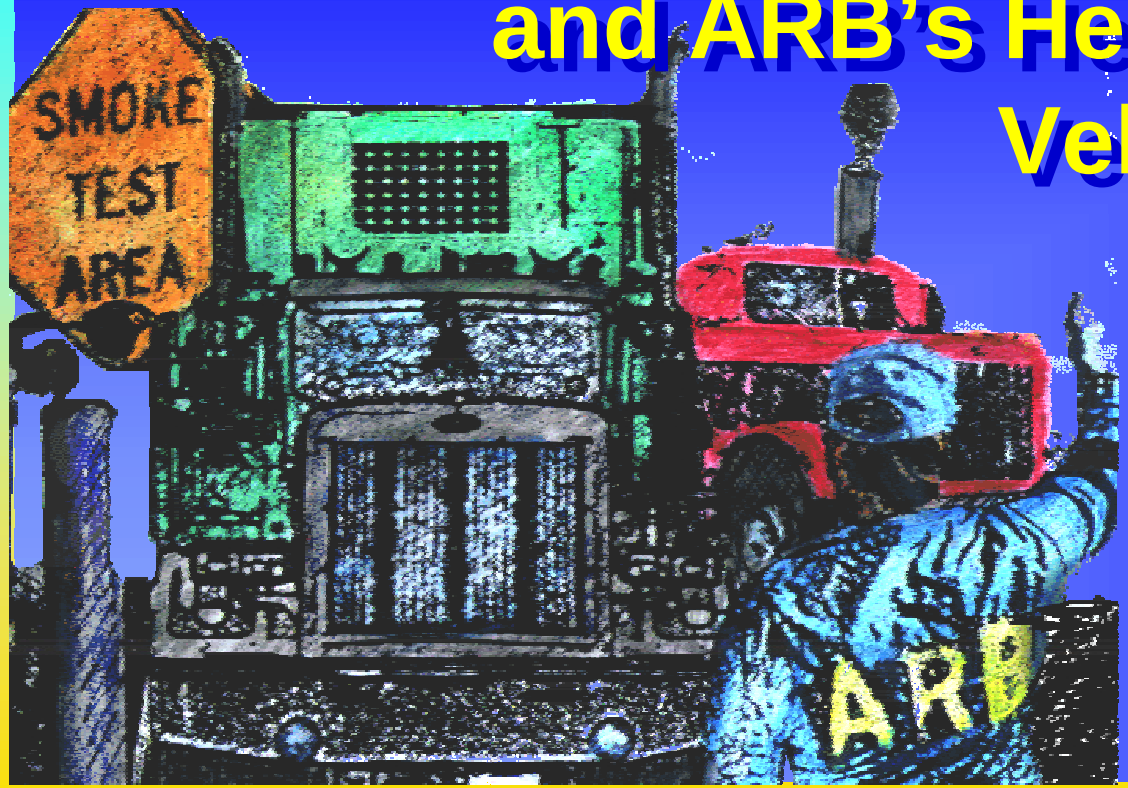
NAFTA & Mexican Truck Emissions and ARB's Heavy-Duty Diesel Vehicle Inspection Programs



Presented to:
The Western States Project
Spring 2005 Conference

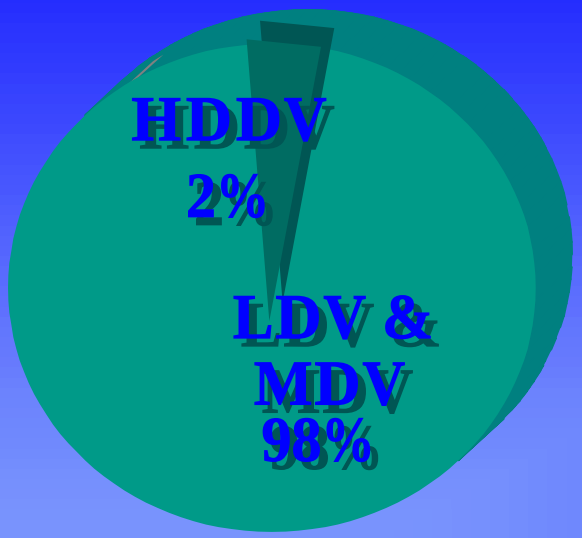
By:
Paul E. Jacobs, Chief
Mobile Source Enforcement
May 2005

