

**STAFF REPORT:  
INITIAL STATEMENT OF REASONS FOR  
PROPOSED Rulemaking**



**PROPOSED REGULATION FOR DRAYAGE TRUCKS**

**Stationary Source Division  
Project Assessment Branch**

October 2007

**State of California  
AIR RESOURCES BOARD**

**STAFF REPORT:  
INITIAL STATEMENT OF REASONS  
FOR THE PROPOSED RULEMAKING**

**Public Hearing to Consider**

**REGULATION TO REDUCE EMISSIONS FROM  
HEAVY-DUTY ON-ROAD DRAYAGE TRUCKS IN  
CALIFORNIA PORT AND INTERMODAL RAIL SERVICE**

To be considered by the Air Resources Board on December 6 and 7, 2007, at:

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**State of California  
AIR RESOURCES BOARD**

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CALIFORNIA PORT AND INTERMODAL RAIL SERVICE**

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## EXECUTIVE SUMMARY

The California Air Resources Board (ARB or Board) staff is proposing a regulation to reduce diesel particulate matter (PM) and oxides of nitrogen (NOx) emissions from drayage trucks operating at California's ports and rail yards. The proposed Drayage Truck Regulation (regulation) is part of ARB's ongoing efforts to reduce PM and NOx emissions from diesel-fueled engines and improve air quality associated with goods movement. In addition, the regulation also provides green house gas benefits and is designed to support local emission reduction goals such as the Clean Air Action Plan by the ports of Los Angeles and Long Beach and the Comprehensive Truck Management Plan by the Port of Oakland. A copy of the proposed regulation is provided in Appendix A of this report. (SPB – CAAP, 2006) (CAAPTech, 2006)

Drayage trucks are on-road, diesel-fueled, heavy-duty trucks that transport containers, bulk, and break-bulk goods to and from the ports and intermodal rail yards as well as to many other locations. Staff estimates that there are approximately 100,000 drayage trucks statewide, of which approximately 20,000 frequently service the ports and rail yards. This segment of the drayage fleet consists largely of independent owner / operators and staff estimates that approximately 80 percent of such drayage trucks are operator owned. Currently, about 3 tons per day (tpd) of diesel PM and 61 tpd of NOx are emitted from drayage trucks due to moving goods to and from California's ports and intermodal rail yards.

Diesel PM was identified as a toxic air contaminant in 1998. Long-term exposures to diesel PM increase the risk of developing lung cancer. Non-cancer impacts, including premature death and respiratory disease, are associated with exposure to directly emitted diesel PM and secondary diesel PM formed when NOx emissions from diesel engines react in the atmosphere to form nitrates. Additionally, NOx emissions contribute to the formation of regional ozone and its associated adverse health effects such as: reduced lung function, increased respiratory symptoms, increased airway hyper-reactivity, and increased airway inflammation.

The purpose of the proposed regulation is to reduce the near-source and regional health risks caused by elevated levels of diesel PM emissions and reduce regional exposures to ozone and secondary PM through NOx emission reductions. The regulatory goals focus on reducing diesel PM as expeditiously as possible and meet, in particular, PM<sub>2.5</sub> standards in the South Coast by 2014.

The proposed regulation includes requirements for trucks in drayage service and establishes emission standards that may require the installation of ARB certified retrofit technologies, the use of trucks meeting more recent California and federal emission standards (emission standards), or both. The proposal would also establish recordkeeping and reporting requirements for drayage truck owners, motor carriers, port terminal operators, rail yard operators, and port and rail authorities.

The proposed regulation sets two distinct compliance deadlines that will affect virtually all drayage trucks that currently move containers and certain other goods to and from ports and intermodal rail yards. First, by December 31, 2009 (Phase 1), all pre-1994 model year (MY) engines are to be retired and / or replaced with 1994 and newer MY engines. Furthermore, all trucks with 1994 – 2003 MY engines would be required to achieve an 85 percent PM emission reduction through the use of an ARB approved level 3 verified diesel emission control strategy (VDECS)<sup>1</sup> (ARBver, 2002). Secondly, by December 31, 2013 (Phase 2), all trucks with 1994 – 2003 MY engines would be required to further reduce emissions to meet the 2007 MY emission standards. Phase 2 of the proposed regulation is designed, in part, to ensure that the NOx emission reductions critical to attainment of federal standards in the South Coast and San Joaquin Valley Air Basins occurs on the needed schedule.

The proposed regulation applies to any person who owns or operates a diesel-fueled drayage truck having a gross vehicle weight rating greater than 33,000 pounds that operates at specified California ports, intermodal rail yards, or both. Under the proposed regulation, owners and operators of drayage trucks equipped with 2004 through 2006 certified model year engines (2004 emission standard engines) would be subject to the monitoring, recordkeeping, reporting, and registry requirements of this regulation. However, the proposed regulation would not specify engine replacement or retrofit requirements for this group of drayage trucks. The engine replacement / retrofit requirements will be established for this group of drayage trucks in the forthcoming regulation for in-use, on-road, diesel-fueled, fleets to be considered by the Board in 2008.

Under the proposed regulation, all drayage trucks involved in work at affected ports and rail yards would be registered in a drayage truck registry (DTR) by late 2009 and would be required to affix a compliance label to the driver's side door. Only compliant trucks would be issued a registry label. Motor carriers would be required to only dispatch trucks with a valid DTR label or face enforcement action. Terminal and rail yard operators would be required to report all trucks entering their facilities without a valid DTR label to their respective port or rail authority according to a set schedule. This information would then be forwarded to ARB enforcement for action against the motor carrier (for dispatching non-compliant truck(s)).

Staff estimates that currently about 28 percent of drayage trucks in service are pre-1994 MY, 68 percent are MY 1994 – 2003, and 4 percent are MY 2004 and newer. To comply with Phase 1, all pre-1994 MY trucks would need to be replaced with 1994 and newer MY trucks and have installed a level 3 VDECS, unless the replacement truck has a 2004 or newer engine. Staff believes that most MY 1994 – 2003 trucks will be retrofitted with a level 3 VDECS rather than be replaced with 2004 and newer emission standard compliant trucks. To comply with Phase 2, staff believes that pre-2004 emission standard compliant trucks will be replaced with MY 2007 and newer vehicles. The possible introduction of new emission reduction technologies could provide other

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<sup>1</sup> Title 13, CCR, Section 2700 – 2710. ARB's Verification Program.

compliance pathways and could significantly reduce the costs of the proposed regulation.

In 2010, after full implementation of Phase 1, diesel PM emissions from drayage trucks would be reduced from baseline 2007 levels by nearly 2.6 tpd (86 percent reduction), and NOx emissions would be reduced by approximately 2 tpd (3 percent reduction). In 2014, after full implementation of Phase 2, NOx emissions would be reduced from baseline 2007 levels by nearly 34 tpd (56 percent reduction) with some additional PM reductions. The emission reductions from the proposed regulation would result in lower ambient PM levels and reduced exposure to diesel PM. The reduction in potential cancer risk was assessed for a heavily traveled segment of the I-710 freeway near the ports of Los Angeles and Long Beach. Based on the overall projected reduction in drayage truck PM emissions, staff estimates a greater than 75 percent reduction in potential cancer risks depending on the distance from the freeway. Additionally, staff estimates that approximately 580 premature deaths statewide would be avoided by year 2014 from implementation of the proposed regulation. Staff also estimates that the proposed rule will reduce carbon dioxide (CO<sub>2</sub>) emissions. CO<sub>2</sub> emissions from vehicles are directly proportional to fuel consumption. Phase 1 of the proposed regulation requires fleet owners to replace pre-1994 MY trucks (mechanical fuel injection) with 1994 or newer vehicles (electronic fuel injection). Trucks with electronic fuel injection achieve better fuel economy (4.5 miles per gallon for mechanical fuel injection versus 6.0 miles per gallon for electronic fuel injection) and as a result, staff estimates a diesel fuel savings of 11 million gallons per year. This fuel savings is expected to reduce carbon dioxide emissions by approximately 7 percent.

Staff estimates that the costs to comply with the proposed regulation would be approximately \$1.1 - \$1.5 billion (2006 dollars). The costs are the incremental costs of regulation compliance and include those costs associated with the early replacement of trucks (the residual value of the truck being replaced), retrofit aftertreatment installation and maintenance costs, and recordkeeping and reporting costs. Staff has estimated initial Phase 1 costs of \$10,000 to \$31,000 per truck (2006 dollars) for retrofit and/or replacement and initial Phase 2 net costs of approximately \$33,000 (2006 dollars) for truck replacement, which could create an economic hardship.

