

Public Workshop to Discuss Reducing Emissions from  
Mobile Cargo Handling Equipment at Ports and  
Intermodal Rail Yards

## Draft Regulatory Proposal

August 24, 2005  
Long Beach, California



California Environmental Protection Agency



Air Resources Board

## Overview

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- ◆ Background
- ◆ Applicability
- ◆ Regulatory Concepts
- ◆ Estimated Impacts
- ◆ Next Steps



## Background



## Goals

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- ◆ Develop statewide control measure to address emissions from mobile cargo handling equipment
  - Achieve maximum emission reductions (both near term and long term) for PM and NO<sub>x</sub>
- ◆ Consideration by the Board in November 2005

# Applicability

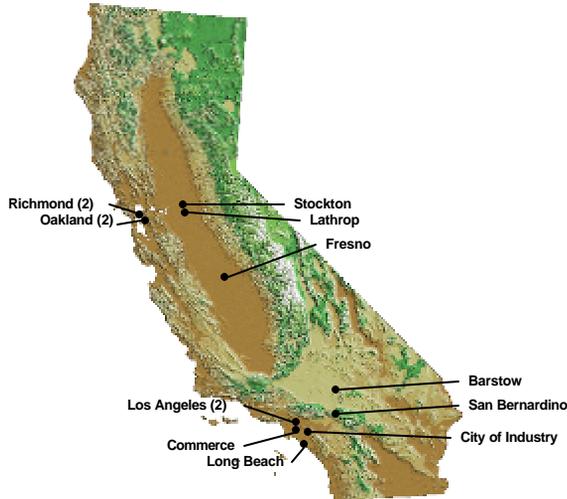


# Ports



## Intermodal Rail Yards

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## Examples of Cargo Handling Equipment Types

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- ◆ yard trucks
- ◆ top handlers
- ◆ side handlers
- ◆ reach stackers
- ◆ rubber-tired gantry cranes
- ◆ forklifts
- ◆ euclids
- ◆ skid steer loaders
- ◆ rubber-tired loaders
- ◆ sweepers
- ◆ dozers
- ◆ excavators
- ◆ mobile cranes
- ◆ railcar movers

## Draft Regulatory Proposal



## Newly Purchased, Leased, or Rented Equipment

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- ◆ DMV registered (onroad) equipment
  - meet current year onroad standard
- ◆ Non-registered (off-road) equipment
  - a. meet current year onroad standard or Tier 4 off-road standard for model year and rated hp; or
  - b. if (a) above is not available, meet highest level available off-road standard for model year and rated hp and apply highest level available VDECS within one year.

*In-Use Yard Trucks*

**Performance Standards**

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- ◆ 2007 or current model year onroad engine standard
- ◆ Tier 4 off-road engine standard
- ◆ Engine with VDECS that meets or exceeds Tier 4 off-road standards



*In-Use Yard Trucks*

**Compliance Table: Fleets of 3 or Less**

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Engine Certification	Model Years	VDECS as of December 31, 2006	Compliance Deadline
Off-road	Pre-2003	None	December 31, 2007
Off-road	Pre-2003	Any Level	December 31, 2008
Off-road	2003-2006	None	Model Year + 7 Years
Off-road	2003-2006	Any Level	Model Year + 8 Years
Onroad	Pre-2007	None	Model Year + 8 Years
Onroad	Pre-2007	Any Level	Model Year + 9 Years

## In-Use Yard Trucks

### Compliance Table: Fleets of 4 or More

Engine Certification	Model Years	VDECS	Number of Yard Trucks for Each Model Year Group	Compliance Deadline
Off-road	Pre-2003	None	The greater of 3 or 50%	December 31, 2007
			100%	December 31, 2008
Off-road	Pre-2003	Any Level	The greater of 3 or 50%	December 31, 2008
			100%	December 31, 2009
Off-road	2003-2006	None	The greater of 3 or 25%	Model Year + 7 Years
			50%	Model Year + 8 Years
			100%	Model Year + 9 Years
Off-road	2003-2006	Any Level	The greater of 3 or 25%	Model Year + 8 Years
			50%	Model Year + 9 Years
			100%	Model Year + 10 Years
Onroad	Pre-2007	None	The greater of 3 or 25%	Model Year + 8 Years
			50%	Model Year + 9 Years
			100%	Model Year + 10 Years
Onroad	Pre-2007	Any Level	The greater of 3 or 25%	Model Year + 9 Years
			50%	Model Year + 10 Years
			100%	Model Year + 11 Years