Presentation Overview

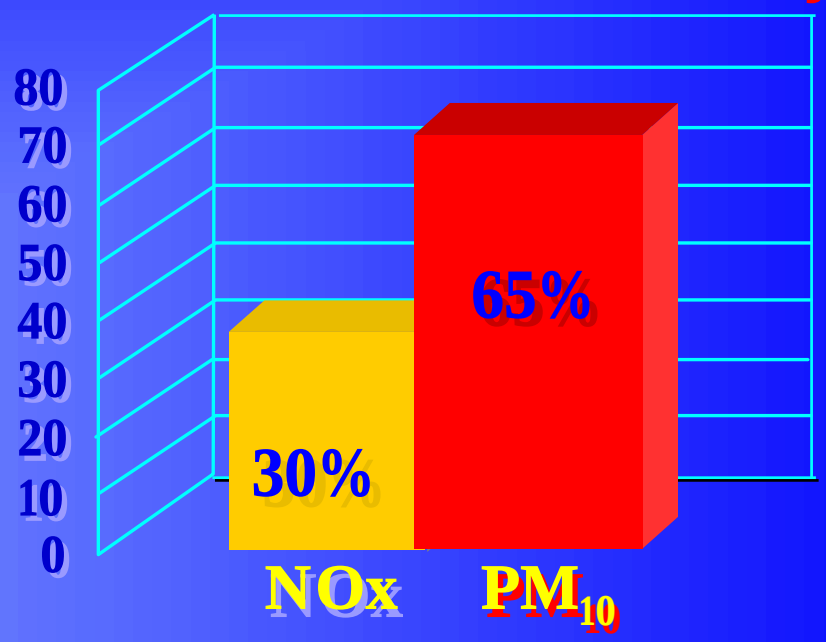
- NAFTA and Mexican Truck Emissions Overview
- ARB's Heavy-Duty Vehicle Smoke Inspection Programs (Roadside Inspections, Fleet Inspections)
- Related Topics/Issues

INTERNATIONAL
4300
CA 67380

The Problem



% of Total
On-Road Vehicles



Clear Day
Los Angeles

Smoggy Day
Los Angeles

Health and Environmental Impacts of Pollutants

Constituent	Detrimental Effect
Particulates (PM_{10}/$PM_{2.5}$)	Carcinogenic/Mutagenic Respiratory Disease
HC & NOx (Smog Precursors)	Ozone (Smog) Respiratory Diseases Crop Losses
NOx & SOx	Acid Deposition Visibility Degradation
Toxic Air Contaminants	Carcinogenic

NAFTA Overview

- Started in 1990 by President George H.W. Bush and Mexican President Carlos Salinas
- Adopted by Congress in 1993 and signed by President William J. Clinton
- Became effective January 1, 1994

NAFTA Litigation

- U.S. Supreme Court decision of June 7, 2004 overturned a previous 9th Circuit Court of Appeals decision
- Decision stated FMCSA not obligated to complete EIS under the NEPA or SIP conformity determination under the FCAAA of 1990

NAFTA Impacts

- Mexican trucks will be allowed to travel freely throughout North America (currently restricted to border commercial zone)
- Currently 3500 Mexican trucks cross into California every day
- Expected to increase significantly when NAFTA is triggered

Map of Border Crossings

NAFTA Impacts Continued

- Mexican fleet is older than U.S. Fleet
- 66% of the Mexican fleet pre 1993 model year HDDEs
- 25% of the Mexican fleet pre 1980 model year HDDEs

Emission Standards

- Mexican diesel engine emission standards were aligned with U.S. EPA standards for the 1994 - 2003 MYs
- Mexico has not revised its emission standards to reflect recent U.S. standards
- U.S. standards require 50% reduction is NOx for 2004 - 2007 engines
- U.S. requires a 90% reduction in NOx and PM for 2007 and subsequent MY engines

U.S. vs. Mexican Heavy-Duty Emission Standards

Comparison of U.S. and Mexico Heavy-Duty Diesel Vehicle Emission Standards
(in grams per brake horsepower-hour)