Staff is proposing to use Proposition 1B funds to help with the initial costs of Phase 1 and reduce the economic hardship on truck owners. It is expected that 1B funds would be used to co-fund the cost of a PM retrofit device or purchase a 2007 MY or newer truck. The use of bond funds would help to greatly accelerate implementation and significantly reduce diesel impacts to surrounding communities.

Staff evaluated the economic impact of complying with the requirements of the proposed regulation on California's economy using the E-DRAM model. The results of this analysis indicates the gross state output would be reduced by \$650 to \$870 million (less than 0.03 percent) and personal income would be reduced by roughly \$220 million (less than 0.02 percent) in 2013. California employment would be reduced by 2,400 to 3,300 (less than 0.02 percent) in 2013. Therefore, the impacts of the proposed

regulation are small compared to the growth that is expected to occur in California over the next 7 years. In addition, the value of the health benefits of the proposed regulation is substantial, and significantly exceeds the direct costs. The estimated economic value of the avoided premature deaths and other health benefits due to the emission reductions are estimated to range from \$3.5 (discounted at 7 percent) to \$4.3 billion (discounted at 3 percent).

Staff has determined that multiple local, State, and federal agencies could be impacted by the proposed regulation. To the extent that these agencies are responsible for port or rail operations, they would be responsible for collecting and collating truck entry information from the terminals and rail yards and relaying it to the ARB. ARB staff estimates costs would be relatively small and could be absorbed within current budgets.

The ARB would also be the primary enforcement agency and would need an estimated additional four (4) staff to perform compliance inspections and audits at a cost of approximately \$400,000 per year. Additionally, staff estimates total ARB outreach costs would be approximately \$110,000.

Staff estimated the cost effectiveness by assuming that all costs for complying with Phase 1 would be attributable to PM emission reductions and all costs for Phase 2 compliance would be attributable to NOx emission reductions, which resulted in a PM cost effectiveness range of \$57 - \$77 per pound and NOx cost effectiveness range of \$6 - \$8 per pound. The cost effectiveness for this proposed regulation is consistent with the Public Fleets Rule PM cost effectiveness of \$160 per pound and NOx cost effectiveness of approximately \$9<sup>2</sup> per pound, which the Board approved in 2005.

Staff crafted the proposed regulation to postpone Phase 2 (2007 engine requirements) as long as possible to minimize used truck prices. In addition, this will allow time for the development of new (and potentially less expensive) emission reduction technologies and give truck owners financial planning lead time. However, the timely attainment of federal standards in the San Joaquin Valley and South Coast Air Basins necessitate very substantial NOx reductions by 2014 to meet SIP obligations. Staff believes the 2013 compliance requirements are attainable and that sufficient lead-time has been provided for industry to generate a solution (e.g. drayage rate structure changes) that would enable truck owners to afford compliance.

Staff believes that supplemental funding (such as is available from Proposition 1B monies), a change in the drayage rate fee structure, or both will be critical in allowing many current truck owners to meet the requirements of the proposed regulation. In implementing the proposed regulation, it is expected that staff would work with the ports, terminal and rail yard operators, shippers, local districts, and other parties to secure funding to both accelerate compliance and ensure that the emission targets are met without an interruption in drayage service throughout the State. Staff will update the Board on progress in this regard and may consider proposing amendments to the

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<sup>2</sup> Combined HC + NOx

proposed regulation for the Board's consideration if substantial problems are occurring and changes are needed to successfully implement the program.

Potential funding mechanisms include a number of federal and State programs that may be utilized by program administrators or truck owners. Funding programs include: The Congestion Mitigation and Air Quality Improvement Program (U.S. Department of Transportation) which provides funding to state and local governments to support transportation projects as well as programs to improve air quality and reduce traffic congestion; The U.S. EPA's National Clean Diesel Campaign which offers funding and technical assistance to foster the adoption of cleaner diesel technologies and strategies; The Carl Moyer grant program that is implemented by a partnership between the ARB and local air districts; and Proposition 1B which will fund projects that reduce air pollution and consequently the resulting health risk associated with freight movement along California's trade corridors. An expanded discussion of these programs is provided in the Technical Support Document.

## 1. INTRODUCTION

This Initial Statement of Reasons (Staff Report) presents an evaluation of the need for emission reductions from drayage trucks. The evaluation includes corresponding health impacts, a summary of the proposed regulation, and the projected emissions reductions along with the associated reduction in health risk. The estimated costs for regulation compliance are presented, for both industry and State and local governments, along with the alternative proposals considered. A copy of the proposed regulation is provided in Appendix A. The Technical Support Document (TSD), an addendum to the Staff Report, provides more detailed analyses of these subjects and supporting documentation for the proposal. The TSD is provided under separate cover.

The California Air Resources Board's (ARB or Board) mission is to protect public health, welfare, and ecological resources through the effective and efficient reduction of air pollutants, while recognizing and considering the effects on the economy of the State. The ARB's vision is that all individuals in California, especially children and the elderly, can live, work, and play in a healthful environment – free from harmful exposure to air pollution. To help achieve this, ARB has adopted numerous regulations to control emissions from many different sources, including diesel engines. Diesel engine exhaust is a significant health concern because it is a source of unhealthful air pollutants including gaseous and particulate-phase toxic air contaminants (TAC), particulate matter (PM), oxides of nitrogen (NOx), carbon monoxide, and hydrocarbons.

In 1998, the Board identified diesel PM as a TAC with no Board-specified threshold exposure level, pursuant to Health and Safety Code (HSC) sections 39650 through 39675 (ARB, 1998). A needs assessment for diesel PM was conducted between 1998 and 2000 pursuant to HSC sections 39658, 39665, and 39666. This resulted in ARB staff developing and the Board approving the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (Diesel RRP) in 2000. The Diesel RRP presented information on the available options for reducing diesel PM and recommended regulations to achieve these reductions. The plan's scope was broad, addressing all categories of mobile and stationary engines. It included recommendations for the development of control measures for diesel sources, such as those covered by the proposed regulation. The ultimate goal of the Diesel RRP is to reduce, by 2020, California's diesel PM emissions and associated cancer risks by 85 percent from the 2000 levels. (ARB, 2000)

In April 2006, the Board approved the *Emission Reduction Plan for the Ports and Goods Movement in California* (Plan). The Plan identifies strategies for reducing emissions created from the movement of goods through California ports and into other regions of the State. The Emission Reduction Plan is part of the broader Goods Movement Action Plan being jointly carried out by the California Environmental Protection Agency and the Business, Transportation, and Housing Agency (ARB, 2006). Phase I of the Goods Movement Action Plan (GMAP) was released in September 2005, and highlighted the air pollution impacts of goods movement and the urgent need to mitigate localized health risk in affected communities. The final GMAP was released in January 2007 and

includes a framework that identifies the key contributors to goods movement-related emissions.

The Plan identifies numerous strategies for reducing emissions from all significant emission sources involved in goods movement, including ocean-going vessels, harbor craft, cargo handling equipment, locomotives, and trucks. The Plan establishes emission reduction goals for drayage trucks including modernizing (replacing and/or retrofitting) port trucks, implementing California and federal 2007 truck emission standards, and restricting entry of trucks new to port service unless equipped with diesel PM controls. The proposed regulation would represent a significant first step toward satisfying the Emission Reduction Plan goals. (BTH & CalEPA, 2007)

The federal Clean Air Act (CAA) requires U.S. EPA to establish National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health, including fine particulate matter (PM<sub>2.5</sub>) and ozone. Set to protect public health, the NAAQS are adopted based on a review of health studies by experts and a public process. Ambient PM<sub>2.5</sub> is associated with premature mortality, aggravation of respiratory and cardiovascular disease, asthma exacerbation, chronic and acute bronchitis and reductions in lung function. Ozone is a powerful oxidant. Exposure to ozone can result in reduced lung function, increased respiratory symptoms, increased airway hyper-reactivity, and increased airway inflammation. Exposure to ozone is also associated with premature death, hospitalization for cardiopulmonary causes, and emergency room visits for asthma.

Areas in the State that exceed the NAAQS are required by federal law to develop State Implementation Plans (SIPs) describing how they will attain the NAAQS by certain deadlines. The NO<sub>x</sub> emission reductions are needed because NO<sub>x</sub> leads to formation in the atmosphere of both ozone and PM<sub>2.5</sub>; diesel PM emission reductions are needed because diesel PM contributes to ambient concentrations of PM<sub>2.5</sub>.