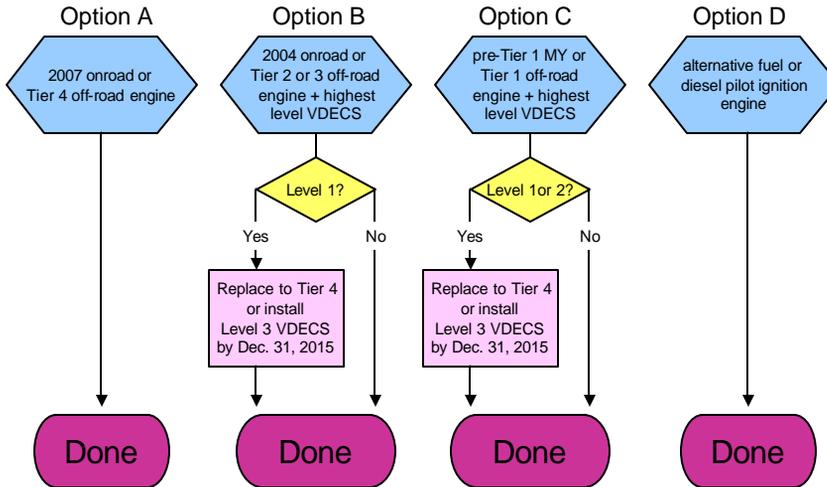
If the percentage of yard trucks in a fleet is not a whole number, conventional rounding practices apply (i.e., if less than 0.5, round down; if 0.5 or greater, round up)

## BACT Requirements for Basic Container Handling Equipment



*In-Use Non-Yard Truck Equipment*

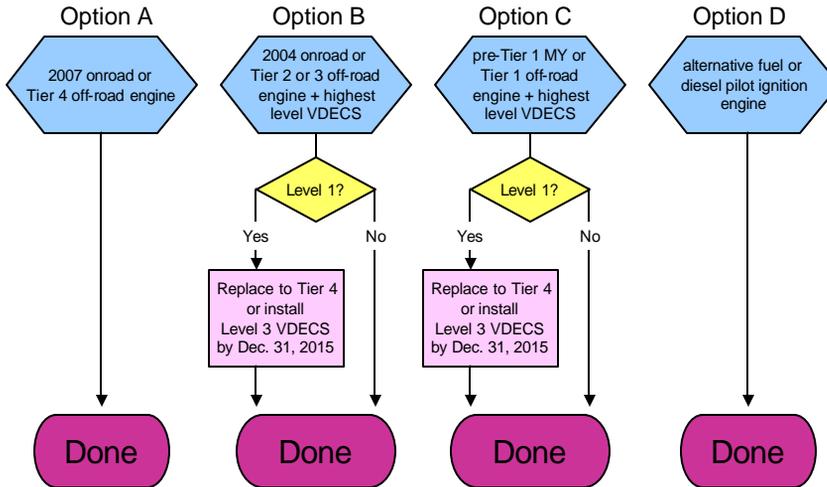
## Compliance Options – Basic Container Handling Equipment



## BACT Requirements for Bulk Cargo Handling Equipment



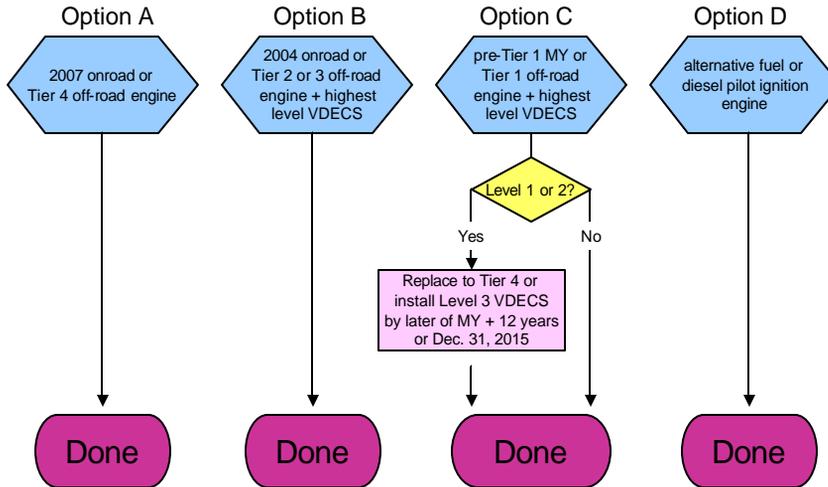
*In-Use Non-Yard Truck Equipment*  
**Compliance Options –  
Bulk Cargo Handling Equipment**



**BACT  
Requirements  
for RTG Cranes**



## In-Use Non-Yard Truck Equipment Compliance Options – RTG Cranes



## In-Use Non-Yard Truck Equipment Compliance Schedule

Engine Model Years	Compliance Date*				
	Non-Yard Truck Fleets of 3 or Fewer	Non-Yard Truck Fleets of 4 or More**			
		First 3 or 25% (whichever is greater)	50%	75%	100%
pre-1988	2007	2007	2008	2009	2010
1988-1995	2008	2008	2009	2010	2011
1996-2002	2009	2009	2010	2011	2012
2003-2006	2010	2010	2011	2012	2013

\* Compliance date refers to December 31<sup>st</sup> of the year indicated.

