

# ***Draft ARB Health Risk Assessment of the BNSF Richmond Railyard***



**June 13, 2007**

California Environmental Protection Agency

 **Air Resources Board**

# Tonight's Presentation

- **Process**
- **Background**
- **Methodology and results**
- **Actions taken to reduce health risks**
- **Questions, comments, and next steps**



# **Process to Review Risk Assessment and Plan Next Steps**

- **Several Purposes for tonight's meeting**
  - Present the draft and findings
  - Discuss progress being made
  - Answer questions
  - Process for Review and Comments
- **After Tonight's meeting There Will Be:**
  - Your written comments
  - Next community meeting
  - Your ideas on possible future emission reduction actions by either the ARB or the railroads

# Health Risk Assessment Timelines

Draft Health Risk Assessments to be Completed by Spring 2007	Draft Health Risk Assessments to be Completed by the end of 2007
BNSF Commerce/Eastern	BNSF Barstow
BNSF Hobart	BNSF San Bernardino
BNSF Richmond	BNSF San Diego
BNSF Stockton	UP Colton
BNSF Watson (Wilmington)	UP ICTF (port of L.A.)
UP Commerce	UP Industry
UP LATC (Los Angeles)	UP Oakland
UP Mira Loma	
UP Stockton	

# Background

- **Our commitment to address pollution impacts on communities**
  - ARB/BNSF/UP Railroad Agreement (2005)
  - ARB Goods Movement Plan (2006)
- **The State's goals**
  - Reduce exposure to diesel PM as quickly as possible
  - Reduce risks at least 85 percent by 2020
  - Implement all possible emission reductions to attain air quality standards



# Purpose of the Assessments

- **Identify emission sources in the railyards**
- **Identify exposures**
- **Evaluate the health impacts**
- **Put the railyard risks into perspective with other sources**
- **Provide priority needed to reduce the risks**



# Scope of the Draft Assessments

- **Two major components:**
  - **Health risk assessment for the railyard**
  - **Health risk assessment associated with significant diesel PM sources surrounding the community**
- **Focus on diesel PM and other toxic air contaminant (TAC) sources**



# Methodology of the Draft Assessment



# Health Risk Assessment Methodology

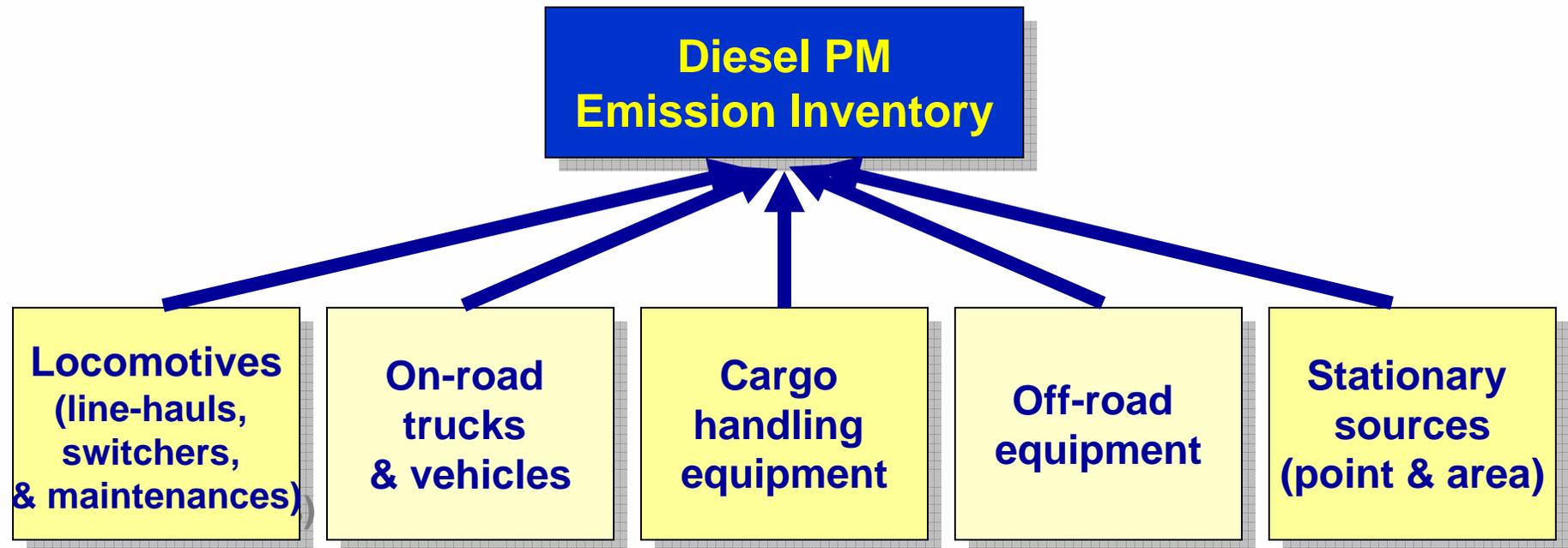
- Prepare the best possible emissions inventory
- Conduct air dispersion modeling
- Evaluate the potential of health impacts
  - Diesel PM
  - Other TACs



# On-site & Off-site Emission Boundaries



# Railyard Emissions



# Emission Estimates

- **Fleet/Equipment population**
- **Operational activity**
  - Operation types or modes
  - Load factor (if applicable)
  - Vehicle miles traveled (VMT)
  - Daily operation hours and temporal profile
- **Emission factors (grams per unit activity)**
- **Fuel characteristics and adjustment**
  - Fuel usage
  - Sulfur content



# Example - Locomotive Emissions

- **Number of locomotives by types**
- **Time operating at each throttle notch setting and idling mode**
- **Emission factors (appendix E in the report)**
- **Hours of operation in each mode**
- **Types and amount of fuel used**
- **Daily activity profiles**