The South Coast Air Quality Management District (SCAQMD) and the San Joaquin Valley Air Pollution Control District (SJVAPCD) are designated as nonattainment of both the federal 8-hour ozone and federal PM<sub>2.5</sub> NAAQS. In order to demonstrate that the necessary emission control programs are in place, the U.S. EPA requires that all necessary emission reductions be achieved by 2014 for PM<sub>2.5</sub> and 2023 for ozone.

In both the South Coast and San Joaquin Valley air basins significant reductions of NO<sub>x</sub> are crucial to meet the federal standards. For example, at this time, the strategy to achieve attainment of the PM<sub>2.5</sub> standards in the South Coast Air Basin includes staff estimates that a 55 percent reduction in NO<sub>x</sub> emissions from 2006 levels (i.e., a total reduction of hundreds of tons per day) and a 15 percent reduction in direct PM<sub>2.5</sub> emissions from 2006 baseline levels will be necessary for attainment of the PM<sub>2.5</sub> standards in the South Coast Air Basin. The NO<sub>x</sub> emission reductions from the proposed regulation would play an essential role in assisting the South Coast Air Basin with meeting its 2014 PM<sub>2.5</sub> deadline as well as its future ozone deadlines.

The federal CAA permits states to adopt more protective air quality standards and California has set standards for particulate matter and ozone that are more protective of public health than respective federal standards. The Bay Area, South Coast, San Joaquin Valley, and San Diego areas are nonattainment for the State standards for ozone and PM<sub>2.5</sub>. HSC section 40911 requires the local air districts to submit plans to the Board for attaining the State ambient air quality standards, and HSC section 40924 requires triennial updates of those plans. The NOx and PM<sub>2.5</sub> emission reductions from the proposed regulation will assist the local air districts in achieving attainment of the State ambient air quality standards.

Staff is proposing a regulation to reduce diesel PM and NOx emissions from trucks in drayage service at California's ports and intermodal rail yards. The regulation would significantly reduce diesel PM emissions by the end of 2009. Diesel PM emission reductions are needed to reduce premature mortality, cancer risk, and other adverse impacts from exposure to this TAC especially in heavily impacted communities near major ports and rail yards. By 2014, staff projects that drayage truck diesel PM emissions would be reduced about 86 percent and NOx emissions about 56 percent from the 2007 baseline. These emission reductions would occur in areas on and near ports and rail yards, along the major truck roadway arteries leading into the ports and rail yards, and in those communities surrounding these areas, as well as further inland.

The regulation would also reduce diesel PM and NOx emissions that contribute to exceedances throughout the State of ambient air quality standards for both PM<sub>2.5</sub> and ozone. These reductions would assist California in its goal of achieving state and federal air quality standards.

## **2. EMISSIONS INVENTORY**

### **Drayage Truck Population**

The proposed regulation would affect drayage trucks that currently service California's ports and intermodal rail yards. Of these, approximately 20,000 trucks service the ports or intermodal rail yards regularly, on average several times a week or more. These are defined as frequent and semi-frequent trucks and are responsible for a large majority of port and rail yard drayage truck emissions. Another estimated 80,000 drayage trucks service ports and rail yards much less frequently, and derive the bulk of their revenues from drayage services to other locations. As expected, a large majority of drayage trucks operate at the ports of Los Angeles and Long Beach. The third largest population operates at the Port of Oakland with the rest spread among the remaining ports and rail yards. Tables 1 and 2 show port and rail yard drayage truck populations by frequency.

**Table 1: Port Drayage Truck Populations (2007)**

Facility Name	Number of Frequent & Semi-Frequent Trucks	Total Number of Trucks (Including Non-Frequent)
Los Angeles	13,800	55,000 – 90,000
Long Beach		
Oakland	2,800	8,000
San Diego	300	900
Hueneme	100	300
San Francisco	100	300
Redwood City	100	200
Richmond	Dedicated Car Carriers	Dedicated Car Carriers
Humboldt Bay (Eureka)	40	100
Crockett	50	100
Pittsburgh	50	100
Stockton	200	500
Sacramento	40	100
Benicia	10	20
<b>Total</b>	<b>~18,000</b>	<b>~66,000 - 101,000</b>

**Table 2: Intermodal Rail Yard Drayage Truck Populations (2007)**

Facility Name	Number of Frequent & Semi-Frequent Trucks	Total Number of Trucks (Including Non-Frequent)
Oakland UP	150	450
Hobart BNSF	1,000	3,300
LATC UP	300	1,100
Commerce UP	500	1,700
Richmond BNSF	100	400
Commerce Eastern BNSF	400	1,300
ICTF UP*	0	0
San Bernardino	700	2,400
Stockton Intermodel BNSF	250	800
Lathrop Intermodel UP	200	700
Oakland BNSF *	0	0
<b>Total</b>	<b>3,600</b>	<b>12,000</b>

\*ICTF UP in Los Angeles and BNSF in Oakland handled only port container traffic. The trucks are included in the port inventories shown in Table 1.

## Drayage Truck Age Distribution

To determine the age distribution of the drayage trucks visiting the Los Angeles and Long Beach ports, staff analyzed the optical character recognition (OCR) data collected by the ports. Optical character recognition data is captured by utilizing equipment which optically scans and records characters (in this case, license plate information) from trucks entering terminals. Staff then compared the license plate information with the Department of Motor Vehicle data base and developed an age distribution for the trucks servicing the ports. Similar methodologies were utilized to generate age distributions for the Port of Oakland and rail yards (See the Technical Supporting Document (TSD) for further analysis). No license plate data were available for the remaining ports and staff assumed they would have the same age distributions as the Port of Oakland. The age distributions revealed the drayage truck fleet has an average age of 13 years, which differs slightly from the average age of 12 years seen in the overall fleet of California registered. Table 3 below shows the overall estimated age distribution and percent of the population for all affected ports and intermodal rail yards.

**Table 3: 2007 Drayage Truck Age Distribution**

<b>Model Year</b>	<b>Percent of Population</b>
2007	<1%
2004-2006	4%
1994-2003	68%
Pre-1994	28%

The proposed regulation affects on-road, diesel-fueled, class-8 trucks (trucks with a gross vehicle weight rating greater than 33,000 pounds) in frequent intermodal drayage service. These trucks comprise about 10 percent of the statewide California registered Class-8 truck fleet and generate about 6 percent of the NOx emissions and about 7 percent of the PM emissions. ARB staff estimates that about 70 percent of NOx and 74 percent of PM emissions from drayage trucks are in the SCAQMD. Furthermore, about 10 percent of all NOx and 6 percent of all PM drayage truck emissions are in the Bay Area Air Quality Management District (BAAQMD), and approximately 11 percent of NOx and 10 percent of PM drayage truck emissions are in the SJVAPCD. The remaining emissions are distributed over other districts with affected ports and rail yards (see Table 4).

**Table 4: Drayage Truck Emissions Inventory (2007)**

Location	2007 Pollutant Emissions, Tons/Year	
	PM	NOx
SCAQMD	630	12,000
BAAQMD	50	2,000
San Joaquin Valley	90	2,000
Rest of State	80	2,000
<b>Total</b>	<b>850</b>	<b>18,000</b>

