

HD 2007 Rule Overview

Clean Diesel Fuel Implementation Workshop

US EPA Office of Transportation and Air Quality

November 20, 2002



Presentation Overview

- Diesels and Air Quality
- Key Elements of the Program
 - Engine Standards and Technology
 - Fuel Provisions
- Costs and Benefits of the Program
- Technology Progress Review
- Clean Diesel Independent Review Panel
- Implementation Activities



Diesel Popularity

- U.S. diesel sales now top one million a year
- Diesels dominate the heavy-duty market
- Dieselization trend to smaller engines continues
- Diesel success is matched by increasing concern about impacts on public health and the environment





Air Quality Need & Public Health Concerns

- Diesel trucks and buses comprise 28% NO_x and 20% PM mobile source emissions nationwide
- Contributions are even higher in some areas with serious air quality problems
- In addition, diesel exhaust has been implicated in an increased risk of lung cancer and respiratory disease
- EPA has concluded (and the Clean Air Scientific Advisory Committee has approved) that diesel exhaust is a likely human carcinogen

A New Approach to Clean Air Programs for Mobile Sources

- In the past, EPA created separate programs for vehicle emission standards and cleaner fuels
- The new diesel program takes a systems approach (vehicle & fuel) to optimize costs and benefits
- Also considers the inter-relationship with other programs (like gasoline desulfurization)



Key Elements of the Engine & Vehicle Program

- Applies new NO_x and PM standards to heavy-duty engines and vehicles
 - 90%+ emission reductions—gasoline-like levels
 - Based on high efficiency emission control devices (like passenger vehicle catalysts)
 - Phase-in of NO_x standards 2007-2010
 - Incentives for early technology introduction