# Summary of Diesel PM Emissions at the BNSF Richmond Railyard

Diesel PM Emission Sources	Richmond Railyard	
	tons/year	percentage
<b>Locomotives</b>	<b>3.3</b>	<b>70 %</b>
Line Haul Locomotives	1.54	33%
Switch Locomotives	1.16	25%
Service/Maintenance	0.55	12%
<b>Off-road Vehicles and Equipment</b>	<b>0.6</b>	<b>12 %</b>
<b>On-road Trucks and Vehicles</b>	<b>0.5</b>	<b>11 %</b>
<b>Cargo Handling Equipment</b>	<b>0.3</b>	<b>6 %</b>
<b>Other Stationary Sources</b>	<b>&lt; 0.01</b>	<b>&lt; 1 %</b>
<b>Total</b>	<b>4.6</b>	<b>100 %</b>

# Off-Site Non-Railyard Emissions

- Focus on diesel PM sources
- Identify the population of on-road trucks
- Apply specific emission factors to the trucks based on traffic flows and volumes
- Local Stationary Sources
- Calculate emissions



# Summary of Off-Site Non-Railyards Diesel PM Emission Inventory

Sources	tons/year	percentage
Mobile Sources	11.7	60%
Stationary Sources	8.1	40%
Total	20	100%



## Comparison of Diesel PM Emissions (tons per year in 2005)

Sources	Locomotive	Cargo Handling Equipment	On-Road Trucks	Other (Refrigerator truck, Off-road, Trailers , etc)	Total
S.F. Bay Area Air Basin	-	-	-	-	4,600
South Coast Air Basin	-	-	-	-	7,800
BNSF Richmond	3.3	0.3	0.5	0.6	4.6
Off-Site Roadways	-	-	11.7	-	11.7



# **Air Dispersion Modeling**

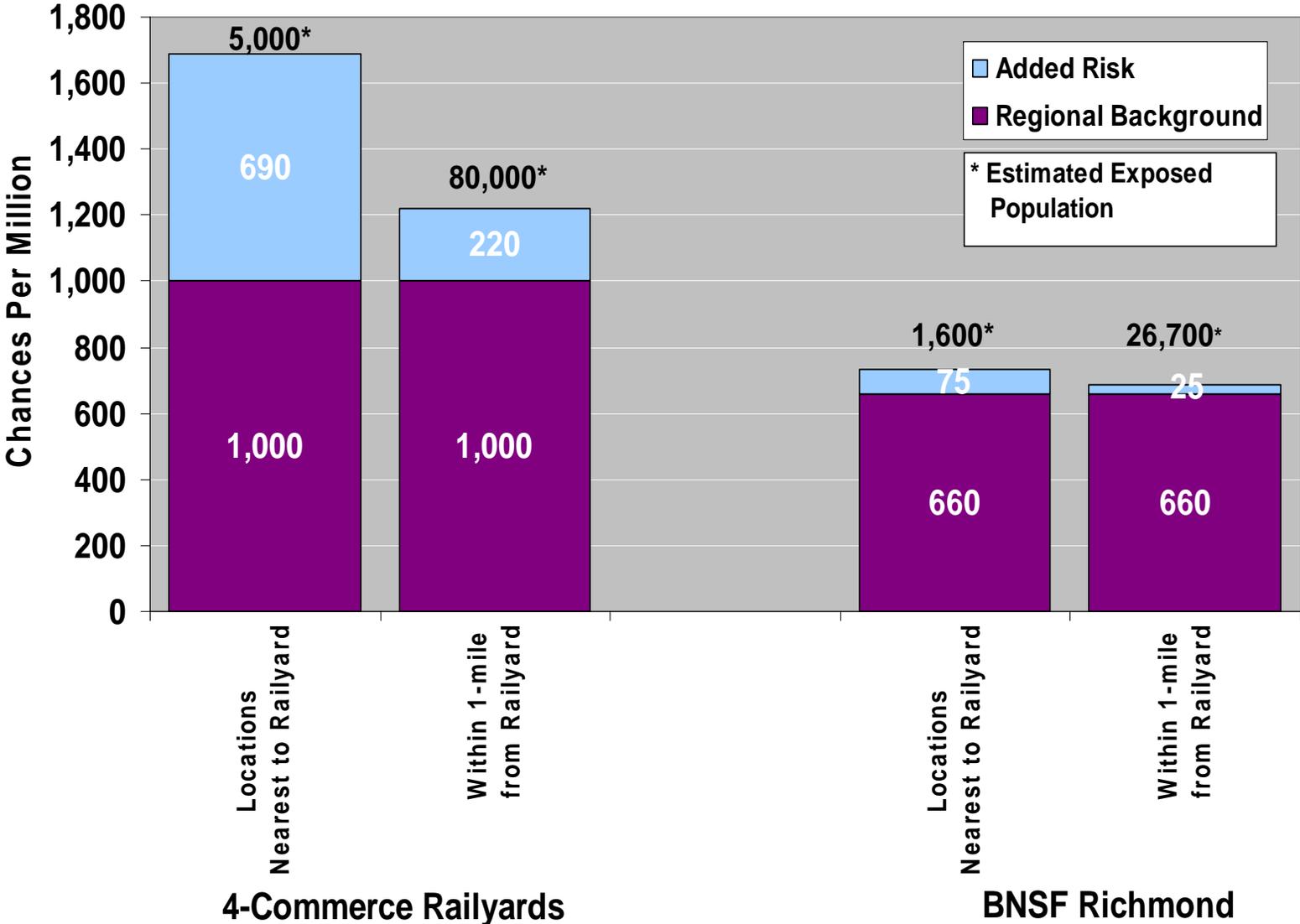
- **Use air dispersion model to estimate the air concentration distributions of diesel PM**
- **U.S. EPA mathematic-computer model (2006)**
- **Key inputs to the model:**
  - **Emissions inventory (temporal & spatial allocation)**
  - **Meteorological data (wind speed, wind direction, temperature, etc.)**

# Health Risk Evaluation

- **Combine air dispersion modeling results with toxicity data to estimate health risks**
- **Toxicity data provided by the Office of Environmental Health Hazard Assessment, Cal/EPA (OEHHA Guidelines, 2003)**
- **Health effects:**
  - cancer risks – as *chances per million (e.g., 25 per million)*
  - non-cancer impacts – as *hazard indices (e.g., 0.2)*
- **No significant impacts on the communities identified for non-cancer effects**

