

## Mobile Cargo Handling Equipment Workshop

### Proposed Amendments Mobile Cargo Handling Equipment Regulation

June 27, 2011

Sacramento, California



California Environmental Protection Agency



Air Resources Board

## Overview

- ◆ Background
- ◆ Comments from February Workshop
- ◆ Outcomes of Clean Technologies Meeting
- ◆ Proposed Amendments
- ◆ CHE Emissions Inventory Impacts
- ◆ CHE Economic Impacts
- ◆ Next Steps
- ◆ Questions/Comments



## Background



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Background

## Need for Emissions Reductions

- ◆ Ports and intermodal rail yards pose a public health concern for nearby residents
- ◆ Diesel Risk Reduction Plan, Goods Movement Action Plan, and State Implementation Plan goals



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## Regulation Status

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- ◆ Adopted by the ARB December 2005
- ◆ Became effective December 31, 2006
- ◆ Implementation began in January 2007
- ◆ U.S. EPA considering authorization
- ◆ Workshops:
  - November 30, 2010
  - February 23, 2011

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## Applicability

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- ◆ Regulation applies to
  - mobile equipment with compression-ignition engines used at ports and intermodal rail yards
- ◆ Regulation does not apply to
  - portable compression-ignition engines or equipment
  - equipment used for fuel delivery or to transport personnel
  - equipment brought in temporarily for construction projects or special jobs/repairs not planned or due to predictable maintenance activities

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## Implementation Status

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- ◆ In-use equipment brought into compliance (based on partial 2010 reporting):
  - 57 percent of yard trucks
  - 40 percent of non-yard truck equipment
- ◆ All equipment on track to be compliant by 2017
  - yard trucks w/off-road engines: 2015 or 2016 (w/VDECS)
  - yard trucks w/on-road engines: 2016 or 2017 (w/VDECS)
  - non-yard truck equipment: 2013

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## Comments from February Workshop

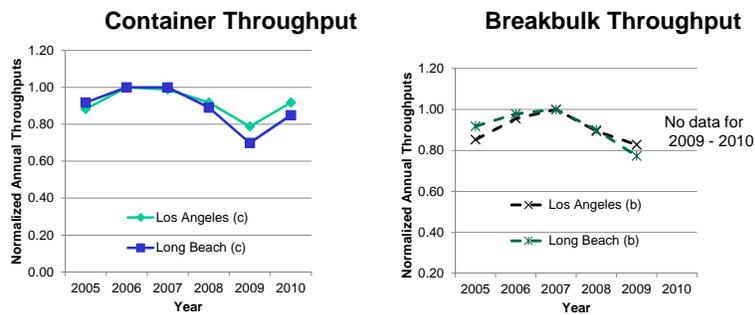


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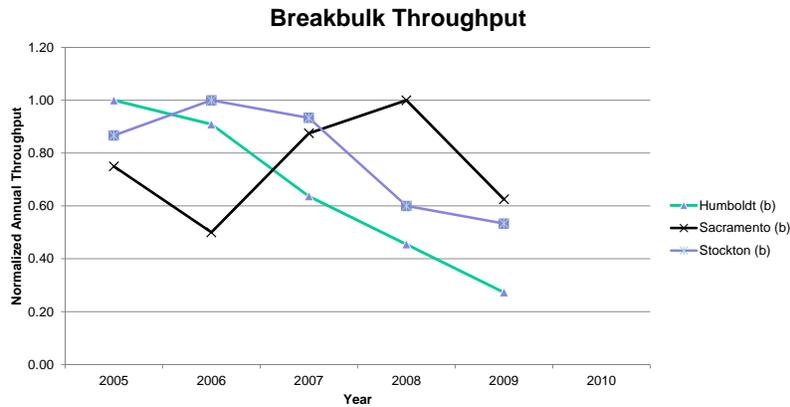
## Comments from February Workshop

- ◆ How will amendments impact current equipment compliance?
- ◆ Has breakbulk been economically impacted more severely than container?