	Hydrocarbons (HC)		Carbon Monoxide (CO)		Nitrogen Oxides (NOx)		Particulate Matter (PM)	
	U.S.	Mexico	U.S.	Mexico	U.S.	Mexico	U.S.	Mexico
1974-78*	-	-	40.0	-	-	-	-	-
1979-83**	1.5	-	25.0	-	-	-	-	-
1984-87	1.3	-	15.5	-	10.7	-	-	-
1988-89	1.3	-	15.5	-	10.7	-	0.6	-
1990	1.3	-	15.5	-	6.0	-	0.6	-
1991-93	1.3	-	15.5	-	5.0	-	0.25	-
1994-97	1.3	1.3	15.5	15.5	5.0	5.0	0.1	0.1
1998-2003	1.3	1.3	15.5	15.5	4.0	4.0	0.1	0.1
2004-2006***	0.5	1.3	15.5	15.5	2.0	4.0	0.1	0.1
2007	0.14	1.3	15.5	15.5	0.2	4.0	0.01	0.1

*U.S. had combined HC+NOx standard of 16 g/bhp-hr
**U.S. had combined HC+NOx standard of 10 g/bhp-hr
***Under a consent decree with U.S. EPA, engine makers implemented the 2004 standards in October 2002. Standards allow the option of 2.4 g/bhp-hr NMHC+Nox, or 2.5 g/bhp-hr NMHC+Nox and 0.5 NMHC.
Assumes no future change in Mexican emission standards.

Truck Emission Factors US/Canada v. Mexican

Truck Emission Factors US/Canada v. Mexican (grams per mile)*

Year	NOx g/mile	Delta	PM g/mile	Delta	Mode**
1999 US/C	12.8	----------	0.75	----------	Highway
1999 MX	19.3	+6.5 (51%)	1.13	+.38 (51%)	Highway
2010 US/C	1.38	----------	0.051	----------	Highway
2010 MX	4.73	+3.35 (243%)	0.262	+.211 (414%)	Highway

These are fleet average emission rates and the 2010 year figures reflect the 2007 USEPA emissions standards discussed above. Canadian engine emissions standards are aligned with the USEPA engine emission standards.

* North American Trade and Transportation Corridors: Environmental Impacts and Mitigation Strategies, Final Report – Prepared for the North American Commission for Environmental Cooperation by ICF Consulting, August 2001. www.cec.org

**Idling emission factors available on request

Otay Mesa Border Crossing Area

California AQ Impacts

Various studies have modeled the AQ impacts of the increased Mexican travel into California under NAFTA and the worst case scenario is 50 additional tons per day of NOx and 2.5 tons per day of PM in the South Coast Basin alone*

*Refer to Sierra Research Report No. SR02-04-01: Critical Review of "Safety Oversight for Mexico Domiciled Commercial Motor Carriers, Final Programmatic Environmental Assessment," Prepared by John A. Volpe Transportation Systems Center, January 2002

NAFTA Legislation

- S. 2842 (Boxer/Feinstein/Jeffords) was introduced on September 23, 2004
- Amends Title 49 of the U.S. Code to require motor carriers (truckers) to comply with vehicle emission performance standards established by the USEPA (The Clean Trucks Act of 2004)
- H.R. 5314 (Filner/Millender-McDonald, Carson and Sandlin) was introduced on October 8, 2004 and is the House version of S. 2842

California NAFTA Legislation

- AB 1009 of 2004 (Pavley Bill)
- Urgency legislation signed into law on September 29, 2004 by Governor Schwarzenegger
- This bill amends Health and Safety Code Section 43701

AB 1009 Requirements

- ARB in consultations with the CHP to adopt regulations by January 1, 2006
- Regulations will prohibit HDDVs with non-USEPA certified engines from operating in California
- ARB and CHP to enforce regulations