# **Results of the Draft Assessments**

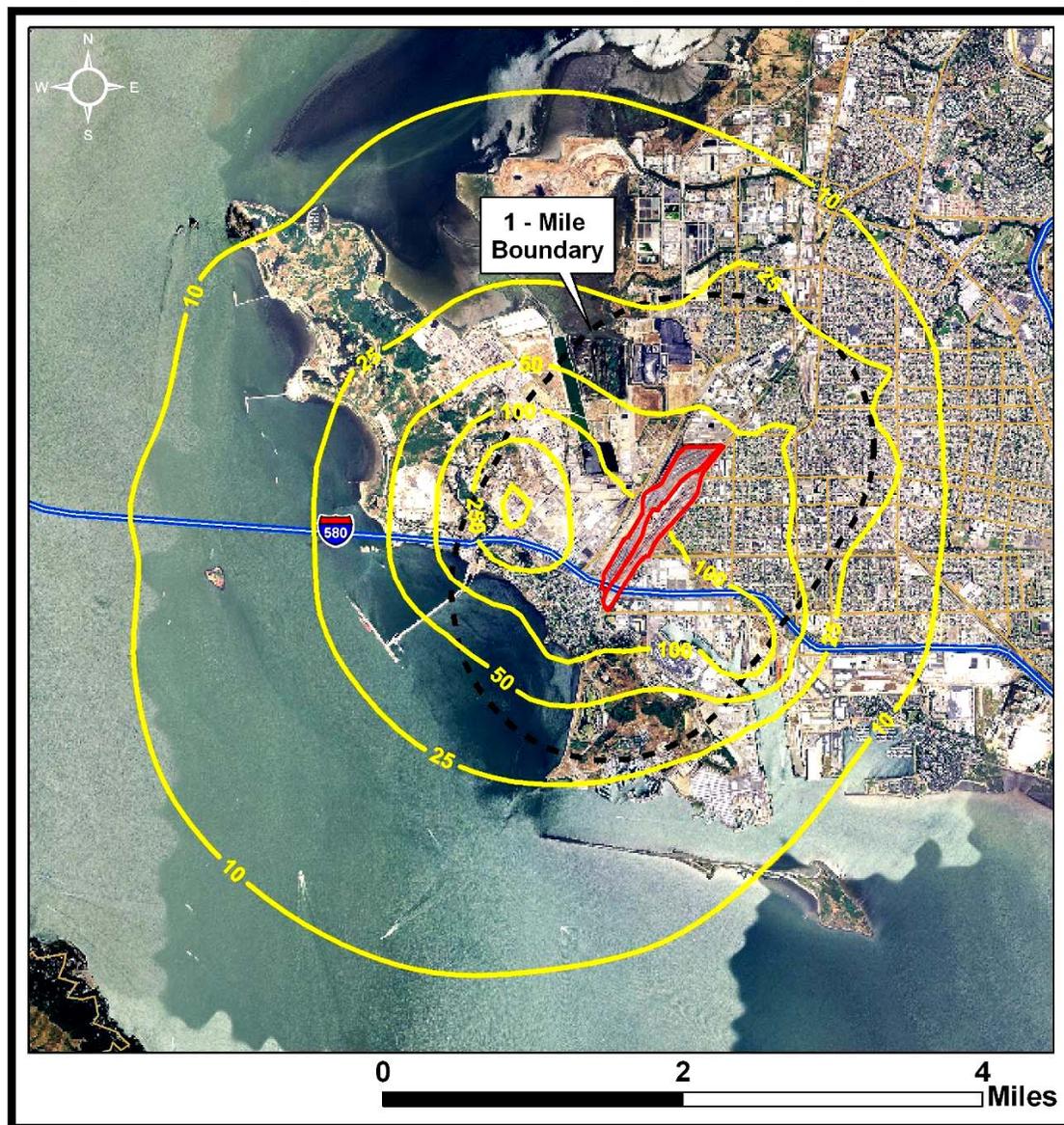
# BNSF Richmond Railyard Estimated Potential Cancer Risks



# Estimated Potential Cancer Risks Associated with the BNSF Richmond Railyard Diesel PM Emissions (chances per million exposed population)



# Estimated Potential Cancer Risks from Off-Site DPM Emissions (chances per million exposed population)



# Emission Reduction Measures



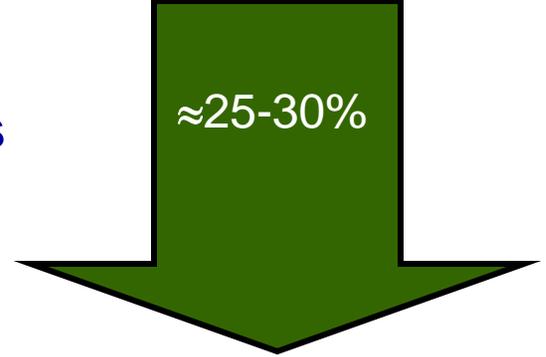
# **Approach to Reducing Emissions**

- **ARB regulations**
  - Fuels
  - Cargo handling equipment (CHE)
  - Transport refrigeration units (TRUs)
  - Heavy-duty diesel on-road trucks and off-road vehicles
- **U.S. EPA regulation**
  - Locomotives
- **Voluntary agreements**
  - 1998 South Coast/2005 Statewide
- **Railroad yard locomotive replacement program**
- **Funding programs**
  - Carl Moyer Incentives

# Benefits of California Railyard Diesel PM Emission Reduction Measures

## ➤ 2005-2007:

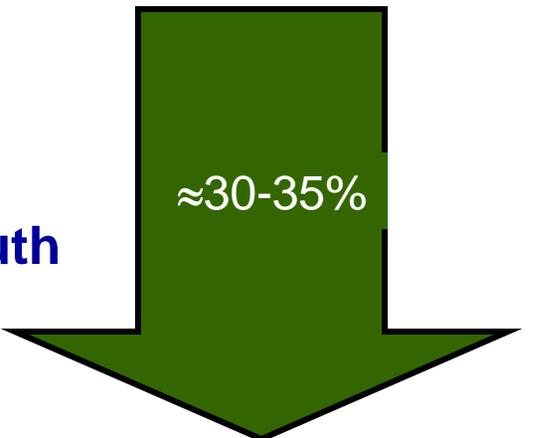
- CARB diesel fuel for intrastate locomotives
- 2005 railyard agreement
- Less cargo handling operation