## Container and Breakbulk Cargo Throughputs Trends Similar at Los Angeles and Long Beach



## Breakbulk Cargo Throughputs at Ports of Sacramento, Stockton, and Humboldt more Variable



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## Data Does Not Support Special Consideration for Breakbulk

- ◆ Breakbulk at LA/LB shows similar economic trends as container
- ◆ Breakbulk at smaller ports more variable
- ◆ 50% of Stockton equipment compliant

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## Outcomes from Clean Technologies Meeting



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### Clean Technologies Meeting

## Meeting on Performance of Clean Technologies

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- ◆ May 26, 2011 in Sacramento
- ◆ Two sessions
  - Morning: VDECS on non-yard truck equipment
  - Afternoon: Use of on-road engines in yard trucks
- ◆ Participants included port and rail terminal representatives, equipment manufacturers, MECA, PMA, and ARB staff

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## Non-yard Truck VDECS Primary Concerns

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- ◆ Performance
- ◆ Economics
- ◆ Maintenance
- ◆ Education



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## ARB Findings: Non-Yard Truck VDECS

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- ◆ Startup issues similar to other industries
- ◆ Multiple causes including:
  - retrofit/equipment duty cycle match
  - operator education
  - maintenance procedures
  - in-field system adjustments

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## ARB Findings: Non-Yard Truck VDECS (cont'd)

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- ◆ Need closer coordination among:
  - equipment OEMs
  - retrofit dealers and installers
  - retrofit manufacturers
  - terminal owners/operators
  - equipment field operators
  - regulatory agencies

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## ARB Action Plan: Non-Yard Truck VDECS

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- ◆ Modify Verification regulation:
  - require retrofit manufacturers to provide enhanced training to operators
- ◆ Modify CHE regulation:
  - additional two years extension for “No VDECS Available”
  - add low-use equipment extension
  - safety provision for extension

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## ARB Action Plan: Non-Yard Truck VDECS (cont'd)

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- ◆ Continue to work with all parties to troubleshoot issues and develop solutions
- ◆ Consider startup issues as move into Regulation enforcement phase
- ◆ Periodic Technical Working Group meetings

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## On-Road Engines in Yard Trucks Primary Concerns

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- ◆ Duty cycle
- ◆ Regeneration
- ◆ Exhaust leaks
- ◆ Sludge in exhaust gas recirculation system
- ◆ Diesel fuel fumes in air brakes



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## ARB Findings: On-Road Engines in Yard Trucks

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- ◆ Startup issues varied depending on operation and maintenance approach
- ◆ Multiple causes including:
  - duty cycle: idling and low speeds
  - need for truck operator education
    - truck operators ignoring stationary regen dash light
    - one terminal connected horn into dash light

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## ARB Findings: On-Road Engines in Yard Trucks (cont'd)

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- ◆ Multiple causes including:
  - need maintenance procedures update for 2007+ engines
    - need regularly scheduled DPF ash cleaning
    - If wait too long – less likely to remove all ash
    - results in increased back pressure
  - two-piece exhaust manifold with slip fit
    - exhaust leak due to increased back pressure
    - one-piece manifold replacement available

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## ARB Findings: On-Road Engines in Yard Trucks (cont'd)

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- ◆ Multiple causes including:
  - > 10 calibration updates available for engines in-field
    - Critical updates are Cummins responsibility
  - exhaust air migrations into truck air system
    - service bulletin – relocate air compressor inlet
    - purge truck's main air tank daily

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## ARB Findings: On-Road Engines in Yard Trucks (cont'd)

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- ◆ Need closer coordination among:
  - engine manufacturer
  - terminal owners/operators
  - equipment field operators
  - regulatory agencies

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## ARB Action Plan: On-Road Engines in Yard Trucks

- ◆ Continue to work with all parties to troubleshoot issues and develop solutions
- ◆ Follow suggested maintenance practices and impact on performance concerns
- ◆ Consider startup issues as move into Regulation enforcement phase
- ◆ Periodic Technical Working Group meetings