\*\* If the percentage of non-yard truck equipment in a fleet is not a whole number, conventional rounding practices apply (i.e., if less than 0.5, round down; if 0.5 or greater, round up).

## Identification & Demonstration of Emission Control Systems for RTG Cranes, Side Picks, and Top Picks

Goal: Identify and demonstrate high efficiency retrofit emission controls and collect data that will lead to verification

Task 1: Datalogging

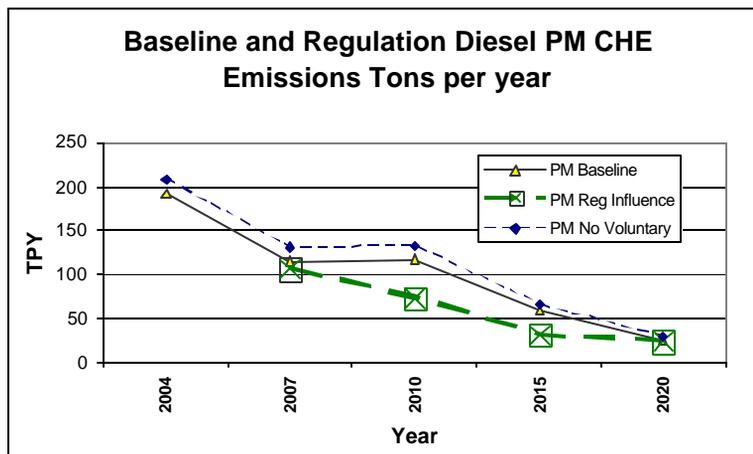
Task 2: Solicitation of technology providers

Task 3: Solicitation of terminal operators/equipment

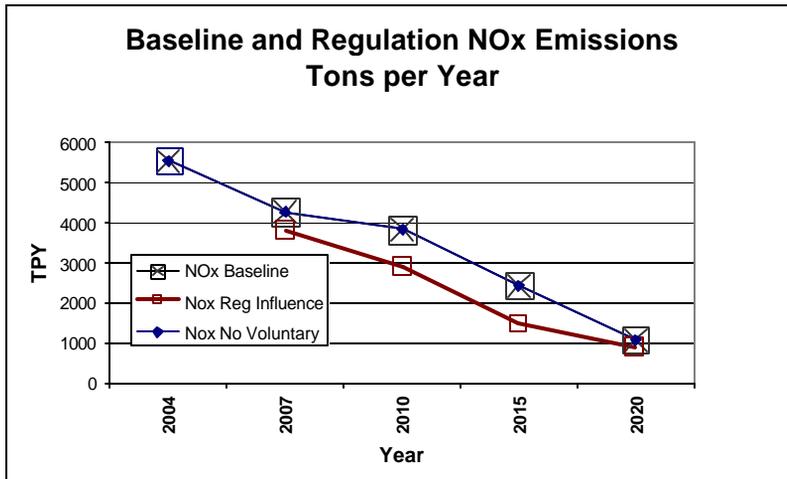
Task 4: Demonstration study and emissions testing

Timeline: June 2005 – March 2006

## Preliminary Estimated Emission Reductions (Diesel PM)



# Preliminary Estimated Emission Reductions (NOx)



# Preliminary Cost Assumptions

Equipment Type	New Equipment Cost	Used Equipment Cost	Control Device	Control Device Average Cost
Crane	\$ 1,200,000		Passive DPF	\$ 17,520
Excavator	\$ 350,000	\$ 50,000	DOC	\$ 2,269
Forklift			Active DPF	\$ 6,000
Basic Container Handling Equip	\$ 400,000	\$ 50,000	DOC	\$ 2,269
Other	\$ 400,000	\$ 50,000	DOC	\$ 2,269
Sweeper/Scrubber	\$ 50,000	\$ 5,000	DOC	\$ 2,269
Tractor/Loader/Backhoe	\$ 75,000	\$ 10,000	DOC	\$ 2,269
Yard Tractor	\$ 60,000	\$ 6,000	On-road Engine Option	\$ 1,500

**Notes:**

Assumed linear depreciation to determine the remaining value of the equipment that was retired early.

Reporting Costs: \$10,000 for the first year and \$500 per year thereafter.

## Preliminary Cost Estimates

Total Annual Statewide Costs for Ports and Rail Including the Reporting Costs in 2004 Dollars			
Year	2007	2010	2015
Total Annual Cost (2004 \$)	\$ 3.8 million	\$ 4.3 million	\$ 2.8 million
PM Cost Effectiveness	\$35 – \$50 per pound PM reduced		

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### Oceangoing Ship Auxiliary

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### Web Sites:

Cargo Handling Equipment: [www.arb.ca.gov/cargo](http://www.arb.ca.gov/cargo)

Oceangoing Ship Auxiliary Engines: [www.arb.ca.gov/marine](http://www.arb.ca.gov/marine)