



**Department of Natural Resources and  
Environmental Control**

**Regulation 1140 –  
Delaware Low Emission  
Vehicle Program (LEV)**

**Technical Support  
Document**

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## **I. INTRODUCTION**

### **Purpose of the Regulations**

Regulation 1140 – Delaware Low Emission Vehicle Program (DEL LEV) establishes Delaware's inclusion into California's Low Emission Vehicle Program (CAL LEV).

The primary purpose of this regulation is to reduce vehicle emissions from new vehicles in Delaware beginning with model year (MY) 2013. Considerable benefits to human health and the environment will be realized under this program in the long term. This will be accomplished by adopting California's emissions standards, which are more stringent than the current federal standards. The LEV Program reduces emissions of ozone precursors, particulates, toxic air pollutants, and greenhouse gases.

### **Background**

#### ***Federal and California Programs***

The 1970 Federal Clean Air Act (CAA) established motor vehicle tailpipe emission standards to curb emissions of carbon monoxide (CO), volatile organic compounds (VOC) and oxides of nitrogen (NOx). The standards took effect for cars and light-duty trucks in model year (MY) 1975. The Federal CAA also granted the state of California the authority to enact stricter standards than those adopted by the federal government.

The 1977 CAA Amendments tightened the NOx standard for cars in two phases: MY 1977 through 1979, and MY 1981. The United States Environmental Protection Agency (EPA) revised the federal standards for light-duty trucks in 1979 and 1988, and set rules for heavier trucks in 1988.

The 1990 CAA Amendments lowered the NOx emissions standards for vehicles starting in 1994. These standards are commonly referred to as the Tier 1 standards, and they resulted in a 40 percent reduction in tailpipe NOx emissions from the prior Federal motor vehicle control program.

Also in 1990, the California Air Resources Board (CARB) adopted its LEV program, which applied to MY 1994 through 2003 passenger cars, light-duty trucks, and medium-duty vehicles. Section 177 of the 1990 CAA Amendments also granted the authority for other states to adopt an identical California motor vehicle emission standards program, as well as prohibiting other states from setting their own standards. Thus, in the United States there are two Federally-sanctioned motor vehicle control programs: the Federal program and the California program.

In 1998, the EPA, vehicle manufacturers, and the Northeastern and Mid-Atlantic states adopted an agreement to introduce cleaner vehicles earlier than in the rest of the country. This was called the National Low Emission Vehicle (NLEV) program and was

closely patterned after the California program. The first NLEVs were available in the Northeast and the Mid-Atlantic states beginning with MY 1999 vehicles, and the balance of the country in MY 2001. Compared with the Tier 1 standards, the NLEV program reduced NOx emissions by 50 percent for cars, and 17 percent for light-duty trucks.

In 1999, the EPA promulgated the motor vehicle Tier 2 emission standards which apply to MY 2004 and later vehicles. The Tier 2 program further reduced the NOx emission standards by between 77 and 86 percent in cars and between 92 and 95 percent in trucks, as compared to the NLEV program.

TAILPIPE TIMELINE	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Federal</b>	<b>Tier 1</b> <sup>1</sup>		<b>Tier 1 and NLEV</b>			<b>Tier 2 phase-in</b>				<b>Tier 2</b>				
<b>California</b>	<b>LEV</b>						<b>LEV II phase-in</b>		<b>LEV II</b>					
States opting into California's LEV program <sup>2</sup>	NY MA	NY MA VT	NY, MA, VT, ME			MA, 77 other states may chose to adopt the LEV II program <sup>2</sup>								
1. The NLEV program began in 1999 in the following states: Connecticut, New Hampshire, New Jersey, Pennsylvania, Rhode Island, Washington DC, Delaware, Maryland, and Virginia. 2. The Clean Air Act allows states to adopt the California Low Emission Vehicle Program.														

### **Delaware Program**

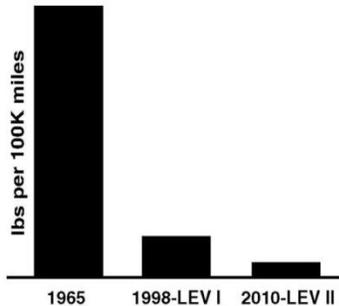
Delaware implemented the NLEV program as a manner to meet its statutory obligations and to reduce air pollution through the reduction of VOCs and NOx generated from motor vehicle emissions. The primary goal of the NLEV program was to ensure that gasoline-fueled passenger vehicles sold in Delaware met a low emission standard, beyond that of the Federal Tier 1 program. Delaware's commitment ended with the commencement of MY 2006. Since then, passenger cars and light-duty trucks sold in Delaware have been subject to the Federal Tier 2 program.

The proposed regulation would replace the Federal Tier 2 program with the Delaware LEV program, and as a result, only California certified vehicles could be legally sold in Delaware. States implementing the California program must provide automobile manufacturers with at least two MYs of lead-time as required by the CAA. As such, in order to comply with this requirement, the earliest the Department can implement the LEV program is MY 2013.

The proposed Delaware program contains two components that will reduce overall vehicle emissions: individual vehicle emission standards and fleet-wide emission standards. The individual vehicle emission standards component requires each manufacturer to certify that its passenger cars and light-duty trucks meet tailpipe emissions, on-board diagnostic requirements, and evaporative emission standards. California's emission standards are at least as stringent as the Federal Tier 2 standards. A manufacturer's entire fleet of the vehicles must meet a specific fleet-wide average for

non-methane organic gas (NMOG) emissions level. A LEV program would mandate that Delaware would only receive vehicles that meet the California emission standards.