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Proposed  
Amendments



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## Purpose of Proposed Amendments

- ◆ Provide additional compliance flexibility
- ◆ Maintain anticipated emissions reductions and enable successful use of retrofit technologies
- ◆ Clarify language and intent

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## Purpose: Provide Additional Flexibility

- ◆ Additional 2 years for “No VDECS Available” and “Low-Use”
- ◆ Allow demonstration of emissions equivalency
- ◆ Non-yard truck equipment transfers within California
- ◆ Rental flexibility for new equipment delays
- ◆ Warranty engine replacement
- ◆ Exempt equipment at small rural ports
- ◆ Allow older engines to be brought into compliance first
- ◆ Allow experimental extension for verification purposes

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## Additional Extension Time

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- ◆ Additional 2 years for “No VDECS Available”
- ◆ Include safety as consideration for “No VDECS Available”
- ◆ Allow extension requests up to 60 days prior to compliance deadlines
- ◆ Low-use extension
- ◆ Experimental extension for generation of verification data

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## Allow Demonstration of Emissions Equivalency

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- ◆ Allow use of new technologies based on emissions equivalency demonstration
  - demonstrate equipment’s emissions meet applicable emissions standards
- ◆ Provides flexibility for new hybrid technologies

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## Non-Yard Truck Equipment Transfers

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- ◆ Allow non-yard truck equipment transfers from port-to-port or rail yard-to-rail yard
  - allow owners/operators to move non-yard truck equipment between in-state locations (same owner of both locations)
  - equipment transfers not to be used to comply with or delay compliance
  - bring into compliance w/in-use standards before operating at new location
  - ARB will review and approve equipment transfer plans
- ◆ Yard trucks compliant with new equipment standards can be transferred within California

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## Rental Flexibility for New Equipment Delivery Delays

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- ◆ If delay in delivery of new compliant equipment, would allow:
  - rental of equipment not meeting current standards for maximum of six months or until delivery, if
    - equipment meeting current standards are not available, and
    - owner/operator rents equipment meeting the immediately preceding standard
      - i.e., if Tier 4i engines are required, only Tier 3 equipment would be allowed

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## Warranty Replacement

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- ◆ Allow warranty replacement with same engine type in cases of premature engine failure
  - regardless of new engine emissions standards in effect
  - failed engine under warranty

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## Exempt Equipment at Small Rural Ports

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- ◆ Requested by North Coast Air District and Humboldt Bay Harbor District
- ◆ Exempt ports that meet the following criteria:
  - rural (at least 75 miles from an urban area)
  - average annual cargo throughput less than a one million tons
    - excluding petroleum products
    - based on two-year average
  - If exceed throughput limit:
    - must submit compliance plan within 6 months
    - comply within 3 years
- ◆ Port of Humboldt Bay only qualifying port

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## Allow Older Engines to be Brought into Compliance First

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- ◆ Phased compliance schedules for different model year groups overlap
- ◆ Some older engines have later compliance dates than newer engines
- ◆ Allow earlier compliance date for newer engines to be swapped with later date for older engines
- ◆ Number of engines brought into compliance remains the same

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## Purpose: Maintain Anticipated Emissions Reductions and Enable Successful Retrofits

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- ◆ Treat Tier 4 engines certified to Alt PM emissions standards as Tier 3
- ◆ Require non-yard truck opacity testing and set limits
- ◆ Require equipment with “No VDECS Available” extension be brought into compliance within 6 months of VDECS availability

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## Only Engines Certified to Primary Tier 4 Qualify as Final Compliance Step

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- ◆ Engine manufacturers allowed to produce Tier 4 engines to Family Emissions Limit (FEL)
  - FEL Alt PM standards –
    - up to 20 percent of U.S. production
    - similar to Tier 3 PM emissions standards
- ◆ Only Tier 4 engines certified to primary emissions standards not required to install highest level VDECS within one year of purchase