Other Mitigation Strategies

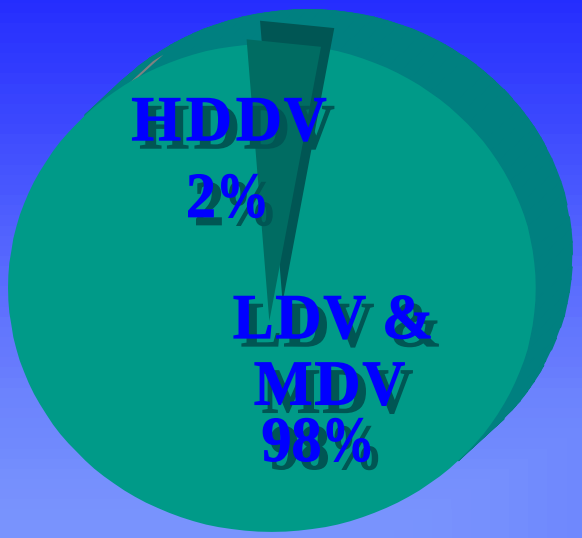
- Expand the Tijuana Inspection and Maintenance (I/M) Project to cover all vehicles
- Expand the California Council on Diesel Education and Technology Program (CCDET) to Baja California
- Continued aggressive enforcement of the Heavy-Duty Vehicle Inspection Program (HDVIP) along the border region

ARB's Heavy-Duty Diesel Vehicle Inspection Programs

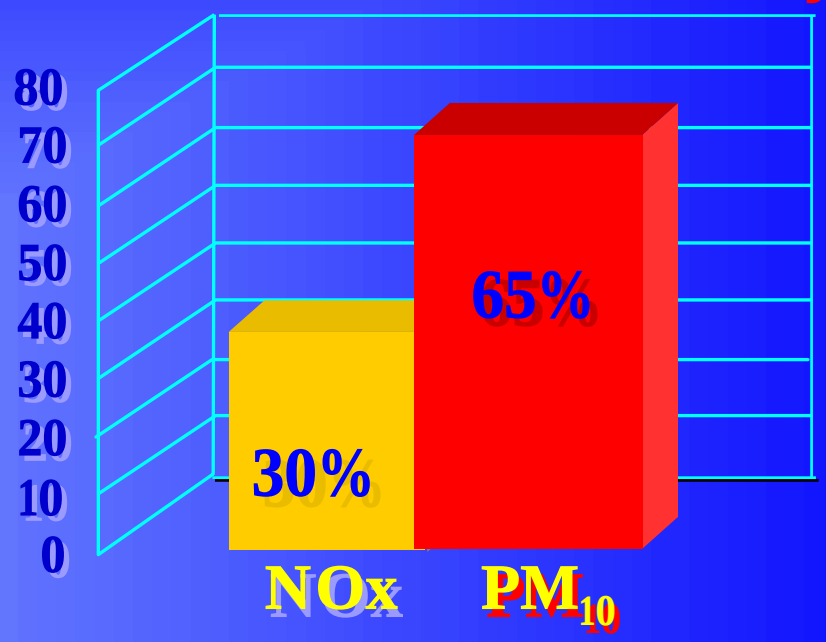
Presented to:
The Western States Project
Spring 2005 Conference

By:
Paul E. Jacobs, Chief
Mobile Source Enforcement
May 2005

The Problem



% of Total
On-Road Vehicles



Mechanical Causes of Excessive Smoke Emissions

- Restricted air filter
- Improper injection timing
- Clogged, worn or mismatched fuel injectors
- Faulty fuel injection pump
- Defective or maladjusted puff limiter
- Low air box pressure
- Improperly adjusted governor
- Air manifold leaks
- Malfunctioning turbocharger
- Malfunctioning aftercoolers
- Maladjusted fuel rack
- Defective air fuel controller
- Poor fuel quality
- Improper driving gear

Source: ATA, EMA "On the Road to Clean Air"

Types of Smoke

Black smoke is caused by incomplete combustion (wasted fuel)

Blue smoke is caused by unburned engine oil mixed in the exhaust

White smoke is caused by drops of unburned liquid fuel and water vapor

Source: ATA, EMA "On the Road to Clean Air"

History of the Heavy-Duty Vehicle Smoke Inspection Program 1988 - 1996

Initial Roadside Inspections

- **Roadside smoke inspections required by legislation in 1988 (SB 1997, Presley)**
- **Initial regulations adopted 1990**
  - Intrastate/interstate/ international vehicles
  - Inspections performed at roadside locations
  - Used SAE J1243 test protocol
  - Smoke opacity limits:
    - 1991+ engines: 40%
    - pre-1991 engines: 55%
- **Program enforced from 1991 to 1993**

Initial Fleet Inspections

- Fleet inspections required by legislation in 1990 (SB 2330, Killea)
- California fleets of two or more vehicles
- First regulations adopted in 1992; voluntary enforcement
- Annual self-inspection
- ARB audits