### 3. HEALTH RISK AND BENEFITS

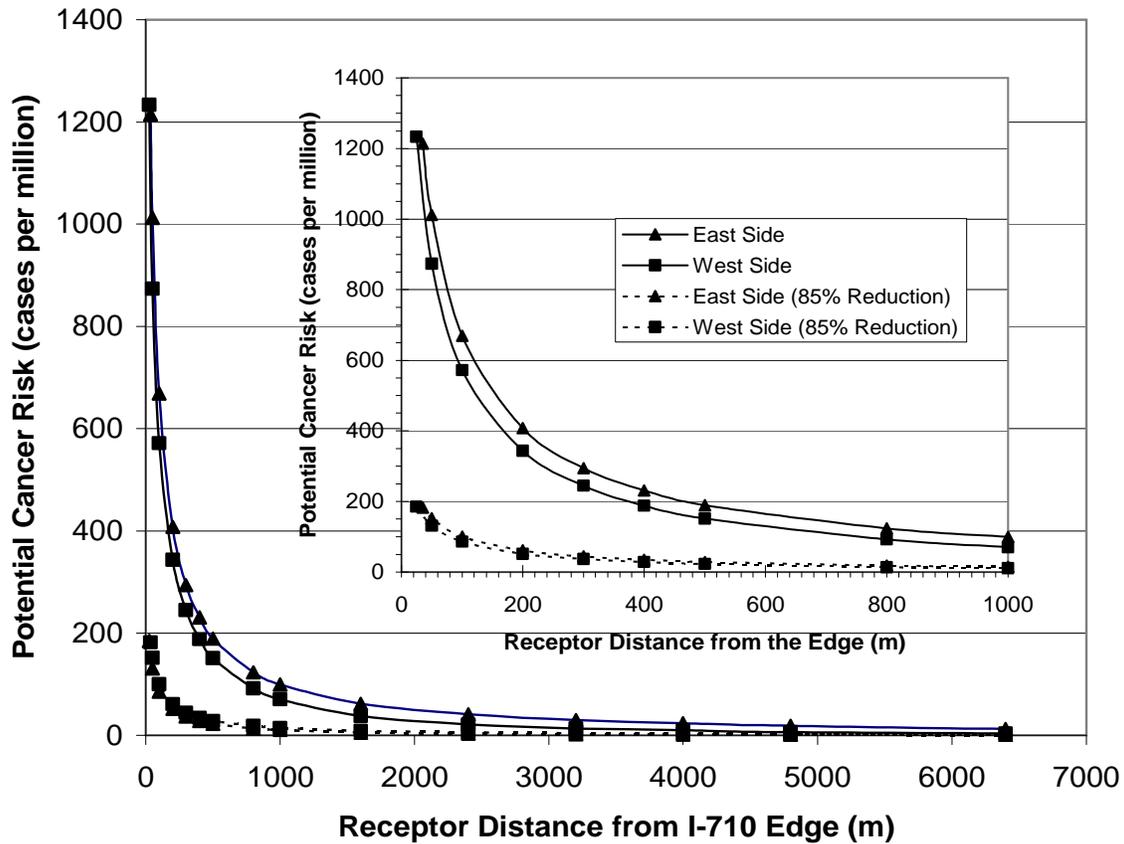
In April 2006, ARB staff published a risk assessment for the Ports of Los Angeles and Long Beach (POLA/LB). The POLA/LB health risk assessment estimated that in-port drayage trucks emissions are a relatively small (three percent of all port specific emissions) when compared to other sources at the ports (ships, cargo handling craft etc.). The analysis shows that the in-port drayage truck ground-based localized impacts of 100 to 200 in a million occurs on port property and exposure risk levels to nearby residents are small. (ARB-POLA-POLB HRA, 2006) However, as this analysis does not include drayage truck emissions released beyond the port's boundaries, staff estimated off-port drayage truck emission health impacts in a subsequent localized health risk assessment detailed below.

To estimate the health risks associated with drayage truck activities in local communities, staff conducted a health risk assessment to determine the 70-year potential cancer risk associated with exposures to diesel PM emissions from drayage trucks operating on the I-710 freeway near the ports of Los Angeles (POLA) and Long Beach (POLB). The I-710 freeway is a major thoroughfare for drayage trucks. Staff believes that the results from this analysis are generally applicable to other California freeways near maritime ports.

To estimate the potential cancer risks from port trucks operating along the I-710 freeway, staff conducted air dispersion modeling to estimate the ambient concentrations of diesel PM as a function of the total diesel truck traffic, speed, and emissions per mile traveled along a one mile freeway segment. The potential cancer risks were then estimated using standard risk assessment procedures.

Figure 1 shows the potential cancer risks to nearby receptors between 25 to 6,400 meters from the edge of the I-710 freeway for each side along the east-west direction (solid lines). The two curves represent risks on the west and east sides of the I-710 freeway as a function of distance from the freeway. Figure 1 also shows that the implementation of the proposed regulation will reduce the public's exposures to diesel PM emissions and the potential cancer risks associated with those exposures (dashed lines).

**Figure 1. Potential Cancer Risks from Diesel Truck Operations from Freeway I-710**



This analysis estimates that the cancer risk is greater than 500 in a million for areas paralleling and within 200 meters of the freeway. The risk level drops off fairly quickly as the distance from the freeway increases. At 2,000 meters from the freeway, the risk levels fall below 50 in a million. The 10 in a million risk contours occurs at approximately the 4,000 – 7,000 meters from the freeway, depending on the side of the freeway.

The overall health benefits of implementing the proposed regulation are substantial. Staff estimates that the cumulative emissions reductions over the lifetime of the rule can be associated with approximately:

- 580 fewer premature deaths
- 120 fewer hospital admissions due to respiratory causes
- 230 fewer hospital admissions due to cardiovascular causes
- 17,000 fewer cases of asthma-related and other lower respiratory symptoms
- 1,400 fewer cases of acute bronchitis
- 100,000 fewer work loss days
- 580,000 fewer minor restricted activity days.

The uncertainty behind each estimated benefit ranges from about 15 to 75 percent for most endpoints. The estimated value of these health benefits over 2010 to 2014 from these reductions in adverse health effects is nearly \$3.5 billion using a 7 percent discount rate or about \$4.3 billion using a 3 percent discount rate. A detailed analysis is provided in the Technical Support Document.

#### **4. SUMMARY OF THE PROPOSED REGULATION**

Pursuant to its authority under HSC sections 39650 through 39667, 43013, 43018 and 43601, the Board is authorized to adopt the proposed drayage truck regulation that would apply to the emissions from all class-8 drayage trucks operating at California's ports and intermodal rail yards. The following sections provide more details about the proposed regulation.

##### **A. Regulatory Requirements**

The regulation would set requirements in two phases (listed below) for drayage trucks that operate at California ports and intermodal rail yards located within 80 miles of ports. By December 31, 2009, Phase 1 of the emission limits would achieve substantial near-term PM reductions to reduce adverse health affects in nearby local communities. Phase 2 of the limits would achieve additional emission reductions by December 31, 2013 that is necessary for the State to meet its SIP commitments in federal non-attainment areas. The South Coast and San Joaquin Valley air basins are both designated as nonattainment of the federal 8-hour ozone and federal PM2.5 National Ambient Air Quality Standards. Significant reductions of NOx are crucial to meet the federal standards for PM2.5 by 2014 and ozone by 2023.

The regulation would also set requirements for port and rail authorities, port terminal operators, motor carriers, truck owners and drivers, and potentially other businesses located on port and rail yard property.

##### **1. Drayage Trucks**

**Phase 1:** By December 31, 2009, all drayage trucks must be equipped with:

- (A) 1994 – 2003 model year engine certified to California and federal emission standards and a level 3 VDECS;

or,

- (B) 2004 or newer model year engine certified to California and federal emission standards.

**Phase 2:** By December 31, 2013, all drayage trucks must be equipped with an engine that:

(A) meets or exceeds 2007 model year California and federal heavy-duty diesel-fueled on-road emission standards;

or,

(B) is certified to 2004 or newer model year California and federal emission standards.

Staff is proposing that emission requirements for the 2004 emission standard compliant trucks (MY 2004 to 2006) be established under the general private fleets' rule that is currently under development by ARB staff. This would allow additional time to investigate several promising PM retrofit technologies that may be available in the near term to reduce PM emissions from these trucks.

The proposal also includes reporting and recordkeeping requirements for port and rail authorities, port terminal and intermodal rail yard operators, motor carriers, and truck owners as discussed earlier. All recordkeeping and reporting requirements are necessary and specifically designed to aid enforcement and to ensure the success of the proposed regulation.

## 2. Truck Owners

Under the proposed regulation, truck owners engaged in port or rail yard operations would be responsible for ensuring that their trucks meet all emission requirements prescribed by the regulation. This responsibility would include any financial outlay necessary to purchase and install retrofits or purchase new trucks. Owners would also be responsible for ensuring that their trucks are registered in the Drayage Truck Registry (DTR), as administered by the State. Additionally, the regulation would require owners to ensure that their emission control devices are properly maintained and that they keep a VDECS maintenance log in the truck at all times. They would also be responsible (in addition to the driver and motor carrier) for ensuring that the driver is able to present motor carrier contact information upon request. Truck owners may be subject to financial penalties for any non-compliance.