**How much smog forming pollution  
does the average new car make?**



*A new 1965 car produced about a ton of smog-forming hydrocarbons during 100,000 miles of driving. California's low emission standards have cut that to around 50 pounds for the average 1998 car. Lev II would further reduce emissions from the average new 2010 car to approximately 10 pounds.*

## II. OVERVIEW OF THE REGULATION

### **Section 1.0 - Purpose**

The proposed regulation establishes Delaware's LEV program, which incorporates the requirements of the California LEV program. The proposed new rules will apply to all year 2013 and later passenger cars and light-duty trucks delivered for sale in Delaware on or after January 1, 2013, and require that the passenger cars and light-duty trucks be certified to California's emission standards.

### **Section 2.0 - Applicability**

Subject to limited exemptions, the proposal would prohibit, beginning with MY 2013, the sale, importation or registration in Delaware, of any new passenger car or light-duty truck, on or after January 1, 2013, unless the vehicle is California-certified. The term "delivered for sale" includes those vehicles that are leased.

If a manufacturer demonstrates that a vehicle complies with all applicable emission standards and requirements of Title 13, California Code of Regulations (CCR), CARB will issue an Executive Order for the vehicle, indicating that the vehicle is "California-certified." A vehicle manufacturer must demonstrate that the vehicle's exhaust and (as applicable, depending on the specific vehicle category) evaporative emission control systems are durable and comply with the emission standards for the vehicle's useful life. This is demonstrated through durability and certification testing of a prototype vehicle. The manufacturer must also demonstrate compliance with the requirements for on-board diagnostics, anti-tampering, fuel tank fill-pipe and openings, and crankcase emissions, as applicable, and must submit an application for certification to CARB and EPA concurrently. Both agencies must approve the application.

Production vehicles must be identical in all material respects to those for which the certification was granted. If the manufacturer makes emissions-related production running changes or "field fixes" as they are sometimes called, those must be approved by CARB. Production vehicles must be properly labeled and their emission control systems warranted for the specified duration. New and customer-owned production

vehicles are subject to compliance testing (by either the manufacturers or CARB) and warranty repairs reporting by the manufacturers, either of which can result in remedial actions.

The Department proposes a one-year transition period, during which non-certified MY 2013 passenger cars and light-duty trucks delivered for sale or lease on or before January 1, 2013 can continue to be sold, offered for sale or, purchased, acquired or received.

The Department proposes several exemptions to the certification requirements. Passenger cars and light-duty trucks held for rental or daily lease to the general public, or that are being utilized for interstate commerce (such as interstate commercial delivery vehicles) that are registered and principally operated outside of Delaware would be exempt from the certification requirements. This provision allows rental cars and light-duty trucks that are registered outside of Delaware to continue to be rented in Delaware.

Passenger cars and light-duty trucks that are classified as test vehicles or emergency vehicles would also be exempt. Test vehicles are developed by manufacturers for vehicle research and development purposes. They are produced in very limited numbers and are not produced for sale to the general public.

The Department proposes an exemption for the special circumstance in which a Delaware resident, operating a vehicle out of State, needs to replace the vehicle because the vehicle was either damaged, became inoperative beyond reasonable repair, or was stolen. This exemption only applies when the replacement vehicle is purchased at the time of the incident while the resident is out of State.

Passenger cars and light-duty trucks that are transferred to a Delaware resident through either inheritance or court decree are exempt from these rules. In such cases, the resident has no discretion in acquiring a complying vehicle, making an exemption appropriate.

Residents of other states establishing residence in Delaware and wishing to transfer a non-complying vehicle that was certified to Federal emission standards and registered in the resident's former state may do so when establishing residence in Delaware.

Passenger cars and light-duty trucks sold directly from one dealer to another dealer would be exempt from the LEV requirements because the rules are not intended to restrict dealers from exchanging vehicles. Vehicles that are sold in order to be wrecked or dismantled, are exclusively for off-highway use, or that are sold for registration in another state are also exempt from the LEV program requirements.

The regulation considers that a vehicle with 7,500 miles or fewer to be a "new" vehicle for purposes of the proposed LEV program. The Department intends by this language to prohibit a Delaware resident or other person from using a "straw man" to purchase and register a non-complying vehicle in another state, and then re-registering the vehicle in Delaware as a used vehicle, in order to avoid the proposed emissions requirements.

### ***Section 3.0 – Definitions***

The definitions used for the regulation are those necessary to implement the California LEV program, along with those specific to Delaware, in order to make a complete and “stand-alone” package.

### ***Section 4.0 - Emission Certification Standards***

The proposed regulation requires that each new passenger car and light-duty truck delivered for sale in Delaware after January 1, 2013, be certified to the emissions standards of Title 13, Code of California Regulations (CCR). As discussed above, when CARB certifies a vehicle, it issues an Executive Order stating that the vehicle has met all of the applicable standards of the LEV program. Evidence that a vehicle has met the California standards is also evidence that the vehicle has met the proposed Delaware standards, since the standards are the same.

### ***Section 5.0 - Non-methane Organic Gas (NMOG) Fleet-Wide Average Emission Requirement***

In order to remain identical to the California LEV program requirements, the Department is proposing a component of the California LEV program known as the NMOG fleet average requirement. The NMOG fleet average is not a new vehicle classification, but rather a weighted average of the emissions for all of the passenger cars and light-duty trucks a manufacturer delivers for sale during the specified MY. This proposal establishes an NMOG fleet average requirement for each manufacturer’s sales in Delaware, beginning with MY 2013. Each manufacturer would be required to demonstrate that all of its passenger cars and light-duty trucks delivered for sale in Delaware on or after January 1, 2013, meet an average emission standard for NMOG, known as the fleet emissions standard.