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## Opacity Testing Program

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- ◆ Similar to ARB's heavy-duty diesel vehicle smoke inspection program
- ◆ Phase in annual opacity testing of engine-out exhaust
- ◆ Opacity limits
  - 55 percent for uncertified engines
  - limit for certified engines based on 100 X PM certification level (gm/bhp-hr)
  - retrofitted engines: set by VDECS manufacturers
- ◆ Retrofitted equipment
  - schedule when VDECS removed for cleaning or inspection

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## Compliance of Engines with “No VDECS Available” Extension

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- ◆ Require compliance within six months of VDECS available notification
- ◆ Currently required for new equipment
- ◆ Clarifying also required for in-use

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## Purpose: Clarify Language and Intent

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- ◆ New and clarified definitions
  - Clarified some existing definitions
  - New definitions to support amendments
  - Definitions added to support clarifications
- ◆ Clarifying amendments
  - Equipment brought onto port or intermodal rail yard solely for construction and unexpected repair are exempt

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Cargo Handling  
Equipment  
Regulation  
Amendments  
Emissions  
Inventory Impacts



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Cargo Handling  
Equipment  
Regulation  
Amendments  
Economic Impacts



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## Amendments Result in Both Costs and Savings

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- ◆ Savings from amendments that:
  - Provide additional compliance flexibility
- ◆ Costs from amendments that:
  - Safeguard anticipated emission reductions
  - Enable successful use of retrofit technologies

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## Some Savings From Additional Flexibility Difficult to Quantify

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- ◆ Allow demonstration of emissions equivalency
- ◆ Non-yard truck equipment transfers within California
- ◆ Rental flexibility for new equipment delays
- ◆ Warranty engine replacement
- ◆ Allow older engines to be brought into compliance first
- ◆ Allow extension requests up to 60 days prior to compliance deadlines

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## Added Extension Times Provide Savings

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- ◆ Additional 2 years for “No VDECS Available”
- ◆ 2 year low-use compliance extension
- ◆ Savings based on 2 year delay of either retrofit or replacement
- ◆ Savings estimated at \$6.8M and \$4.0M for two amendments respectively

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## Exemption of Port of Humboldt Bay Provides Savings

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- ◆ Equipment at Port of Humboldt Bay compliance cost comparison
  - CHE Regulation
  - Off-Road Equipment Regulation
  - On-Road Truck and Bus Regulation for one on-road truck
- ◆ Net savings of \$1million

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## Costs for Opacity Test Requirement

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- ◆ Two options for compliance:
  - Train mechanics and purchase test equipment
    - One time costs
      - ~\$2,000 per mechanic for training – 2 days of training at local community college
      - ~\$5,500 for test equipment
    - Annual costs
      - half hour maximum mechanics time or ~\$50/engine/year
  - Hire consultant
    - \$30-\$60/engine/year
- ◆ Cost estimated at \$1.3M to \$2.4M

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## Retrofit Tier 4 Engines Certified to Alt PM FEL Standard

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- ◆ Retrofit costs estimated based on engine horsepower
- ◆ \$7.7M for estimated 220 engines
- ◆ Costs can be avoided by requesting Tier 4 engine certified to primary standards
- ◆ Engine label provides certification information

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## Summary of Savings and Costs

Amendment	Cost or (Savings)
Additional 2 years for "No VDECS Available"	(\$6.8M)
2 years extension for low-use equipment	(\$4.0M)
Exempt equipment at Port of Humboldt Bay	(\$1.0M)
Require annual opacity testing of non-yard truck equipment	\$2.4M
Treat Tier 4 engines certified to Alt PM FEL as Tier 3	\$7.7M
Overall Costs or (Savings) to Industry	(\$1.7M)

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## Next Steps



- ◆ On-going Stakeholder Input
- ◆ Revise Draft Regulatory Language
- ◆ Finalize CHE Emissions Inventory Revisions
- ◆ Finalize Economic Impacts Analyses
- ◆ Initial Statement of Reasons August 2011
- ◆ Tentative Board Hearing September 2011

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## Contacts

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## Questions/Comments

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