≈25-30%

## ➤ 2005-2010:

- Measures above plus:
- Spilled-over benefits from 1998 NOx locomotive fleet average agreement (in South Coast)
- ARB on-road heavy-duty truck regulation
- ARB transport refrigeration unit regulation



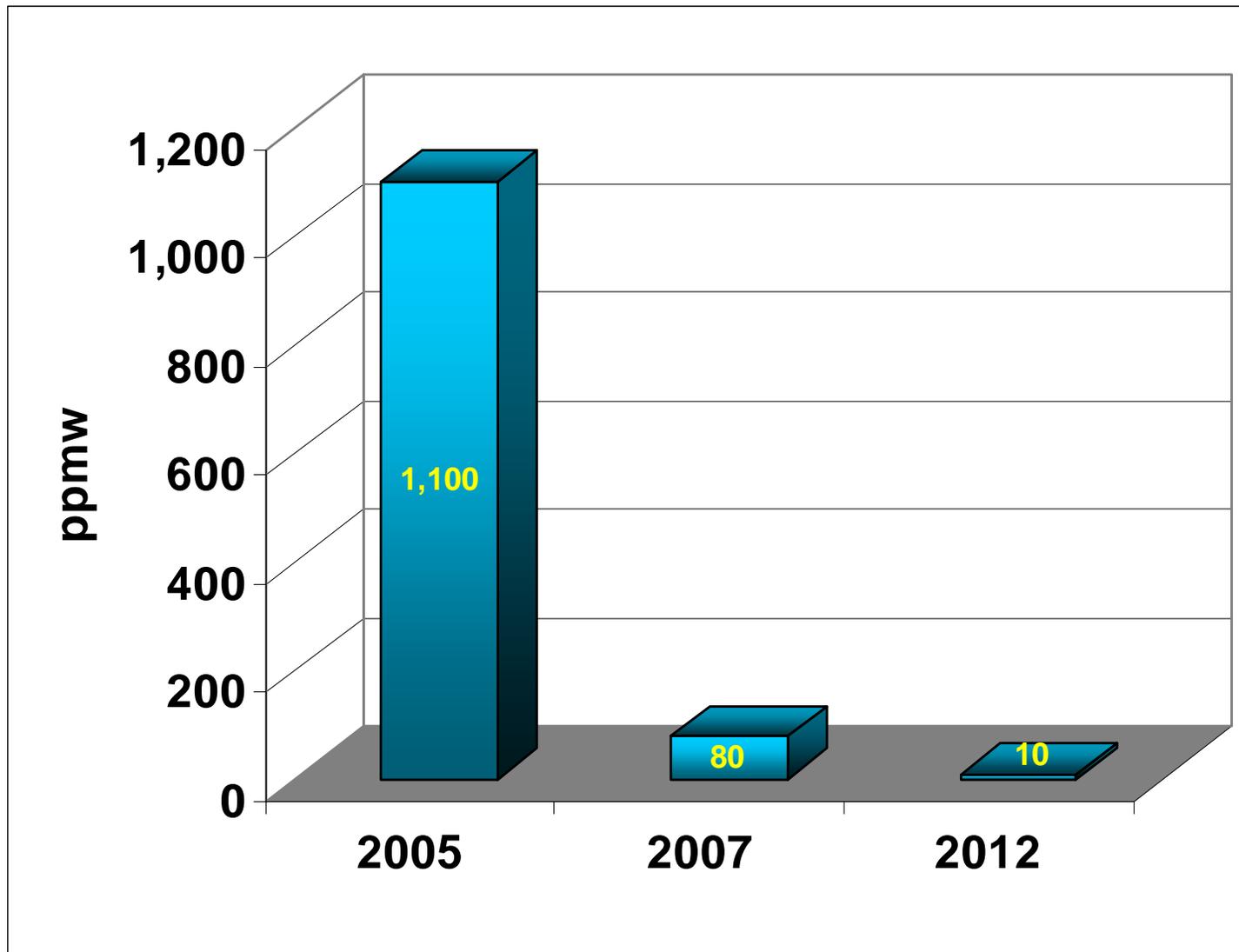
≈30-35%

# Existing Measures - Diesel Fuel Standards

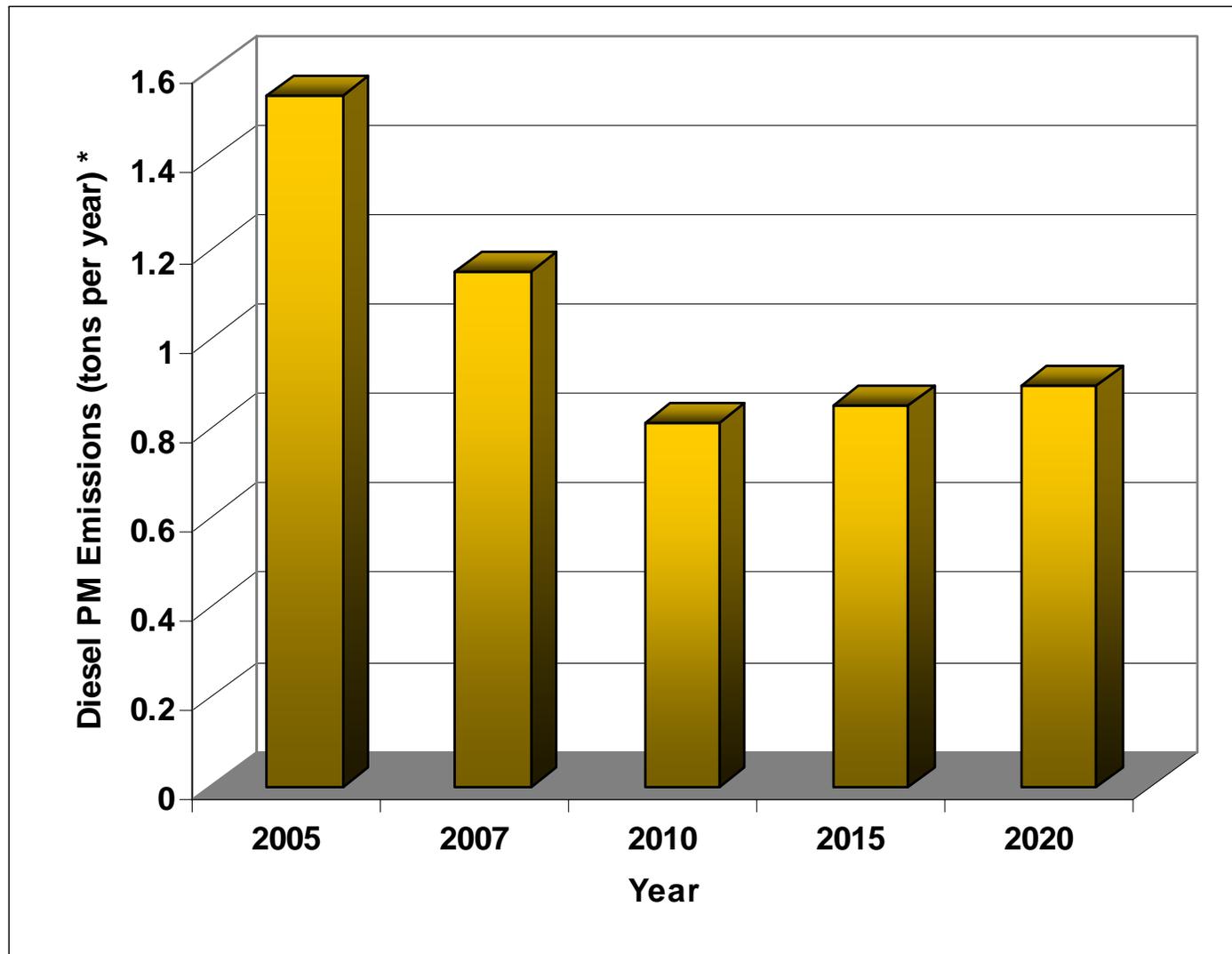