Initial Roadside Inspections - Litigation

- **Valley Spreader et al. v. ARB**
  Imperial County Superior Court
  1993 decision for ARB
  Upheld the program and test procedures

- **Harris Transportation et al. v. ARB**
  Sacramento County Superior Court
  1994 decision for ARB
  Upheld the program and test procedures
  Upheld by 3rd District Court of Appeals (Sacramento);
  California Supreme Court denied review

- **Aura Hardwood et al. v. ARB**
  Sacramento County Superior Court
  1994 decision for ARB
  Upheld the program and test procedures
  Upheld by 3rd District Court of Appeals (Sacramento);
  California Supreme Court denied review

- **Viviano et al. v. ARB**
  Sacramento County Superior Court
  1997 decision for ARB
  Upheld the program and test procedures Upheld by 3rd District Court of Appeals (Sacramento);
  California Supreme Court denied review

SAE J1667

- Committee established in 1992
- Diverse membership: (ARB, US E.P.A., EMA, ATA, CTA, smokemeter manufacturers, other states, academia)
- Test protocol and smokemeter specifications
- Adopted by SAE in February 1996

Statutory Requirements
(AB 584, Cortese) 1993

- Consistent and repeatable tests
- No false failures (unless remedied without cost to owner)
- Adoption of SAE J1667 satisfies requirements

History of the Heavy-Duty Vehicle Smoke Inspection Program 1997 - present

Updated Roadside Inspections

- **Updated regulations adopted by ARB in December 1997**
- **Opacity cutpoints retained**
  - 1991+ engines: 40%
  - pre-1991 engines: 55%
- **Use of SAE J1667 test protocol**
- **Administrative appeals through Administrative Law Judge (ALJ) hearing process**
- **Enforcement resumed June 1, 1998**

Penalty Schedule

Violation	Correction	Penalty
Notice of Violation	Repaired within 45 days	$0
First citation	Repaired within 45 days	$300
First citation	Not repaired within 45 days	$800 ($300 + $500)
More than one citation in a year	Repaired within 45 days	$1,800 ($300 + $1,500)

Updated Periodic Fleet Inspections

- **Revised regulations adopted December 1997**
  - Same cut points as roadside program
  - Uses SAE J1667 test protocol
  - Four-year rolling exemption
- **Started July 1, 1998**

Statewide Benefits
(tons per day)

	ROG	NOx	PM_{10}
1999	6.4	12.2	5.2
2010	5.3	14.0	3.2

(EMFAC 7g)

Annual Costs
(Combined Roadside and Fleet Programs)

	1999	2010
Administrative Costs to Fleets	$17 million	$22 million
Costs to Vehicle Owners	$24 million	$20 million
Fuel Costs (Savings)	-$22 million	-$25 million
Total Net Costs of Both Programs	$19 million	$17 million

Note - Gallons of fuel saved: in 1999 - 16.7 million, in 2010 - 19.2 million

Cost Effectiveness

1999	2010
$1.12 / pound*	$1.05 / pound*

*(ROG, NOx, PM-10)

HDVIP Statistics

	HDVIP I (1991 - 1993)	Current Program (June 1998 - Dec 2004)
No. Visual Inspections	38,947	116,734
Number of Citations	8,492	5,795
Number of NOVs	N / A	1,929
Total Violations	8,492	7,724
Failure Rate	22%	7.0%
Number Appealed	1,157 (14%)	122 (1.6%)
Penalties Assessed	$2,613,300	$ 1,848,000
Penalties Collected	$2,061,500	$ 1,457,037

Delinquent Citation Collection Status

(Data through 12/31/04)

	Pending	Cleared	Collected
HDVIP I	694	695	$184,000
HDVIP II	920	714	$287,000
TOTAL	1615	1409	$471,000

Periodic Fleet Inspections Statistics

- **14,000+ fleets in state**
- **56,000+ terminals in state (CHP 2000 BIT database)**
- **ARB audits these fleets/terminals for compliance**
- **Phase-in period ended October 1, 1999**
- **Activity to date (through 12/31/04) :**
  - ~8,500 fleets audited
  - Compliance rates **at initial audit**:
    - 42% show full compliance
    - 28% partial compliance (~99% compliance on follow-up)
    - 30% non-compliance (~99% compliance on follow-up)
      - 5 enforcement cases completed to date (~$250K in penalties)