### ***Section 6.0 - Vehicle Testing***

The Department proposes that each vehicle manufacturer must be prepared to demonstrate that its passenger cars and light-duty trucks meet the emission standards of the California LEV program. The California LEV program requires a vehicle to meet the emission standards at three distinct periods: at the time of certification, as the vehicles are produced on the assembly-line, and in actual customer use.

Under the California rules prior to vehicle production a manufacturer must submit test data to CARB demonstrating that the vehicle meets the applicable emission standards. The manufacturer must predict the anticipated emissions deterioration of the vehicle in-use using pre-production, developmental vehicles. Once the deterioration factor is established, low mileage emission-data vehicles must be tested and the emission results adjusted using the deterioration factor to determine whether the vehicle would meet the emission standards throughout its useful life. A manufacturer is required to provide this information for each engine family in order for the vehicles to be California certified and receive a CARB Executive Order. An engine family is a group of

vehicles having engines and emission control systems with similar operational and emission characteristics.

Once an engine family has been certified, the manufacturer must conduct quality audit emission tests on a small portion of the actual production passenger cars and light-duty trucks in each engine family as they leave the assembly line. In appropriate instances, functional tests may be conducted during the vehicle assembly process before the end of the assembly line. For components whose function cannot practically be checked on every vehicle, a statistically valid sampling test may be used as the functional tests. CARB must approve the manufacturer's sampling test to assure that the tests are designated for the appropriate control components and systems or that the tests will be adequate to reasonably assure that the components and systems are correctly installed and are functioning properly.

During and after production but prior to sale, CARB may order a vehicle manufacturer to make a reasonable number of vehicles available for compliance testing and may direct that the vehicles be delivered to CARB's emission testing laboratory. If CARB finds that the vehicles exceed the emission standards, CARB may invoke its New Vehicle Recall provisions. Similarly, CARB administers its in-use compliance program by procuring late-model vehicles from their owners for emission testing to determine whether vehicles that have been properly maintained and used comply with the emission standards in actual use. If CARB's test data demonstrate that an engine family does not comply, the manufacturer must either submit a plan to remedy the nonconformity at its expense or recall the vehicles. Under the proposed rules, vehicle manufacturers must comply with CARB's standards in order to be in compliance in Delaware.

Upon the Department's request, a vehicle manufacturer must submit to the Department the testing and findings made by CARB for each of the testing requirements listed in proposed 6.0.

### ***Section 7.0 - Warranty***

The Department proposes to incorporate into its regulations the California emissions warranty requirements for new LEVs. The warranty requirements would apply to all qualifying vehicles delivered for sale in Delaware on or after January 1, 2013.

The emissions warranty under the California LEV regulations is longer and more comprehensive than the Federal Tier 2 emissions warranty. Manufacturers are required to provide a 15 years/150,000 mile warranty on any defect that causes illumination of the malfunction indicator light or check-engine light, and to repair any malfunction that causes the vehicle to fail the inspection/maintenance emissions test during this period. The Federal emissions performance warranty is two years/24,000 miles, whichever occurs first. The Federal warranty also covers key emission control components (catalytic converter, electronic emission control unit and the onboard diagnostics control unit) for 12 years/120,000 miles.

Under the California LEV regulations, a manufacturer is required to monitor the frequency of emission-related warranty repairs and report those components that are failing above a certain rate. In lieu of a Delaware-specific report, the Department is proposing to allow a manufacturer to submit the Failure of Emission-Related Components reports that it submits to CARB. The manufacturer would be required to supply a copy of this report to the Department upon request.

An example of what could trigger the Department to request a copy of the report submitted to CARB is the Department's belief that an emission-related component may be failing at a different rate in Delaware than reported in California. The report data would enable the Department to better evaluate the issue.

### ***Section 8.0 - Reporting Requirements***

Beginning with MY 2013, each manufacturer would be required to submit two reports by March 1 following the close of the completed MY. For the first report, the manufacturer would tabulate the total number of passenger cars and light-duty trucks in each test group delivered for sale in Delaware. For the second report, each manufacturer subject to the NMOG fleet average requirements of proposed 5.0 would submit a report to the Department calculating its fleet-wide NMOG emission average for passenger cars and light-duty trucks delivered for sale in Delaware for the MY just ended. These reports will enable the Department to evaluate a manufacturer's compliance with the NMOG fleet average requirement.

### ***Section 9.0 - Enforcement***

In this proposal, all subject manufacturers must maintain records for a period of not less than five years after submitting any applications, notices, reports or amendments to the Department. The five-year record retention period is consistent with the record-keeping requirements for compliance documents specified. The five-year period allows the Department sufficient time to conduct compliance reviews and take any necessary enforcement action.

The Department is proposing that any orders, enforcement actions or voluntary emission-related recall campaigns taken by CARB that result in the recall of any model vehicle, shall also apply to all of the same model vehicles registered in Delaware. A manufacturer would have 30 calendar days following the issuance of the action by CARB to demonstrate to the Department that the action is not applicable to vehicles in Delaware. The Department believes that 30 calendar days are a reasonable amount of time for a vehicle manufacturer to make the demonstration to the Department.

The Department has both the framework and the authority to assess penalties if violations of this or any regulation are determined.