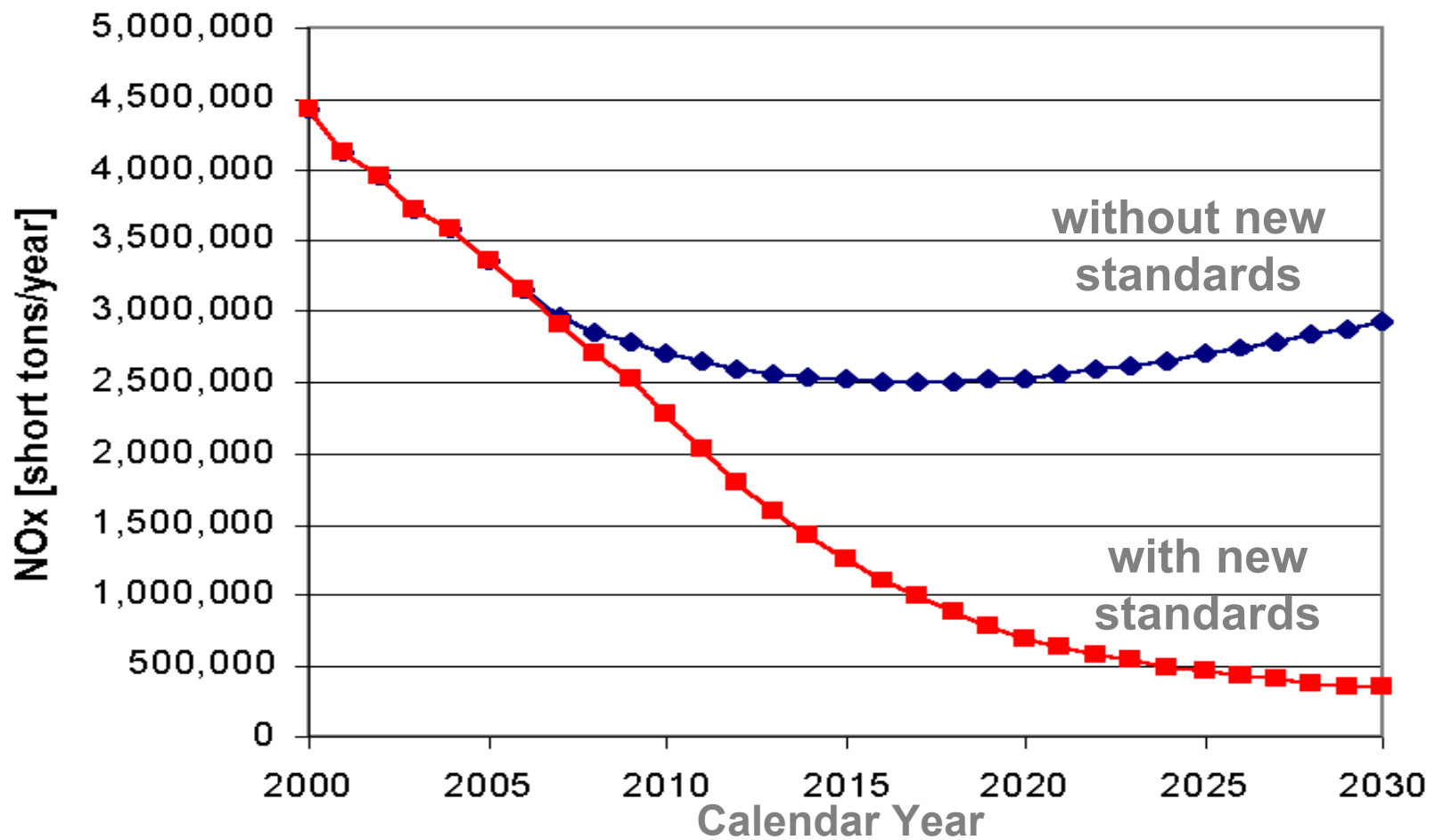
Key Elements of the Fuel Program



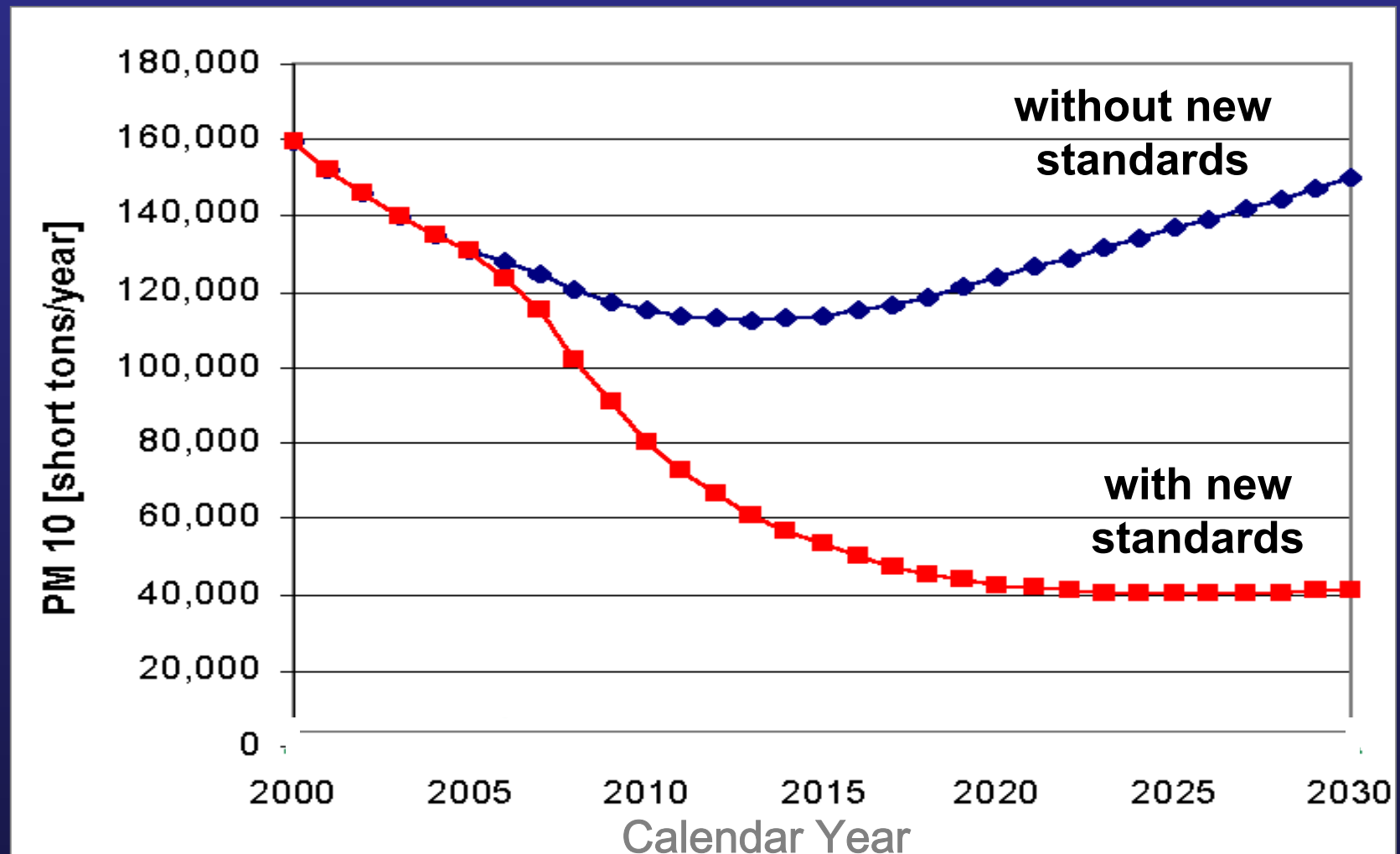
- Reduces diesel fuel sulfur levels nationwide
 - Enables use of advanced emission control technology
 - Highway diesel fuel sulfur cap of 15 ppm
 - 80% by 2006
 - 100% by 2010
 - Flexibility for small and Western refiners