Fuel Type	Maximum Sulfur Level (ppmw)		Aromatics Maximum (% by volume)
	Prior	2006-2007	
<b>CARB Diesel</b>	<b>500</b>	<b>15</b>	<b>10</b>
<b>EPA On-Road Diesel</b>	<b>500</b>	<b>15</b>	<b>35</b>
<b>EPA Non-road Diesel</b>	<b>5,000</b>	<b>500*</b>	<b>35</b>

\* Lower to 15 ppmw in 2012.

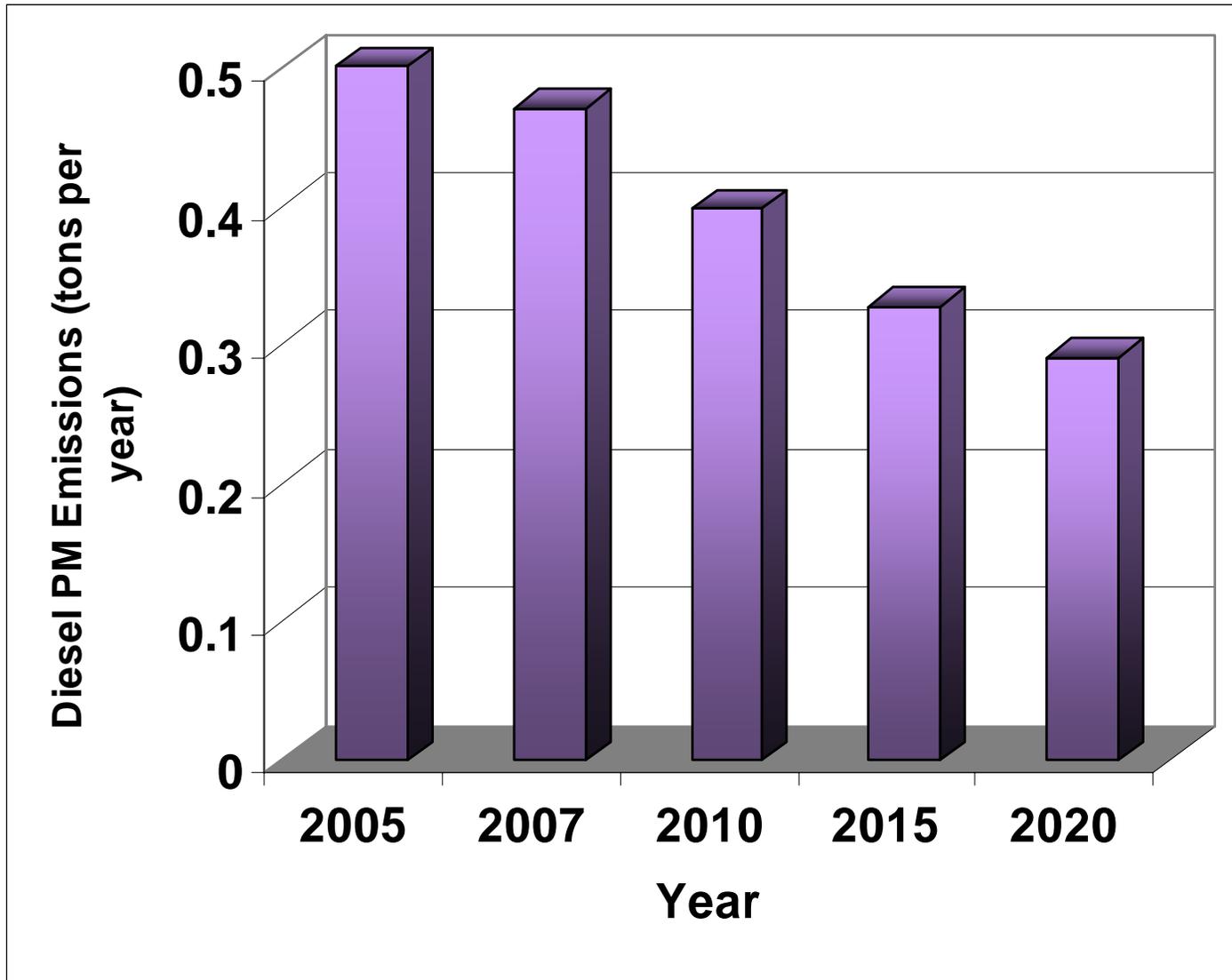
## Existing Measures - Average Diesel Fuel Sulfur Levels Consumed by Locomotives in California