### ***Section 10.0 - Incorporation by Reference***

The implementation of sections of Title 13, CCR are being incorporated by reference in this regulation. In order to maintain consistency with the CCR, when California amends, supplements, repeals or otherwise changes a CAL-LEV rule, the change shall also be effective in Delaware. To accomplish this change, a proposal

must be made and subjected to the same regulatory process as that used to adopt this initial regulation. There is no allowance for “automatic” adoption in Delaware. Additionally, the Department intends that, when a provision of the CCR is incorporated by reference, the incorporation includes all documents and notes associated with that provision, unless specifically excluded by the new rules. Proposed Table 40-1 identifies the specific provisions of Title 13, CCR, which are to be incorporated by reference into the proposed rules.

If an inconsistency is found at any time between the Delaware regulation and the incorporated California rules, the Delaware regulation must be amended as soon as practicable. This is necessary since the Clean Air Act requires states to adopt regulations essentially identical to Title 13 CCR. Nothing in the incorporated California rules shall affect the Department's ability to enforce statutes, rules, permits, or orders administered or issued by the Secretary.

#### ***Section 11.0 – Document Availability***

This section announces where copies of this regulation and the various references can be obtained. This includes the incorporated California rules from California, as well as from Delaware's Air Quality Division.

#### ***Section 12.0 - Severability***

The Department proposes to include a “severability” provision on all sections of the regulation. The provision is consistent with similar provisions in other air pollution control rules.

### **III. AFFECTED SOURCES**

The California standards apply to new vehicles (less than 7,500 miles) transferred (i.e. sold, delivered, purchased, leased, rented, acquired, received, registered) into Delaware beginning with the 2013 model year. The regulation affects new gasoline and diesel passenger cars, light-duty trucks, and medium-duty vehicles.

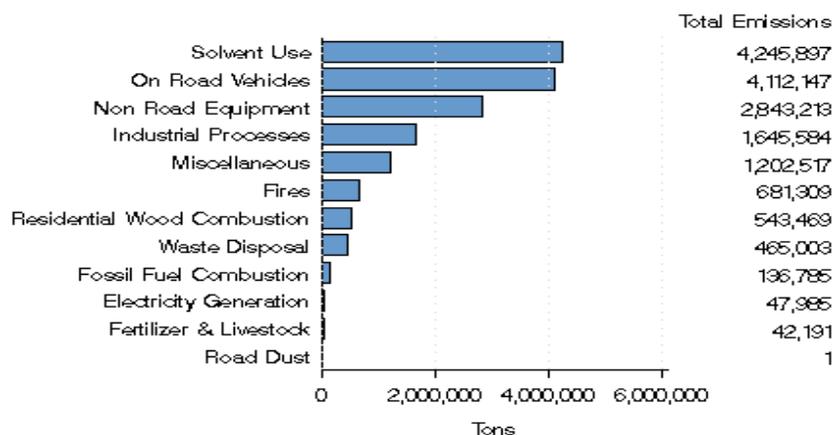
### **IV. VEHICLE EMISSIONS**

The DE LEV Program is another step toward mitigating some of the environmental and health impacts of air pollution in Delaware. Vehicle emissions pose a threat to Delaware's air quality and human health.

#### **Non Methane Organic Gases (NMOG)**

NMOG stands for Non Methane Organic Gases. It is analogous to Volatile Organic Compounds (VOC), which is a class of chemicals that participate in atmospheric photochemical reactions. VOCs in the atmosphere can lead to the formation of ground level ozone. Besides being a predominant factor in the formation of ozone, many VOCs are toxic and some are suspected carcinogens.

National Volatile Organic Compounds Emissions by Source Sector  
in 2005



Courtesy of US EPA

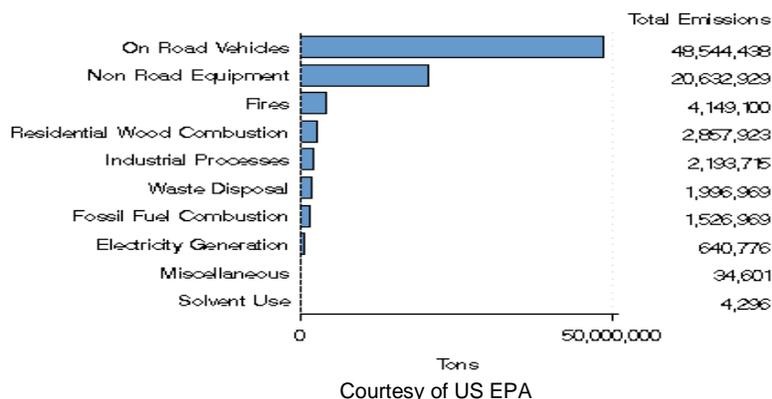
NMOG consists of all organic gasses, except methane, as determined by a specific EPA test method used in conjunction with highway engine emissions certification (EPA or CARB). All VOCs, except methane, are NMOG. All NMOG are not VOCs and all NMOG do not necessarily participate in the formation of ground-level ozone.

Because the vehicle emissions test methods cannot distinguish between photochemically active organic compounds, the CARB standard is written to regulate NMOG and therefore, indirectly, VOC.

### Carbon Monoxide (CO)

Nationwide, three-quarters of carbon monoxide emissions come from on-road motor vehicles (cars and trucks) and non-road engines (such as boats and construction equipment). Control measures have reduced pollutant emissions per vehicle over the past 20 years, but the number of cars and trucks on the road and the miles they are driven have doubled in the past 20 years. Vehicles are now driven two trillion miles each year in the United States. With more and more cars traveling more and more miles, growth in vehicle travel may eventually offset progress in vehicle emissions controls.