## 3. Truck Operators

Upon request, drayage truck operators (drivers) engaged in port or rail yard operations would be responsible for presenting to enforcement personnel all motor carrier contact information that they have been provided by dispatching motor carriers and, if applicable, the VDECS maintenance log that drayage truck owners are required to have on-board the truck. As motor carriers are responsible for dispatching compliant trucks and may be fined for not doing so, the truck driver's responsibility for presenting motor carrier information is critical in tracking a non-compliant truck back to the dispatching

carrier. As stated, the maintenance log is the primary responsibility of the truck owner, but the regulation would require that the driver has the responsibility of presenting it upon request. Truck operators may be fined for non-compliance.

#### 4. Motor Carriers

Motor carriers are the conduit through which virtually all drayage trucks are dispatched. The regulation would assign motor carriers with the primary responsibility for ensuring that compliant drayage trucks are dispatched to the ports and intermodal rail yards. To ensure the truck is compliant, each motor carrier would be required check that the truck is registered and current in the drayage truck registry (DTR), which is explained in more detail below. Checking registry status provides a method for the motor carrier to easily determine the compliance status of any drayage truck. To aid in outreach and help ensure that truck owners are apprised of the regulatory requirements, motor carriers would be required to provide a copy of the regulation or an ARB approved summary to each drayage truck owner. Similar to the truck owner requirements mentioned above, the motor carrier would also be required to ensure the truck operator has the motor carrier's contact information at all times while engaged in drayage truck service.

Motor carriers would be required to keep records of all trucks they dispatch to the ports and rail yards for at least five years. This recordkeeping requirement is designed to aid enforcement efforts by providing a paper trail that can be audited for compliance. Motor carriers may be subject to financial penalties for any non-compliance.

#### 5. Port Terminal and Rail Yard Operators

As previously stated, motor carriers would be required to dispatch compliant trucks. To ensure compliance, terminal and rail yard operators would be required to collect and submit information on each truck that does not display a DTR compliance label (non-compliant truck). Every three months, the non-compliant truck information would be sent from the terminal or rail yard to the port or rail authority. Terminal and rail yard operators would be required to keep these records for a minimum of five years.

The terminals and rail yards would not be required to turn around non-compliant trucks – just collect required information for ARB enforcement. ARB staff expects this information to be used in the initial stages as an outreach tool to inform stakeholders of their responsibilities under the proposed regulation. After the outreach stage, the non-compliant truck information is expected to be used to target non-compliant trucks and motor carriers with increasingly more stringent penalties and other actions necessary to ensure compliance. Port terminals and rail yards may be subject to penalties for non-compliance with these responsibilities.

## 6. Port and Rail Authorities

Port and rail authorities are responsible for gathering all the non-compliant truck information from their terminals or rail yards and then relaying that information to the ARB according to a prescribed schedule and in a prescribed format. Port authorities and rail authorities may be subject to penalties for non-compliance with these responsibilities.

### **B. Drayage Truck Registry**

Beginning January 1, 2010, any truck entering a port or intermodal rail yard must have a DTR label in order to show compliance with the proposed regulation. Drayage truck owners that presently operate at ports or intermodal rail yards and intend to continue to do so would be required to submit an application for registration in the ARB administered DTR by September 30, 2009. This would provide ample time for ARB staff to process the applications and issue DTR labels before the January 1, 2010 deadline.

Trucks for which owners have demonstrated compliance with the regulation would receive a DTR compliance label. Truck owners would be required to affix the label in a location specifically spelled out in the regulation. The label would be used by ports, terminals, and ARB to determine compliance with the regulatory requirements. Beginning January 1, 2010, drayage trucks that service ports and intermodal rail yards that do not have DTR compliance label would be deemed non-compliant and subject to potential enforcement action.

Additionally, the ARB staff envisions that the registry, being statewide, will eventually become an invaluable resource to motor carriers in determining the compliance status of drayage trucks.

### **C. Compliance Extensions**

The only compliance extension allowed by the proposed regulation would be for model year 1994 – 2003 engines, for which no level 3 diesel particulate filters have been verified by ARB by the 2009 compliance deadline. This extension would only apply to the Phase 1 compliance deadline requiring the installation of a level 3 VDECS on 1994 – 2003 engines. Truck owners would be responsible for applying for the one-time, one-year compliance extension from ARB by June 1, 2009. If granted by the ARB Executive Officer, the compliance deadline for the truck would be extended to December 31, 2010. This extension is designed to allow for the development of new technology needed to reduce PM emissions for that particular model year engine. However, the extension is only granted for one year and cannot be renewed. After expiration of the compliance extension and no device has been verified, the truck owner would need to cease using the existing truck at ports and rail yards.

## **D. Exemptions**

The proposed regulation would not apply to uni-body dedicated use vehicles such as dedicated auto transports, fuel delivery vehicles, concrete mixers etc. These uni-body vehicles are exempt from the proposed regulation because they represent less than five percent of the drayage truck population and differ from 'typical' drayage trucks in other aspects such as high replacement costs. Staff expects these trucks would be subject to the private fleet rule currently under development by the ARB. The proposed drayage truck rule would also not affect emergency vehicles or military tactical or combat support vehicles.

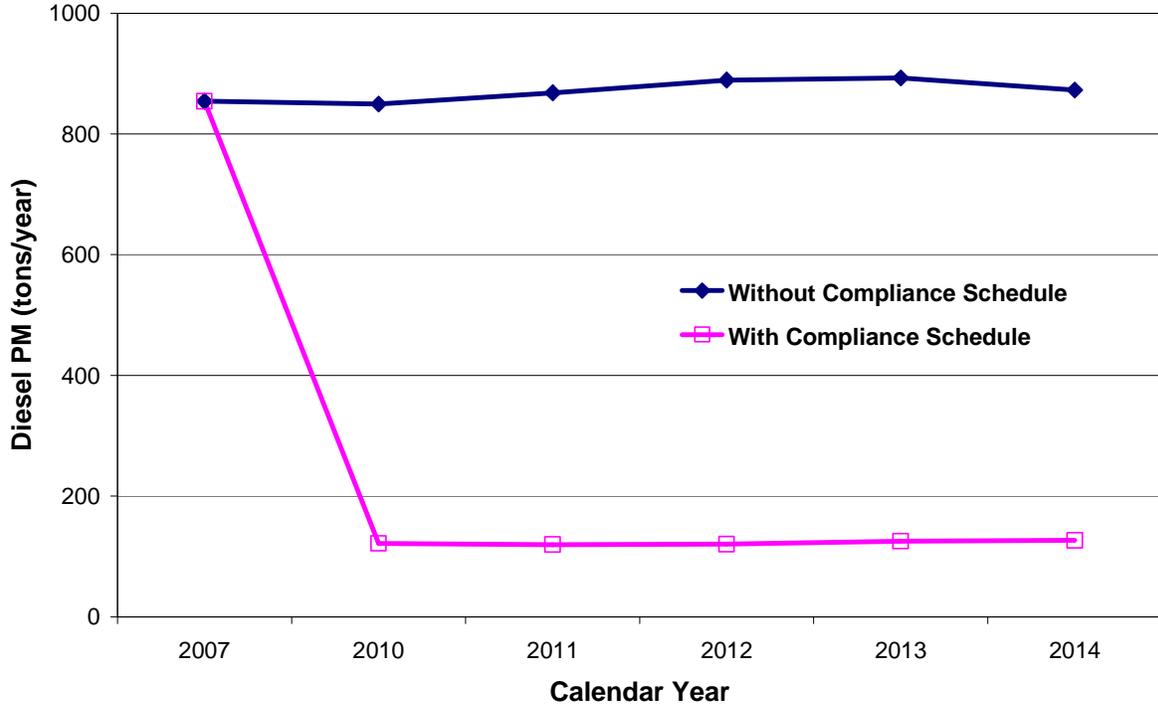
Staff realizes it is critically important to guarantee an uninterrupted flow of goods through the ports and rail yards. To that end, the regulation would also grant the ARB Executive Officer the ability to authorize non-compliant vehicles into the ports and rail yards during instances such as natural disasters.

The proposed regulation provides a process for seeking an exemption for ports or rail yards in whole or in part providing certain criteria are met. All ports and rail yards are unique, with an eclectic array of land uses – many not drayage related. As the regulation applies to truck activities on all properties owned or managed by a port or rail authority, the proposed regulation could negatively impact properties that have no drayage truck traffic or interests. An example could be the financial outlays necessary (infrastructure and staffing) to monitor all truck traffic even though the trucks are exempted under the proposed regulation. As such, the proposed regulation would allow the Executive Officer to exempt ports where the overwhelming majority of drayage trucks are exempted under the rule (i.e. ports solely serviced by dedicated uni-body car carriers). The regulation would provide a mechanism with guidelines for port or rail authorities to apply for the annual exemption if desired.