Outreach Activities

- Compliance assistance to fleets
- Presentations to associations
- Technical papers/presentations
- Mailouts
- Pamphlets/fact sheets
- Information on ARB web site@ www.arb.ca.gov/enf/enf.htm
- ARB released updated video in fall 2000---on ARB web site

California Council on Diesel Education and Technology

- **Partnership: Community colleges, government, industry**
- **Low-cost training of smoke-test protocol and smoke-related engine repairs**
- **ARB audits classes for QA/QC**
- **Participating Schools:**

  College of Alameda (Oakland area)
  San Joaquin Delta College (Stockton)
  L.A. Trade Tech College (Los Angeles)
  Palomar College (San Diego County)
  Santa Ana College (Orange County)
  San Diego Miramar College

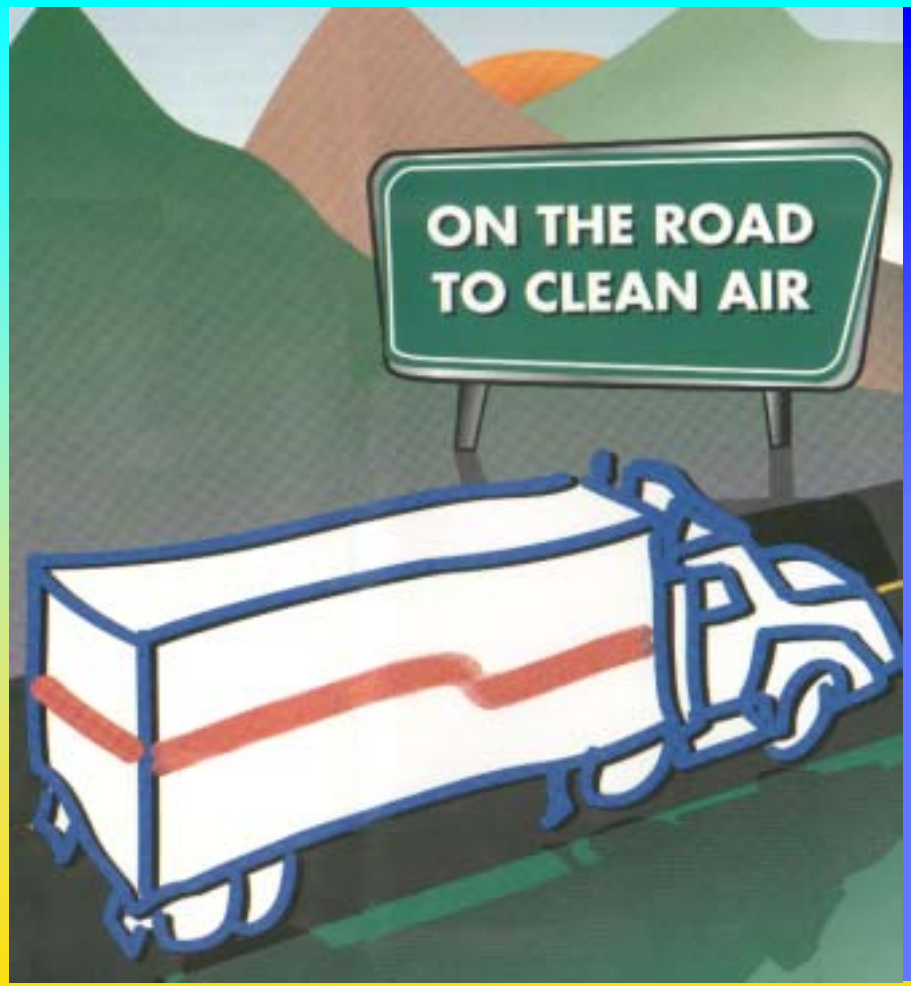
Related Topics

- National HDD I/M Guidance (USEPA/SAE/ARB)
- On the Road to Clean Air
- Enforcement at the Mexican Border/ NAFTA
- Dyed Diesel Inspections(BOE/IRS)
- Use of Penalty Funds(VIRF/DERF)
- Smoking Vehicle Complaint Line
- Heavy-Duty Diesel Vehicle I/M
- School Bus Idling/HDDV Idling ATCMs
- HDDE Reflash