**National Carbon Monoxide Emissions by Source Sector**  
in 2005



Carbon monoxide can cause harmful health effects by reducing oxygen delivery to the body's organs (like the heart and brain) and tissues.

**Cardiovascular Effects.** The health threat from lower levels of CO is most serious for those who suffer from heart disease, like angina, clogged arteries, or congestive heart failure. For a person with heart disease, a single exposure to CO at low levels may cause chest pain and reduce that person's ability to exercise; repeated exposures may contribute to other cardiovascular effects.

**Central Nervous System Effects.** Even healthy people can be affected by high levels of CO. People who breathe high levels of CO can develop vision problems, reduced ability to work or learn, reduced manual dexterity, and difficulty performing complex tasks. At extremely high levels, CO is poisonous and can cause death.

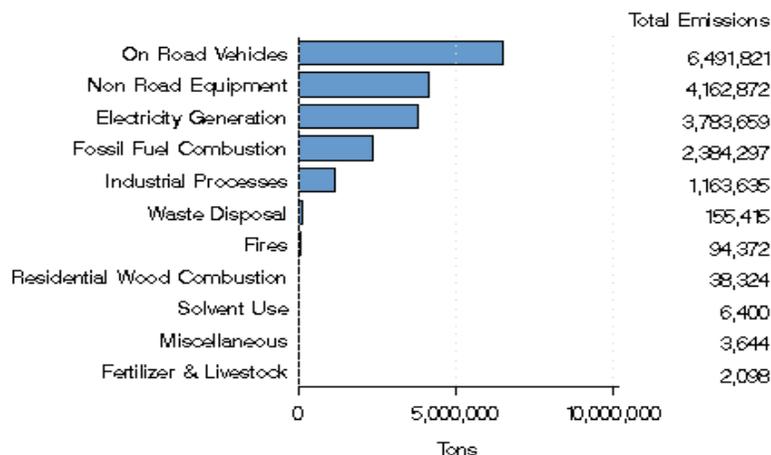
**Smog.** CO contributes to the formation of smog ground-level ozone, which can trigger serious respiratory problems.

### **Nitrogen Oxides (NO<sub>x</sub>)**

Nitrogen oxides (NO<sub>x</sub>) is a generic term for a group of reactive gasses that are composed of nitrogen and various amounts of oxygen (including nitrogen oxide and nitrogen dioxide). NO<sub>x</sub> is formed in the combustion process as a result of high temperature reactions of nitrogen in the fuel, and nitrogen in the ambient combustion air, with oxygen in the combustion air. NO<sub>x</sub> causes, or contributes to, a wide variety of health and environmental impacts.

### National Nitrogen Oxides Emissions by Source Sector

in 2005



Courtesy of US EPA

NO<sub>x</sub> contributes to the formation of ground level ozone (smog) by reacting with volatile organic compounds (VOC's) in the presence of heat and sunlight. Short term exposure to ozone can cause rapid, shallow breathing and related airway irritation, coughing, wheezing, shortness of breath, and exacerbation of asthma, particularly in sensitive individuals and asthmatic children. Short term exposure also suppresses the immune system, decreasing the effectiveness of bodily defenses against bacterial infections. Research studies indicate that markers of cell damage increase with ozone exposure. Some studies suggest that there is a link between ozone exposure and premature death of adults and infants. Other studies indicate a link between ozone and premature birth and adverse birth outcome, cardiovascular defects, and adverse changes in lung structure development in children.

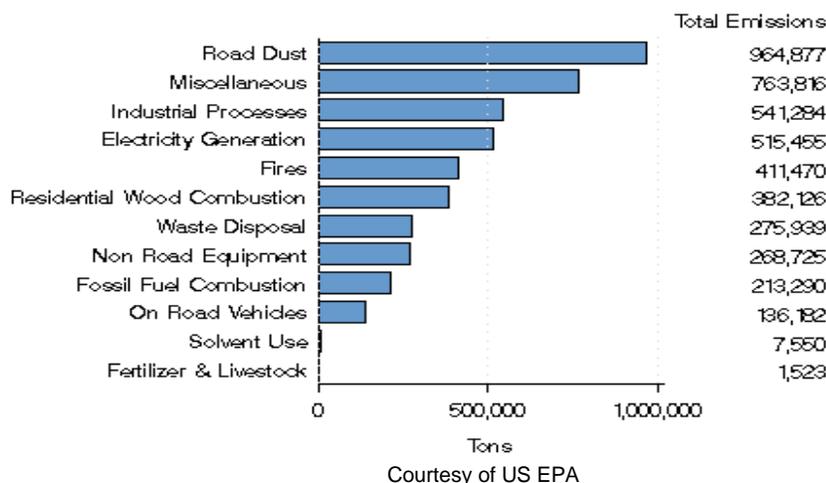
NO<sub>x</sub> reacts with other substances in the atmosphere to form acids that contribute to acid rain. Acid rain can damage cars and structures, and contribute to bodies of water becoming acidic and unsuitable for many fish. NO<sub>x</sub> precipitation can contribute to increased nitrogen loading in water bodies, particularly coastal estuaries, and upset the chemical balance of nutrients used by aquatic plants and animals. This can contribute to oxygen depletion which has adverse effects on fish and shellfish populations. NO<sub>x</sub> also contributes to fine particle matter concentrations in the atmosphere, which can adversely affect health and contribute to visibility impairment. The effect of fine particles on health is separately addressed.