## **5. EMISSION REDUCTIONS**

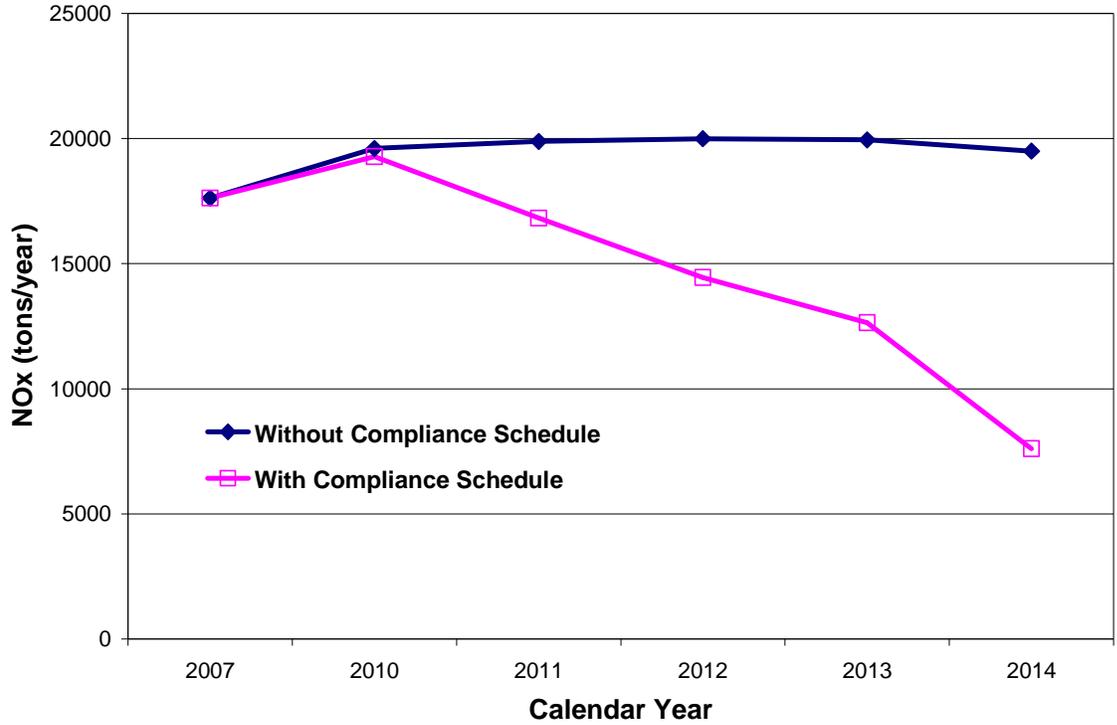
The ARB staff has estimated that the proposed regulation would substantially reduce PM and NOx emissions from drayage trucks operating at ports and intermodal rail yards and would achieve the necessary reductions to meet the Goods Movement Action Plan goals for drayage trucks. Staff has also determined that the emission reductions that would occur in both the South Coast and San Joaquin air basins from the proposed regulation would be a critical element in meeting their SIP commitments. As shown in Figures 2 and 3, in 2009, after full implementation of Phase 1, the statewide diesel PM emissions from drayage trucks would be reduced from the 2007 baseline by nearly 750 tons per year (tpy); after full implementation of Phase 2, NOx emissions would be reduced from the 2007 baseline by approximately 11,900 tpy.

**Figure 2: Projected Diesel PM Emissions With and Without the Proposed Regulation**



By December 31, 2013 all drayage truck engines would meet or exceed 2007 emission standards except for 2004 to 2006 MY engines. As a result, staff redistributed the population of pre-2004 MY trucks to trucks meeting 2007 or better emission standards across each of the calendar years 2010 to 2014. The result of this methodology shows a decrease in NOx emissions (Figure 3) in the years 2011 to 2013 although the proposed regulation does not require it.

**Figure 3: Projected NOx Emissions With and Without the Proposed Regulation**



ARB staff estimates that the proposed regulation would reduce diesel PM emissions from drayage trucks by about 86 percent by 2010. Staff also estimates that NOx emissions would be reduced by about 3 percent by 2010 and nearly 56 percent by 2014 from 2007 levels.

Although both PM and NOx uncontrolled emissions are projected to drop through the natural introduction of newer model year used diesel engines meeting the 2007 and 2010 model year emission standards into the drayage truck fleet overtime, the proposed regulation would accelerate the anticipated emission reductions. For example, without the proposed regulation, the State would not achieve the projected 2010 emission reductions of 86 percent drop in PM emissions from the 2007 baseline until 2025. The annual percentage reductions from the proposed regulation are summarized in Tables 5 and 6.

**Table 5: Projected Statewide Diesel PM Benefits of the Proposed Regulation**

Year	PM without Regulation (tons/day)	PM with Regulation (tons/day)	Emission Reductions from 2007 (tons/day)	% Emission Reductions from 2007
2007	3.0	3.0	0	0
2010	3.0	0.4	2.6	86
2011	3.0	0.4	2.6	86
2012	3.1	0.4	2.7	90
2013	3.1	0.4	2.7	90
2014	3.0	0.4	2.6	86

**Table 6: Projected Statewide NOx Benefits of the Proposed Regulation**

Year	NOx without Regulation (tons/day)	NOx with Regulation (tons/day)	Emission Reductions from 2007 (tons/day)	% Emission Reductions from 2007
2007	61	61	0	0
2010	68	67	6 (increase)*	15 (increase)*
2011	69	59	2	3
2012	70	50	11	18
2013	70	44	17	28
2014	68	27	34	56

\* NOx increases are due to a growth in population of 1994-2003 MY engines from the required retirement of pre-1994 engines, increased vehicle miles traveled, and overall fleet growth.

## 6. ENVIRONMENTAL IMPACT

No significant adverse environmental impacts are expected to occur from adoption of, and compliance with, the proposed requirements for drayage trucks. Implementation of the proposed regulation would reduce directly emitted and secondarily formed PM levels, provide both near source and regional risk reduction, contribute to the overall effort of reducing PM mortality, hospital admissions, and lost work days, and contribute to the reduction of regional ozone formation and adverse ozone health effects through NOx emission reductions.

## 7. IMPACT ON GLOBAL WARMING

Overall, staff estimates that the proposed rule will reduce CO<sub>2</sub> emissions. CO<sub>2</sub> emissions from vehicles are directly proportional to fuel consumption and Phase 1 of the proposed regulation requires fleet owners to replace pre-1994 MY trucks (mechanical fuel injection) with 1994 or newer trucks (electronic fuel injection). Trucks with electronic fuel injection achieve better fuel economy (4.5 miles per gallon for mechanical fuel injection versus 6.0 miles per gallon for electronic fuel injection) and as a result,

staff estimates a diesel fuel savings of 11 million gallons per year. This fuel savings is expected to reduce carbon dioxide emissions by approximately 7 percent.

Some actions required by the proposed regulation could result in slightly increased CO<sub>2</sub> emissions for some applications. For example, drayage truck owners could choose to install an emission control technology (aftertreatment) to comply with the PM emission reduction requirements. An increase in CO<sub>2</sub> could occur if after-treatment devices, such as PM particulate filters, decrease the vehicle's fuel efficiency or increases the vehicle's weight. However, other actions required by the rule will likely offset this effect. For instance, the accelerated phase-in of newer engines, which employ modern, less polluting technologies, should reduce greenhouse gas emissions from each new engine relative to the older, in-use engines. In addition, the proposed regulation will reduce emissions of black carbon (a component of diesel PM and a likely contributor to global warming), which will further offset the minor increases in CO<sub>2</sub> emissions that may occur as a result of some retrofit applications.

## **8. ECONOMIC IMPACTS**

Regulatory costs are the estimated costs resulting from the proposed regulation due to early engine (truck) replacements, emission retrofit installations, recordkeeping and reporting requirements, and enforcement efforts. The costs considered for early truck replacement includes the residual value (if applicable) of the truck being replaced, and the time value of money. These costs are those directly attributable to compliance with the proposed regulation. New equipment costs are the estimated total out-of-pocket costs for purchasing, installing, and maintenance of a newer truck or after-treatment technology, and recordkeeping and reporting. Staff estimates that the overall regulatory costs to business for complying with the proposed regulation would be approximately \$1.1 - \$1.5 billion (2006 dollars). Staff has estimated initial Phase 1 per vehicle costs of \$10,000 - \$31,000 (2006 dollars) for retrofit and/or replacement and initial Phase 2 net costs of approximately \$33,000 (2006 dollars) for truck replacement, which could create an economic hardship and is further analyzed in the TSD.