## Existing Measures - Richmond Railyard Diesel PM Emission Reductions: Line-Haul Locomotives



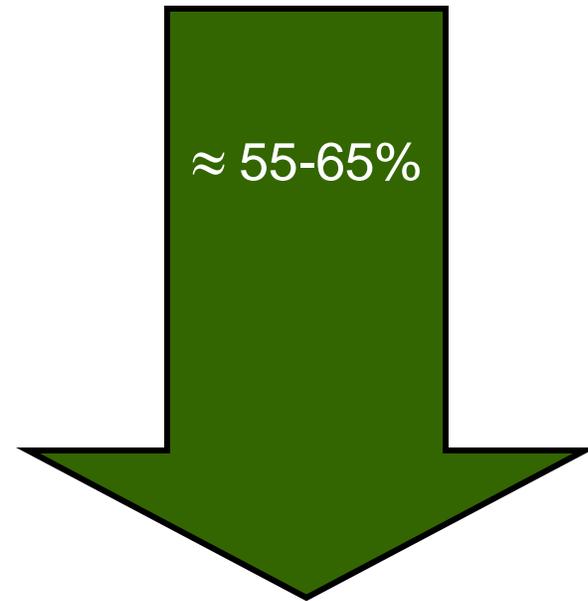
# Existing Measures - Richmond Railyard Diesel PM Emission Reductions: New On-Road Trucks