### Particulate Matter (PM<sub>2.5</sub>)

Fine particulate matter (PM<sub>2.5</sub>) emissions will be impacted by the reductions in NO<sub>x</sub> emissions that are being addressed in this regulation. PM<sub>2.5</sub> indicates particulate matter of 2.5 micron diameter or smaller. PM<sub>2.5</sub> generally originates from the combustion of fossil fuels, and can be formed from sulfate and nitrate aerosols when SO<sub>2</sub> and nitrogen oxides condense in the atmosphere. PM<sub>2.5</sub> can also combine with other

substances in the atmosphere to become a complex, harmful mixture of sulfur, nitrogen, carbon, acids, metals, and airborne toxics.

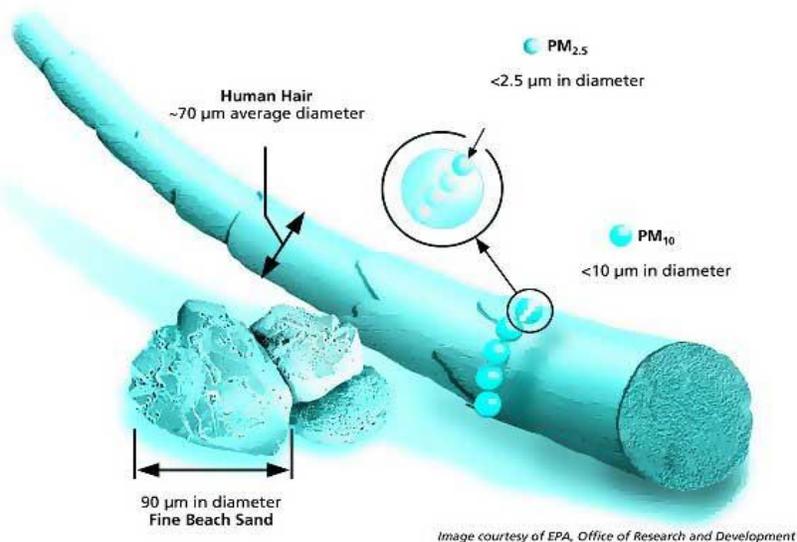
### National PM<sub>2.5</sub> Emissions by Source Sector in 2005



Short term exposure to high particulate levels has been shown to aggravate lung disease causing asthma attacks and acute bronchitis, increases susceptibility to respiratory infections, and cause heart attacks and arrhythmias in people with heart disease. Long term exposure to high particulate exposure has been shown to increase respiratory symptoms (coughing, breathing difficulty), cause decreased lung function, aggravate asthma, cause development of chronic bronchitis or chronic obstructive lung disease, cause irregular heartbeat, increase the rate of heart attacks, and increase the rate of premature death in people with heart or lung disease.

The health effects of particulate matter are strongly linked to particle size. Particles from fossil fuel combustion are likely to be most dangerous because they are small enough to be inhaled deeply into the lungs. There, the particulate can settle where the body's natural clearance mechanisms cannot remove them. Components of these small particles may also be more chemically active and acidic, thereby causing more damage. The smallest particles may be so small that they pass through the lungs into the blood stream, just like oxygen molecules.

Medical studies indicate that particulate matter may affect children even before they are born. There is evidence that low birth weight and premature births may be affected by exposure of a developing fetus to particulate matter in utero. Medical studies have also linked exposure to particulate matter to slow lung function growth in children.



## Carbon Dioxide (CO<sub>2</sub>)

CO<sub>2</sub> is a gas emitted through the burning of fossil fuels such as oil, natural gas, and coal, and through the burning of solid waste, trees, and wood products. It is also cycled through natural systems. Carbon dioxide is produced naturally through the eruption of volcanoes and respiration of animals. Plants use CO<sub>2</sub> in photosynthesis, converting energy from the sun into living matter such as leaves and branches. In addition, the oceans at their surface release CO<sub>2</sub> to the atmosphere and store CO<sub>2</sub> from the atmosphere.<sup>1</sup>

The federal Tier 2 Program does not address GHG emissions. Based on current GHG emission reporting guidelines, the federal EPA estimates that the transportation sector accounted for approximately one-third of the total U.S. GHG emissions. Transportation is the fastest-growing source of CO<sub>2</sub> in the U.S. and CO<sub>2</sub> is the most prevalent GHG. In Delaware, approximately one-third of CO<sub>2</sub> emissions are also emitted from vehicles.

The LEV regulation contains requirements for reducing GHG emissions from motor vehicles and sets progressively restrictive limits through 2016. When California has fully phased in the GHG requirements by 2016, new vehicles must emit an average of 30% less carbon dioxide (CO<sub>2</sub>). The targeted results are expected to be achieved using existing technologies or alternative fuels. The technologies include turbo charging, cylinder deactivation, variable valve lift and timing, low-leak air conditioning, continuously variable transmissions, direct fuel injection, and electric power steering.

<sup>1</sup> U.S. Environmental Protection Agency (EPA), Greenhouse Gas Emissions, <http://www.epa.gov/climatechange/emissions/index.html#ggo>, accessed 12/10/07.

Additionally, adoption of the LEV Program will not require the sale or use of California fuels. The courts have ruled that a state's failure to adopt California fuel requirements does not violate the requirement in §177 of the Clean Air Act that state emission standards be identical to the California standards.

## **Ozone (O<sub>3</sub>)**

### ***Formation and Sources of Ozone***

Ground level ozone, or smog, is formed when NO<sub>x</sub> and VOC emissions from automobiles and other pollution sources react in the presence of sunlight and heat. Ozone occurs most frequently during summer months. NO<sub>x</sub> is produced whenever fuels are burned from motor vehicles, power plants, industrial boilers and other combustion sources. VOCs are emitted in the form of exhaust and evaporative emissions from petroleum-fueled automobiles, trucks, boats, lawn mowers, and industrial and fueling operations.