ARB staff assessed the overall impact of the proposed regulation on California's economy. Staff used E-DRAM, a model of the California economy, developed by the University of California, Berkeley, to estimate the potential impacts to gross state output, personal income and employment. ARB has used E-DRAM to assess the economic impacts of several major regulations. The Department of Finance has used it in the past for policy and revenue analysis. The model is updated as industrial data becomes available and the current version is based on the latest 2003 industrial data.

E-DRAM represents the economic conditions in California in the year 2003.<sup>3</sup> In order to estimate future year impacts, it is necessary to produce a representation of the 2013 California economy. The 2003 data are extrapolated to 2013 based on forecasts of state population, personal income, and industry-specific growth obtained from the California Department of Finance and the UCLA Anderson School of Business.

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<sup>3</sup> E-DRAM uses industrial data from the 2002 Bureau of Economic Analysis, Survey of Current Business.

Regulatory changes are then introduced into the model and impacts are measured as the difference between the 2013 representation with and without the proposed regulation.

The E-DRAM estimates that gross state output, personal income, and employment will grow by \$530 billion (22 percent), \$310 billion (23 percent), and 1.5 million (10 percent), respectively between 2006 and 2013. The implementation of the proposed rules would result in the state economy growing at a slightly slower rate. The results of analysis indicate the gross state output would be reduced by \$650 - \$870 million (less than 0.03 percent) and personal income would be reduced by roughly \$220 million (less than 0.02 percent) in 2013. California employment growth would be reduced 2,400 to 3,300 (less than 0.02 percent) in 2013. Therefore, the impacts of the proposed regulation are small compared to the growth that is expected to occur in California over the next 7 years.

In addition, staff estimated the potential small business impacts by comparing gross margins before and after the proposed regulation and comparing it to the California per capita income level. On average, drayage truck operator gross income would be below the California per capita income level by 4 percent (Phase 1) and 10 percent (Phase 2). On average, gross margins for drayage truck owners would decrease approximately \$2,300 per year. However, staff expects that compliance costs to drayage truck owners would be passed through the supply chain. The total regulatory cost is expected to be approximately \$9 per container. This cost represents less than a one percent increase in standard sea-born container shipping rates. This pass through of regulatory costs will likely occur with a minimal financial impact to the drayage truck owner.

Staff also believes that Phase 2 of the regulation would provide truck owners the benefits associated with owning newer equipment. For example, newer vehicles tend to be more fuel efficient, require less maintenance, and have better reliability (less down time).

## **9. COST TO LOCAL, STATE, AND FEDERAL AGENCIES**

The ARB is expected to be the primary state agency fiscally impacted by the proposed regulation. The ARB would be the primary enforcement entity and will require an additional four staff to perform compliance inspections and audits at a cost of \$400,000 per year. Finally, the ARB will prepare and distribute education and outreach materials for all stakeholders regarding the proposed regulation. These total costs are estimated to be approximately \$110,000 (education and outreach) and are expected to be absorbed within existing ARB budgets and resources.

Multiple local, State, and federal agencies could be impacted by the proposed regulation. To the extent that these agencies are responsible for port or rail operations, they will be responsible for collecting and collating truck entry information from the terminals and rail yards and relaying it to the ARB. ARB staff estimates costs to be minimal and should be absorbed within current budgets.

## 10. COST-EFFECTIVENESS

Cost-effectiveness is expressed in terms of costs in dollars per unit of emissions reduced (pounds or tons). Staff estimated the cost effectiveness by assuming all costs for complying with Phase 1 would be attributable to PM and all costs complying with Phase 2 would be attributable to NOx. The cost-effectiveness for Phase 1 is determined by dividing the net annualized regulatory costs for the years 2010 to 2013 by the pounds of diesel PM reduced in 2014. Similarly, NOx cost-effectiveness for Phase 2 is determined by dividing the net annualized regulatory costs for the years 2014 to 2027 by the total pounds of NOx reduced in 2014. All costs are in 2006 equivalent expenditure dollars. Tables 7 and 8 shows cost-effectiveness estimates for the proposed regulation for PM and NOx respectively.

**Table 7: Cost-Effectiveness - All Phase 1 Costs to PM**

Emissions	Average Total Annualized Cost 2010 – 2013	Total Emissions Reduced in 2014	Total PM Cost- Effectiveness
<b>PM</b>	\$84 - \$115 million	1,492,000 lbs	\$57/lb - \$77/lb

All values rounded

**Table 8: Cost-Effectiveness - All Phase 2 Costs to NOx**

Emissions	Total Annualized Cost 2014 – 2027	Total Emissions Reduced in 2014	Total NOx Cost- Effectiveness
<b>NOx</b>	\$138 - \$185 million	23,794,000 lbs	\$6/lb - \$8/lb

All values rounded

The total cost of Phase 1 is estimated to be \$358 - \$481 million with average annualized costs of \$84 - \$115 million over a 4 year capital recovery period. The total cost of Phase 2 is estimated to be \$777 - \$1,044 million with annualized costs of \$138 - \$185 million over a 14 year capital recovery period. Combining annual costs with annual emission reductions resulted in a Phase 1 PM costs effectiveness of \$57 - \$77 per pound and a Phase 2 NOx costs effectiveness of \$6 - \$8 per pound. The cost-effectiveness values are within the range of cost effectiveness for other diesel engine regulations adopted by the Board, as shown in Table 9.

**Table 9: Diesel PM Cost-Effectiveness of the Proposal and Other Regulations / Measures (When All Costs Attributed to PM Reduction)**

Regulation or Airborne Toxic Control Measure	Diesel PM Cost-Effectiveness
	Dollars / Pound PM
Public Fleet Rule	\$160
<b>Drayage Trucks*</b>	<b>\$57 - \$77</b>
Commercial Harbor Craft	\$29
Cargo Handling Equipment	\$41
Solid Waste Collection Vehicle Rule	\$28
Stationary Diesel Engine ATCM	\$4 - \$26
Transport Refrigeration Unit ATCM	\$10 - \$20

\* Phase 1 cost only

The estimated value of the health benefits associated with the proposed regulation is substantial. Following standard U.S. EPA practice, ARB staff estimates the statewide benefits between 2010 and 2014 to be nearly \$3.5 billion using a 3 percent discount rate, or \$4.3 billion using a 7 percent discount rate. Nearly all of the monetized benefits result from avoiding premature death.

## 11. FEASIBILITY OF PROPOSED REGULATION

ARB staff believes that truck replacements and retrofits would be the most likely compliance options chosen to meet the proposed regulation's requirements. Staff estimates that Phase 1 would result in the replacement of up to 8,300 pre-1994 MY trucks and the installation of up to 31,000 PM retrofits. Model year 1994 to 2003 trucks are expected to use a combination of replacements and or retrofits. For Phase 2 of the regulation, staff anticipates the replacement of up to 32,000 trucks. Staff has met with industry representatives and is confident that there will be an adequate supply of used trucks, retrofit technologies, and installation and maintenance facilities to comply with the proposed regulation.

To evaluate the feasibility of the proposed regulation, staff conducted a phone survey of retrofit manufacturers, used truck dealerships, and retrofit installation facilities in California to determine the annual statewide capacity for drayage truck replacements and retrofit installations. Based on the survey, staff has estimated the current State's capacity at about 20,000 retrofit installations per year. In addition, staff anticipates additional capacity would be created based on increased demand.

Staff also believes that there will be an adequate supply of used 2007+ MY trucks available for the December 31, 2013 compliance deadline. Replacement trucks should be available nationwide and the regulation allows enough time for the 2007+ MY trucks to cycle in large quantities into the used truck market.

