 10891.