### ***Ozone non-attainment***

EPA has proposed that the current level of the 8-hour primary standard, which was set at 0.075 ppm in the 2008 final rule, should instead be set at a lower level within the range of 0.060 to 0.070 ppm. This would provide increased protection for children and other "at risk" populations against an array of ozone-related adverse health effects that range from decreased lung function and increased respiratory symptoms to serious indicators of respiratory morbidity .

With regard to the secondary standard for ozone, EPA proposes that the secondary ozone standard, which was set identical to the revised primary standard in the 2008 final rule, should instead be a new cumulative, seasonal standard expressed as an annual index of the sum of weighted hourly concentrations, cumulated over 12 hours per day (8 am to 8 pm) during the consecutive 3-month period within the ozone season with the maximum index value, set at a level within the range of 7 to 15 ppm-hours.

Based on 2006 through 2008 ozone monitoring data, the 8-hour ozone values for New Castle, Kent, and Sussex counties are 0.083 ppm, 0.081 ppm, and 0.081 ppm, respectively. Since these values are all greater than the 0.075 ppm standard, all three counties in Delaware will likely be designated as non-attainment for both the primary and secondary 8-hour ozone NAAQS. Implementation of LEV within Delaware will help to attain and maintain the new ozone standard, and help with maintenance of the prior .08ppm ozone NAAQS, by reducing emissions of air contaminants from motor vehicles.

### ***Health and Environmental Effects of Ozone and Ozone Precursors***

Ozone is a photochemical oxidant that can cause lung dysfunction and eye, nose and throat irritation. It can also exacerbate respiratory illness and reduce resistance to

infection. Ozone is of particular concern for children, the elderly, people with asthma and other chronic respiratory diseases and people exercising and working outdoors for prolonged periods of time. It can also damage forests, other vegetation and agricultural crops as well as natural and synthetic materials.

## V. ECONOMIC ANALYSIS

The LEV Program is expected to increase the cost of new vehicles in the long-term. Currently, there is no price difference for the consumer. Delaware does not receive “Delaware specific” vehicles that only meet Tier 2 standards but not LEV 2 standards. For the ozone-reducing standards, the incremental cost of a California car over a federal Tier 2 car is less than \$100. The GHG standards, which began in 2009 in California and will be fully phased-in by 2016, are expected to increase the cost of a vehicle by a little more than \$1,000 in 2016. However, complying vehicles will be much more fuel-efficient than those meeting the federal Tier 2 standards. Those fuel savings will more than offset the increased vehicle cost. Multiple analyses indicates that increased vehicle costs will be completely offset by reduced operating costs, resulting in a net savings to consumers of \$1,000 for trucks and \$2,000 for cars over an average 150,000 miles. CARB estimated additional cost per vehicle due to GHG controls:

Model Year	Cars/Small Trucks	Larger trucks/SUVs
2009	\$ 17	\$ 36
2010	58	85
2011	230	176
2012	367	277
2013	504	434
2014	609	581
2015	836	804
2016	1064	1029

Adoption of the LEV Program could have a far greater economic impact in Delaware due primarily to the ZEV component. In 2011, the incremental cost of a partial zero emissions vehicle (PZEV) is estimated to be \$100 (low end estimate) and the incremental cost of an alternative technology zero emissions vehicle (AT-PZEV) is estimated at \$700. (California Air Resources Board, Staff Report: Initial Statement of Reasons: 2003 Proposed Amendments to the California ZEV Program Regulations, January 10, 2003.)

We understand that the auto industry disagrees and estimates that these vehicles will cost up to \$3000 per vehicle to comply; they also disagree with how CARB calculated operational savings and how consumers value those operational savings. Over the past 30 years, the estimates of cost put forth by the auto industry have tended to be much higher than has proved to be the case. While the industry estimates cost for the program are substantially higher, they do not alter the fundamental cost effectiveness of the program and consumers will see benefits within the expected the average lifetime of the vehicle.

## **VI. ALTERNATIVES CONSIDERED**

The Department had several options to consider before proposing the current DEL LEV Program. The options were to do nothing and continue in the Federal Program, propose LEV without ZEV, or propose LEV with ZEV.

The Department decided that continuing in the Federal Program did not provide enough cost-effective emission reductions. Although DE is surrounded by LEV states and receives CARB certified cars due its proximity to these states, there is no guarantee that CARB certified vehicles will be delivered to DE. As the Federal Program and LEV Program begin to converge towards uniformity, fewer reductions will be realized the longer the implementation of LEV is delayed.

The more reductions of ozone-producing pollution we can get from vehicle technology, the less we have to rely on controls from industrial or commercial sources. There is no single practical program left, that by itself will have substantial emission reductions. While Delaware's air quality problem is not as severe as California's, California is a leader in strategies to reduce motor vehicle emissions.

The Department also considered proposing LEV with ZEV. The requirement of ZEV sales is, without a doubt, the most contentious issue regarding the "California car" adoption. The alternative approach of tracking sales of "ZEV equivalents" provide the manufacturers the ability to obtain the same emission reduction benefits as would result from ZEVs, by selling more of the cleanest Low Emission Vehicles. EPA has expressed its opinion that excluding ZEV in favor of the "ZEV equivalents" does not violate the "identity" requirement.