US EPA Heavy-Duty Diesel I/M Guidance

- **Adopted February 1999 by the U.S. EPA as a "Guidance"**
- **ARB program serves as model**
- **Recommends nationwide use of SAE J1667 test protocol**
- **Recommends cutpoints (adjusted for altitude):**
  - 40% for 1991+
  - 55% for pre-1991
- **Other states/provinces with smoke programs:**
  Arizona, Colorado, Connecticut, Maryland, Nevada, New Jersey, New York, Ohio, Utah, Washington, British Columbia and Ontario (Canada), Jalisco (Mexico), and others

On the Road to Clean Air



- **Campaign co-sponsored by:**
  - American Trucking Association
  - Engine Manufacturers' Association
  - Supported by ARB
- **Video, pamphlet, public service announcements and press releases - Spring 1997**
- **Strong anti-tampering message**

Enforcement at the Mexican Border & NAFTA

- **Legislation (SB 270, Peace) in 1998 authorized:**
  - Full time enforcement at Otay Mesa and Calexico Border Crossings
  - Funding for inspection site improvements at Otay Mesa and Calexico
- **~3,500 commercial vehicles cross into California at these crossings each day**
- **NAFTA Issues & Litigation (U.S. Supreme Court decision 6/7/04)**

Inspections/Violations

CHP CVIFs: 5653/370*

Failure Rate: ~7.0%

Random Roadsides: 1738/276

Failure Rate: ~16%

***Includes random roadsides data through CY 2004**

Dyed Diesel Inspections

- **Dyed diesel (RED) is a tax-free fuel intended for use in public fleets and non-road (agriculture and construction) vehicles**
- **ARB performs inspections for Board of Equalization/Internal Revenue Service**
  - Concurrent with roadside inspections
  - Approximately 25,000 inspections per year

Use of Penalty Funds

- **Diesel Emissions Reduction Fund**
  - $300 portion of citation
  - Funds research for clean diesel technology
  - Provided ~$4 million, to date, towards research and development
  - Current program to support Advanced Technology Program and Carl Moyer Program low-NOx technology incentives
- **Vehicle Inspection and Repair Fund**
  - Funds from the portion of a citation that is greater than $300
  - Funds support Smog Check Program

Smoking Vehicle Complaint Line

- Toll-free number and toll-free cellular telephone number available for motorists to report smoking vehicles: 1-800-END-SMOG or #SMOG on cellular telephone
- ARB sends vehicle owner an advisory letter alerting them that their vehicle is emitting excessive smoke and asking them to repair it and return proof of correction
- ARB receives approximately 2,500 calls each year and sends out approximately 2,000 letters each year
- Approximately 45% of owners repair their vehicles

Heavy-Duty Diesel Veh
Inspection and Maintenance (

- Board adopted M-17 SIP Amendment in February 1997
- Heavy-Duty Diesel Engine test cycles under development
- Heavy Duty Diesel Engine in use compliance and recall program under development

School Bus Idling ATCM

- Regulation adopted in December 2002 as an ATCM
- Prohibits HD school buses and delivery vehicles from idling
- Enforced by ARB/APCDs/CHP/Local Law Enforcement
- Public may report violations to ARB @ www.arb.ca.gov/enf/enf.htm or 1-800-END SMOG

Commercial Vehicle Idling ATCM

- Regulation effective February 1, 2005.
- Prohibits commercial diesel-fueled vehicles with gross vehicular weight rating (GVWR) greater than 10,000 lbs.
- Limits the idling to no longer than 5 minutes under most circumstances.
- Limits diesel-fueled auxiliary power system (APS) to no longer than 5 minutes to a power heater, air conditioning, or any ancillary equipment.

HDDE Reflash

- Result of Consent Decrees between U.S. EPA,ARB and Engine Manufacturers
- ~34 TPD NOx reduced or 25% per HDDE reflashed
- December 2004 Board Hearing for regulation adoption
- Voluntary program from March 2004 - December 2004
- EMA and member company law suit March 2005

Summary

- On-road heavy-duty diesel vehicles produce a disproportionate amount of California's NOx and Particulates
- ARB administers two-part program to reduce smoke emissions from these vehicles
- Program is cost-effective and achieves significant emissions reductions
- Program has become model for national and international programs