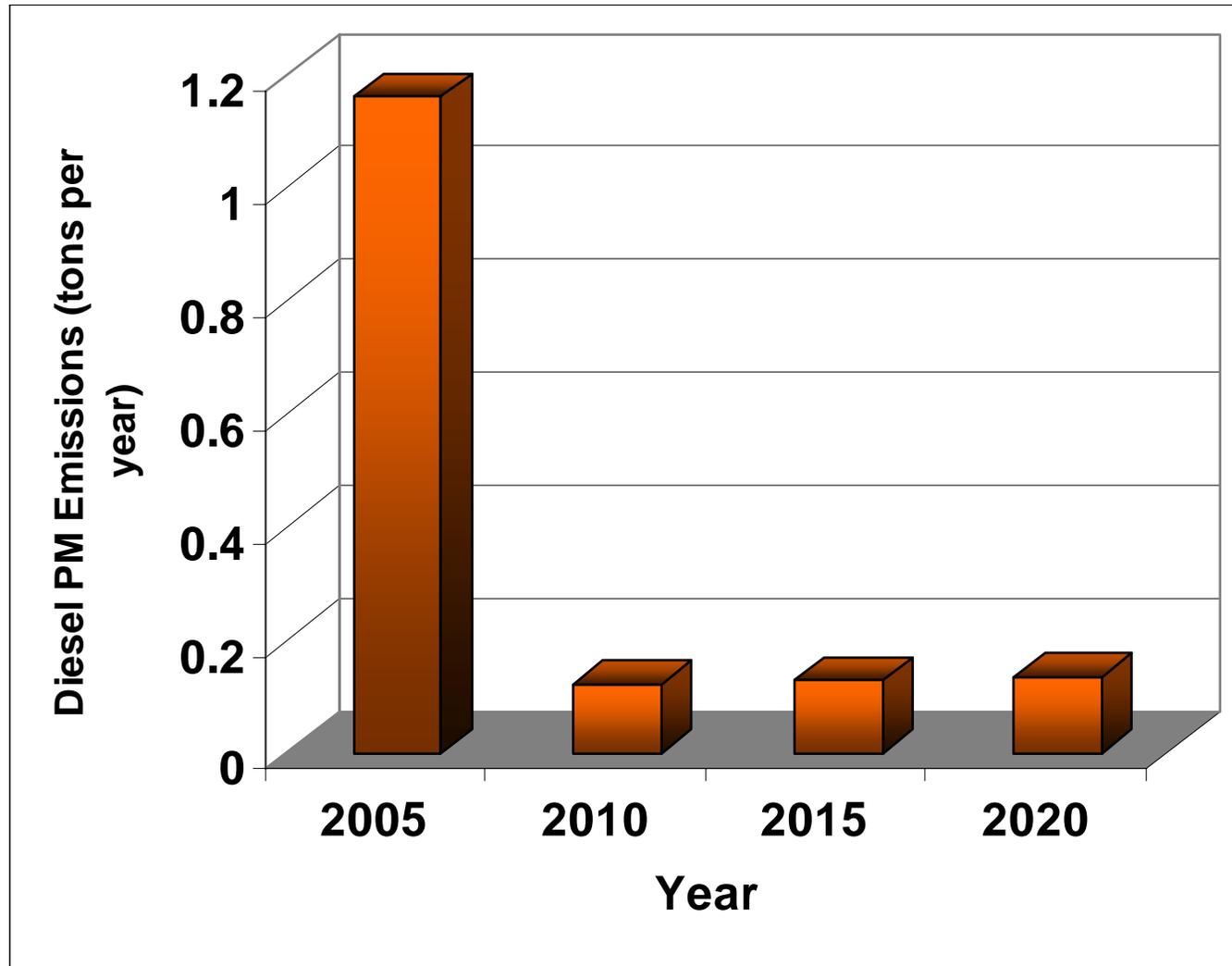
# Possible Additional Measures

## ➤ 2005-2020:

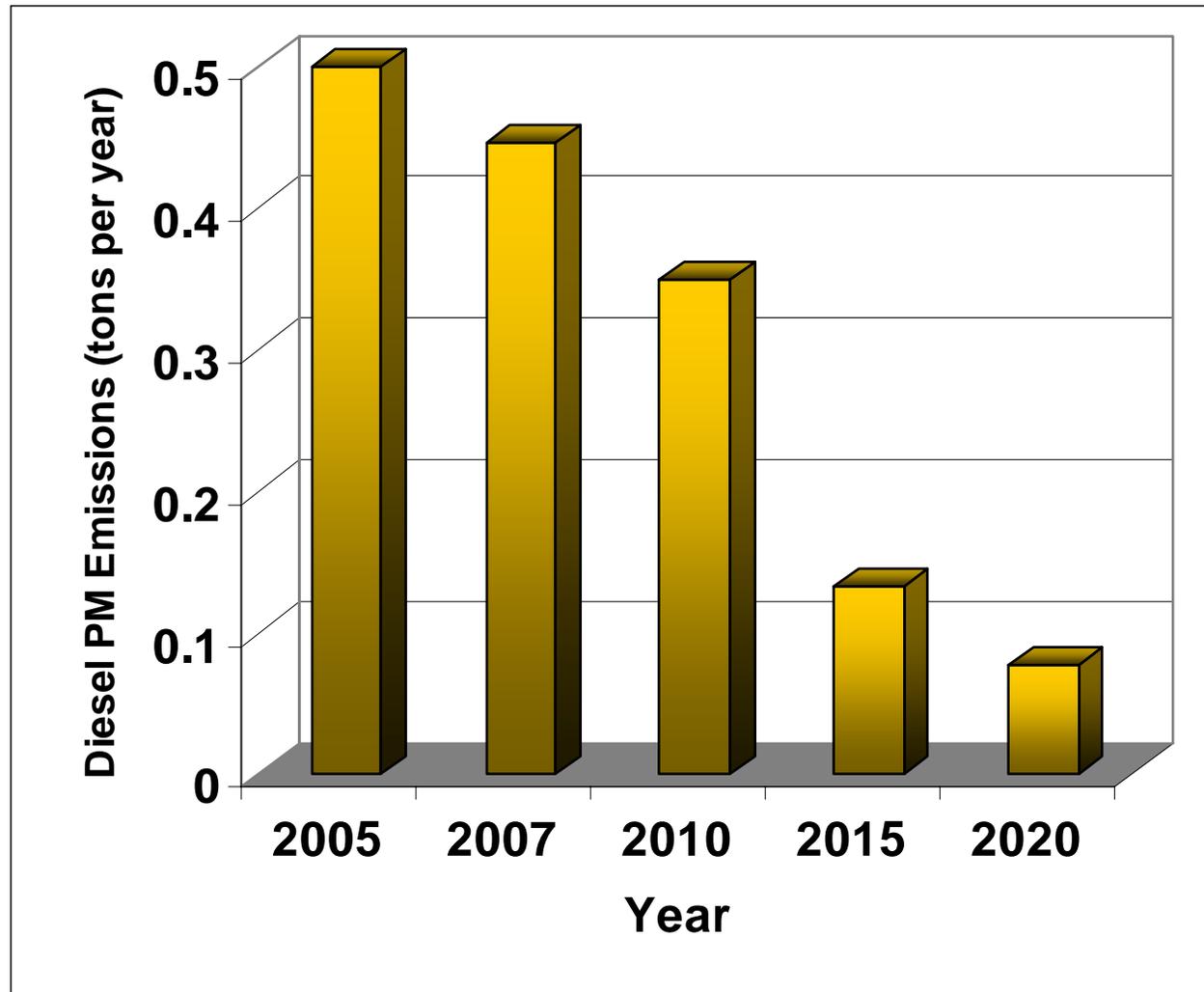
- U.S. EPA locomotive rulemaking
- California replacement of switch locomotives
- ARB in-use truck measure