Nationwide Heavy-Duty NOx Emissions



Nationwide Heavy-Duty PM Emissions



Costs and Benefits

- Health benefits

The program will prevent annually

- Over 8,300 premature deaths
- Over 750,000 respiratory illnesses
- 1.5 million lost work days
- 2.6 million tons of NO_x, 110,000 tons of PM, and 17,000 tons of toxic pollutants

- Monetized benefits: \$70.3 billion/year

- Compliance costs

- estimated at \$1200-1900 per engine
- 4-5 cents per gallon fuel
- Total costs are \$4.3 billion/year

Basic Program Requirements

	2006	2007	2008	2009	2010	2011	2012
PM		100% at 0.01 g/hp-hr					
NOx		50% at 0.20 g/hp-hr			100% at 0.20 g/hp-hr		
Fuel		80% at 15 ppm maximum sulfur (under voluntary compliance option) Hardship Provisions			100% at 15 ppm		



Feasible 2007 Emission Control Technologies

Diesel vehicles

- Catalyzed PM trap
- High-efficiency NOx Adsorber

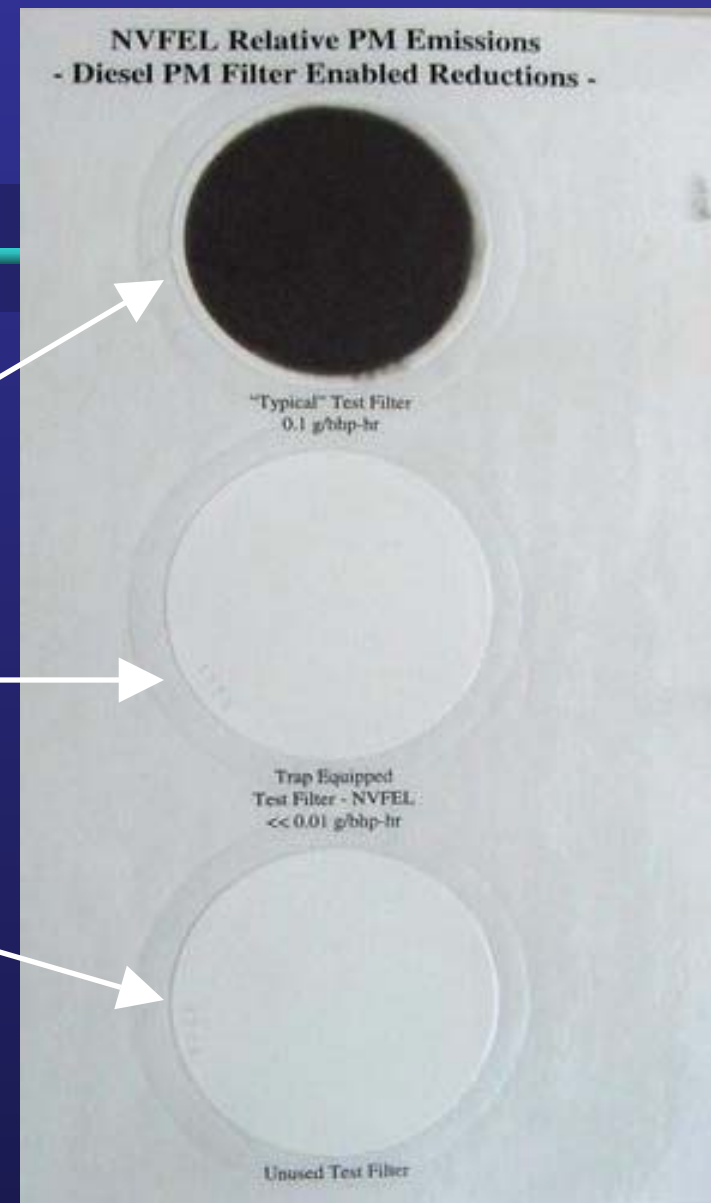
Gasoline vehicles

- Improved engine and catalyst designs based on proven light-duty technology



PM Emissions with Trap

- Typical test filter – current standards
- Test filter – 2007 standards
- Unused test filter