EPA ruled that the ZEV production mandate is not required to ensure consistency with section 177 for the reasons given in the SNPRM. (See 59 FR at 48691–48692). EPA is leaving to each individual state the decision as to whether to adopt the ZEV mandate. EPA is not resolving whether the ZEV mandate is an "emission standard." Rather, the Agency concludes that the ZEV production mandate is not required to meet the identical standards provision under section 177, whether or not the mandate is a standard relating to control of emissions. Section 177 does not require adoption of all California standards for a particular model year, but only requires that if a state adopts motor vehicle standards, those standards that are adopted must be identical to California's standards. The ZEV production mandate and the remainder of the LEV program can be segregated from each other, and the ZEV mandate is not essential for implementation and enforcement of the remainder of the LEV program, which is a fully functional and enforceable motor vehicle emissions program. States

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adopting the LEV program therefore need not adopt the ZEV mandate to comply with the requirement for identical standards under section 177. (40 CFR Parts 51, 52 and 85 [FRL-5141-8] RIN-2060-AF15. Final Rule on Ozone Transport Commission; Low Emission Vehicle Program for the Northeast Ozone Transport Region. January 24, 1995 Pages 4728-29.)

CARB is scheduled to implement LEV 3 during 2011. If finalized, the Department would be forced to upgrade to LEV 3 (to avoid a “third wheel” scenario) or return to the Federal Program. At that time, the Department could also decide to include ZEV into DEL LEV 3 if it so chooses.

## **VII. REASONS FOR DELAWARE TO IMPLEMENT THE LEV PROGRAM**

California and the LEV states in the Northeast have now had actual experience with the program. We now know that the cost differential is lower than originally projected and always lower than the industry predicts, and at this time, do not translate to any significant price differential. We face new challenges in public health and welfare despite our constant progress in reducing emissions. Amounts of smog-producing emissions from vehicles will remain significant. There are more states implementing the program, increasing the market share of LEV cars, and thus reducing any competitive disadvantage dealers may face. Reducing greenhouse gases from vehicles can also be done at an overall cost savings to consumers.

Introducing the LEV Program without ZEV provides a balanced regulation that guarantees the cleanest vehicles to the citizens of Delaware, without adding extra burden to the manufactures by requiring the ZEV production mandate.

APPENDIX A

Federal Tier 2 / CAL LEV II Emission Standard Comparison (g/mi)

Tier 2 Bin #	Intermediate Life (5 years / 50,000 mi)					Full Useful Life (120,000 mi)				
	NMOG	CO	NOx	PM	HCHO	NMOG	CO	NOx	PM	HCHO
8	0.1	3.4	0.14	-	0.015	0.125	4.2	0.2	0.02	0.018
7	0.075	3.4	0.11	-	0.015	0.09	4.2	0.15	0.02	0.018
6	0.075	3.4	0.08	-	0.015	0.09	4.2	0.1	0.01	0.018
5	0.075	3.4	0.05	-	0.015	0.09	4.2	0.07	0.01	0.018
4	-	-	-	-	-	0.07	2.1	0.04	0.01	0.011
3	-	-	-	-	-	0.055	2.1	0.03	0.01	0.011
2	-	-	-	-	-	0.01	2.1	0.02	0.01	0.004
1	-	-	-	-	-	0	0	0	0	0
<b>Fleet Ave.</b>						<b>0.07</b>				
<b>LEV Vehicle Type</b>										
LEV	0.075	3.4	0.05	-	0.015	0.09	4.2	0.07	0.01	0.018
ULEV	0.04	1.7	0.05	-	0.008	0.055	2.1	0.07	0.01	0.011
SULEV	-	-	-	-	-	0.01	1	0.02	0.01	0.004
ZEV	-	-	-	-	-	0	0	0	0	0
<b>Fleet Ave</b>	<b>0.035</b>									

## APPENDIX B

### Emission Estimate for 2015

#### Federal Tier 2 / CAL LEV II Emission Modeling Comparison (tons)

County		HC	CO	NO2	NO	NOx
Kent	FED	1672	27053	682	2745	3427
	LEV	1626	26691	670	2658	3328
	Reduction	46	362	12	87	99
NC	FED	5710	89752	2190	9620	11810
	LEV	5560	88489	2148	9332	11481
	Reduction	150	1263	42	288	329
Sussex	FED	2293	36379	995	3980	4975
	LEV	2229	35928	977	3852	4829
	Reduction	64	451	18	128	146
Total	FED	9675	153184	3867	16345	20212
	LEV	9415	151108	3795	15842	19638
	Reduction	260	2076	72	503	574

There are some differences in the required fleet average standards and the way that manufacturers meet those standards between the Federal and California programs. In MOVES, these differences apply only to NOx, CO, and HC (in all of its various forms). There are no differences for PM or GHG.

Gary Dolce  
 US EPA, OTAQ.

**APPENDIX C**  
**Emission Estimates for 2020**  
**Federal Tier 2 / CAL LEV II Emission Modeling Comparison**  
**(tons)**

<u>County</u>		<u>CO</u>	<u>NO2</u>	<u>NO</u>	<u>NOx</u>
Kent	FED	20472	302	1900	2202
	LEV	20352	299	1867	2166
	Reduction	120	3	33	36
NC	FED	69207	1404	6706	8110
	LEV	68790	1390	6601	7991
	Reduction	417	14	105	119
Sussex	FED	27770	451	2820	3271
	LEV	27605	443	2766	3209
	Reduction	165	8	54	62
Total	FED	117449	2157	11426	13583
	LEV	116747	2132	11234	13366
	Reduction	702	25	192	217

There are some differences in the required fleet average standards and the way that manufacturers meet those standards between the Federal and California programs. In MOVES, these differences apply only to NOx, CO, and HC (in all of its various forms). There are no differences for PM or GHG.

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