# Potential Measures - Richmond Railyard Diesel PM Emission Reductions: Switcher Locomotive Replacement by 2010

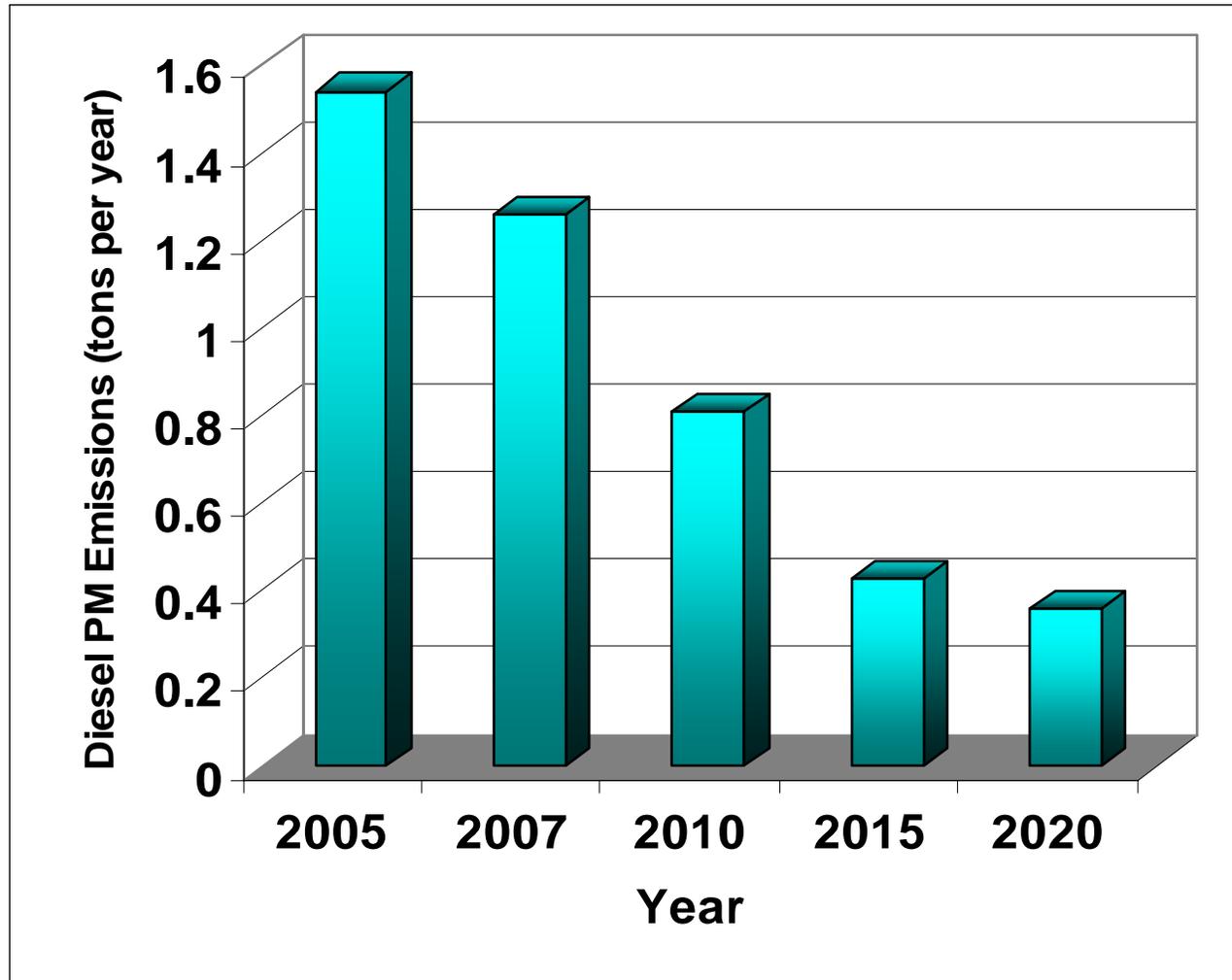


## Potential Measures - Richmond Railyard Diesel PM Emission Reductions: In Use On-Road Trucks



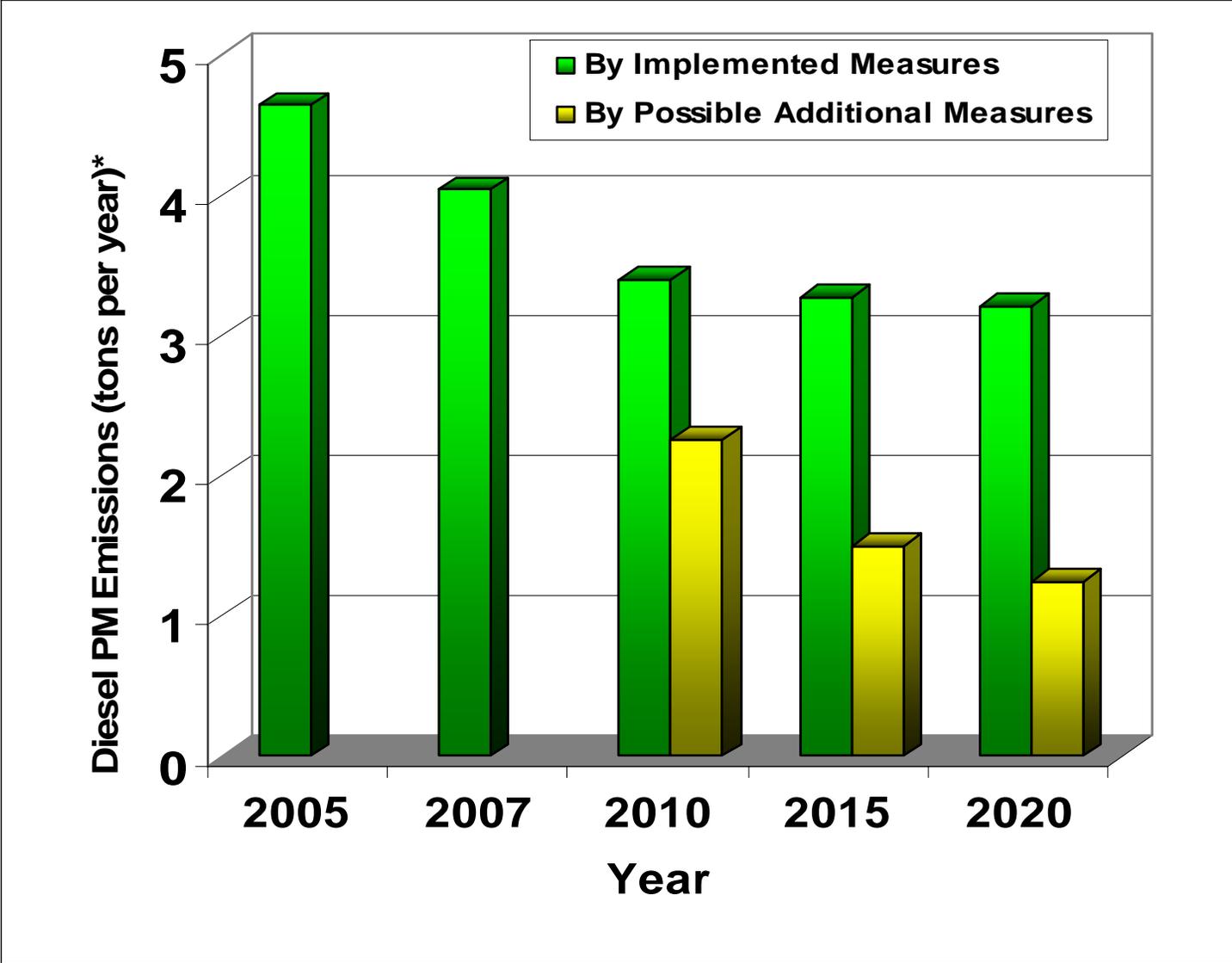
➤ In addition to the existing on-road heavy-duty truck regulation.

# Potential Measures - Richmond Railyard Diesel PM Emission Reductions: U.S. EPA Locomotive Rulemaking



- In addition to the existing line-haul locomotive fleet average agreement .

# Existing & Potential Measures - Total Benefits of the Emission Reductions Measures for Richmond Railyard



# Next Steps

- **Feedbacks from the Public**
- **Written comments to ARB**
- **Next Community Meeting**
- **Evaluate any additional feasible mitigation measures**

# ARB Railyard HRA Contacts

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## ➤ ARB Railyard HRA Website:

- <http://www.arb.ca.gov/railyard/hra/hra.htm>