## 12. ALTERNATIVES CONSIDERED

The ARB staff considered alternatives to the proposed drayage truck regulation. One alternative would be to do nothing and rely on natural turnover to allow trucks meeting federal engine standards to gradually replace the existing fleet. Manufacturers and vendors of on-road heavy-duty diesel engines have been subject to California and federal emission standards for more than twenty years. As of January 1, 2007, new model year engines are subject to the 2007 California and federal emission standards. Unfortunately, under the current drayage business model, staff estimates that 2007+ standard trucks won't cycle into the drayage fleet in large numbers until approximately the 2020 time frame. This alternative would not achieve ARB's goals of near term PM reductions for the health of communities located near ports and rail yard facilities and would not achieve the PM and NOx reductions needed by the Board to achieve national ambient air quality standards and its SIP commitments.

A second alternative would be to require all covered drayage trucks to meet California and federal 2010+ model year emission standards by the end of 2013. This option would achieve and surpass PM and NOx emission reductions from the proposed regulation. However, in 2013, there will be relatively few used 2010 trucks available in the marketplace, as most trucks don't cycle into the used truck market until four or more years after their build date. The only compliance option would be a new model year truck with a price that could exceed \$130,000 (2006 dollars). For this alternative, staff estimates PM cost effectiveness to be \$166 to \$223 per pound and NOx cost effectiveness to be \$8 to \$11 per pound. Even with the greater annual NOx emission reductions, the cost effectiveness of the alternative would be less than staff's current proposal and could create significant economic hardship for drayage truck owners. Consequently, staff has determined that this alternative is not feasible.

A third alternative would be to require half the drayage truck fleet to operate 2007+ model year emission standard engines and half operate LNG fueled trucks by the end of 2013. Similar to option 2, this option would achieve an additional 3 percent PM (<0.1 tpd) and 5 percent NOx (3 tpd) emission reductions from the proposed regulation. Staff expects there would not be an adequate supply of used LNG trucks due to current low production numbers. Staff estimates net costs for used 2007 model year trucks to be \$33,000 and costs for new LNG fueled trucks to be \$175,000. Staff estimates that this alternative would have a PM cost effectiveness of \$132 to \$178 per pound and a NOx cost effectiveness of \$8 to \$10 per pound. Additionally, significant challenges and costs would exist for the development of the required LNG fueling infrastructure for a fleet of this size (10,000+ trucks). LNG fueling infrastructure and fuel dispensing labor costs were also factored into the cost analysis for the regulatory comparison. Even with greater annual NOx emission reductions, the cost of this alternative is more than twice the cost of the proposed regulation which could create significant economic hardship for drayage truck owners. Consequently, staff has determined that this alternative is not feasible.

### 13. KEY ISSUES

#### Industry Economics

The proposed regulation potentially requires Drayage trucks to modernize twice, first in 2009 to reduce the risk from diesel PM emissions to nearby communities and then again in 2013 to meet the State's SIP commitments. Staff has analyzed the economics of the drayage industry and the truck owners / operators in particular. Questions arose about the affordability of the various compliance options, especially when taken in the context of the current business model at several ports, rate structures, and the near-term compliance deadlines.

Staff estimates that virtually all drayage truck owners / operators are classified as small businesses. Research based on surveys has shown that the mean net income (after deducting for fuel, insurance, and maintenance expenses) for drayage truck owners / operators in 2006 to be approximately \$37,000 per year, which is approximately 50 percent of their gross annual income. The regulation is estimated to cost owners / operators approximately \$10,000 to \$31,000 for Phase 1 and a net cost of approximately \$33,000 for Phase 2. Staff estimates owners / operators would incur annual costs of approximately \$550 for emission control system maintenance and for recordkeeping and reporting requirements, which was included in the annualized cost estimate.

Staff crafted the proposed regulation to postpone the 2007 engine requirements as long as possible to minimize used truck prices. In addition, this will allow time for the development of new (and potentially less expensive) emission reduction technologies and give truck owners financial planning lead time. However, the timely attainment of federal standards in the San Joaquin Valley and South Coast Air Basins necessitate very substantial NOx reductions by 2014 to meet SIP obligations. Staff believes the 2013 compliance requirements are attainable and that sufficient lead-time has been provided for industry to generate a solution (e.g. drayage rate structure changes) that would enable truck owners to afford compliance.

Staff believes that supplemental funding (such as is available from Proposition 1B monies), a change in the drayage rate fee structure, or both will be critical in allowing many current truck owners to meet the requirements of the proposed regulation. In implementing the proposed regulation, it is expected that staff would work with the ports, terminal and rail yard operators, shippers, local districts, and other parties to secure funding to both accelerate compliance and ensure that the emission targets are met without an interruption in drayage service throughout the State. Staff will update the Board on progress in this regard and may consider proposing amendments to the proposed regulation for the Board's consideration if substantial problems are occurring and changes are needed to successfully implement the program.

Potential funding mechanisms include a number of federal and State programs that may be utilized by program administrators or truck owners. Funding programs include: The

Congestion Mitigation and Air Quality Improvement Program (U.S. Department of Transportation) which provides funding to state and local governments to support transportation projects as well as programs to improve air quality and reduce traffic congestion; The U.S. EPA's National Clean Diesel Campaign (NCDC) which offers funding and technical assistance to foster the adoption of cleaner diesel technologies and strategies; The Carl Moyer grant program that is implemented by a partnership between the ARB and local air districts; and Proposition 1B which will fund projects that reduce air pollution and consequently the resulting health risk associated with freight movement along California's trade corridors. An expanded discussion of these programs is provided in the TSD.

#### **14. OUTREACH**

ARB has worked extensively with the various stakeholders over the past two years to identify issues, find ways to address these issues, and develop appropriate regulatory language. Staff has also worked closely with the ports of Los Angeles, Long Beach, and Oakland to ensure the proposed regulation supports the emission reduction goals of the Clean Air Action Plan and the Comprehensive Truck Management Plan. The proposed regulation has been discussed with the California Air Pollution Control Officers Association (CAPCOA) during several joint CAPCOA-ARB conference calls. Additionally, ARB staff made extensive contacts with industry representatives, local air districts, environmental, pollution prevention, public health advocates, and other interested parties through meetings, telephone calls, and electronic mail. Staff has held six public workshops and five community outreach meetings (some specifically geared to truck owners / operators and their concerns) to discuss the proposed regulation. Finally, staff made information available via ARB's web site (<http://www.arb.ca.gov/msprog/onroad/porttruck/porttruck.htm>) to further expand public outreach opportunities and reach the widest possible audience.

#### **15. ENVIRONMENTAL JUSTICE**

A public process that involves all parties affected by the proposed regulation is an important component of ARB rulemaking activities. The proposal is consistent with the ARB's environmental justice policy to reduce health risks from toxic air contaminants in all communities, including low-income and minority communities. The proposed regulation would reduce diesel PM and other emissions from drayage trucks in all areas of the State where these trucks operate. However, the vast majority of these trucks operate within the Los Angeles/Long Beach and Bay Area ports, which are surrounded by densely populated areas, including some in low-income and minority communities. Therefore, the proposal would help address environmental justice concerns by reducing emissions and health risks in the areas where drayage truck emissions have the greatest impacts.

## **16. IMPLEMENTATION AND ENFORCEMENT**

ARB staff needs to take the following actions to efficiently and effectively implement the proposed regulation:

- develop an outreach program to inform drayage truck owners and operators, rail operators and authorities, port terminals and authorities, and motor carriers of the requirements of the proposed regulation, as well as provide information about incentive programs such as the Carl Moyer programs, the Port of Los Angeles Air Quality Mitigation Funds, and the upcoming Proposition 1B air quality mitigation funds,
- develop recordkeeping and reporting guidance,
- develop and begin operation of the Drayage Truck Registry,
- develop an enforcement action plan which includes targeted port and rail yard field inspections and the auditing of drayage activity records; and,
- provide implementation guidance and assistance as needed.

## **17. RECOMMENDATION**

We recommend the Board approve the proposed drayage truck regulation presented in Appendix A of the staff report. The early turnover and retrofit of drayage trucks would reduce diesel PM, NOx, and other air pollutant emissions, exposure, and health risk across California, particularly in the proximity of ports and intermodal rail yards. The proposed regulation would also support the emission reduction goals of the Clean Air Action Plan from the ports of Los Angeles and Long Beach and the Comprehensive Truck Management Plan from the Port of Oakland. The ARB staff believes the proposed regulation is technologically feasible, cost-effective, and necessary to carry out the Board's responsibilities under State law and implement provisions of the Emission Reduction Plan for Ports and Goods Movement approved by the Board in April 2006.

## References:

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**Appendix A:**  
**Proposed Regulation to Control Emissions from In-Use On-Road Diesel-Fueled  
Heavy-Duty Drayage Trucks**