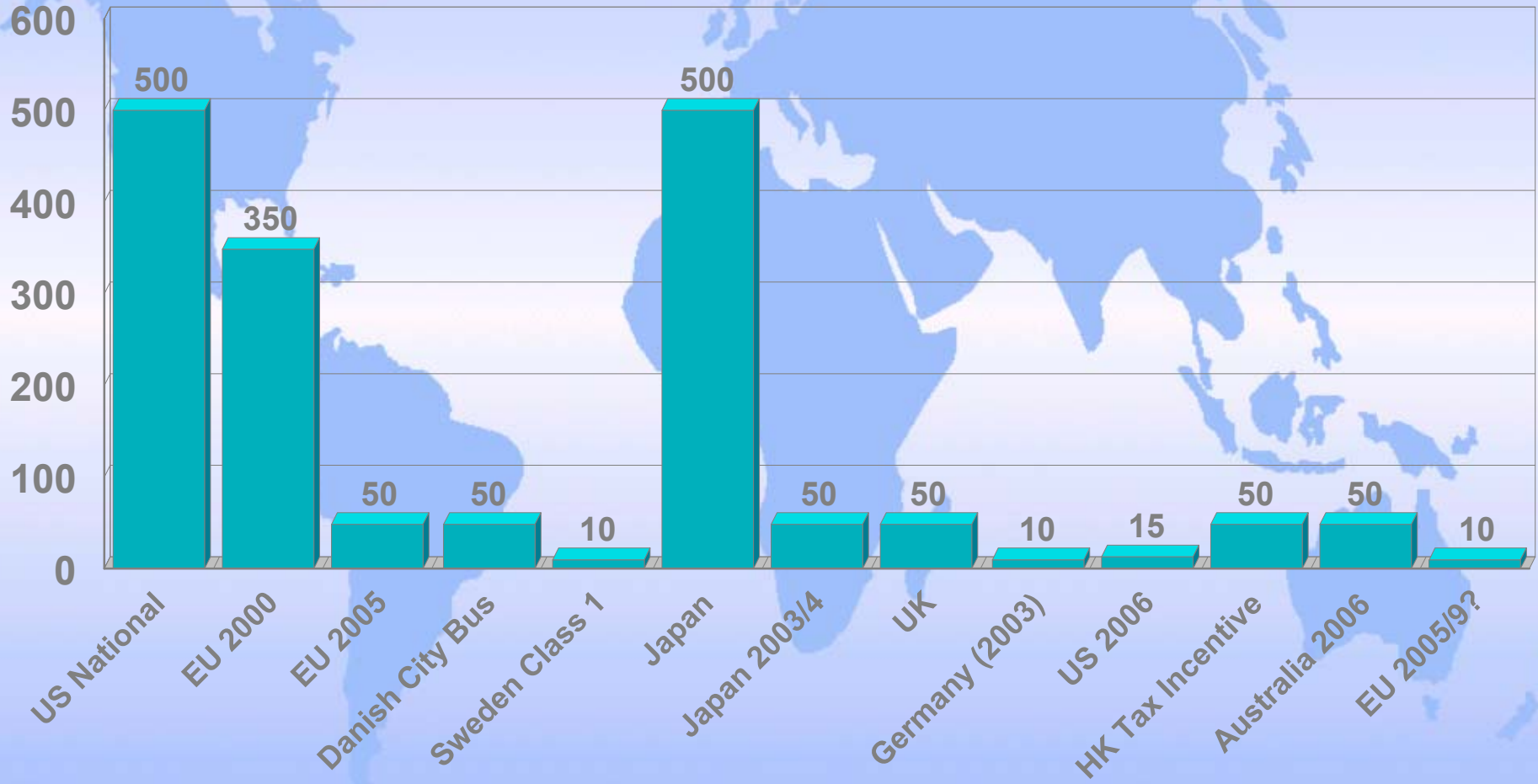
Why 15 ppm?

- Sulfur damages promising control technologies — sulfur removal enables dramatic emission reductions
- Testing has demonstrated the effectiveness of these technologies with sulfur-free fuel
- EPA program balances technology need with challenge of providing low sulfur fuel
- Low sulfur fuel also provides immediate benefits for existing trucks (reduced wear in rings/liners/exhaust systems, less frequent oil changes) and their PM emissions

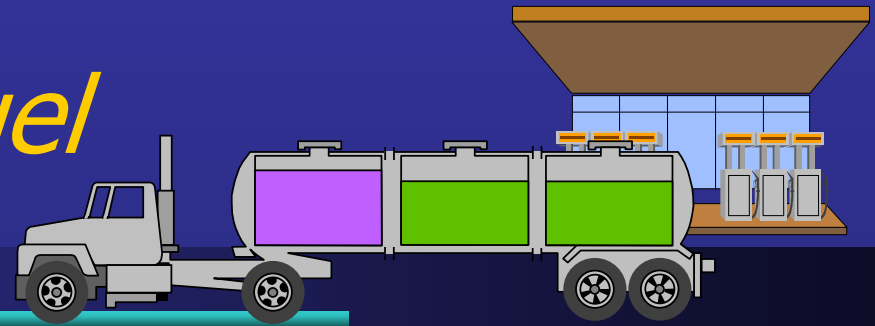


Diesel Fuel Sulfur Specifications

PPM



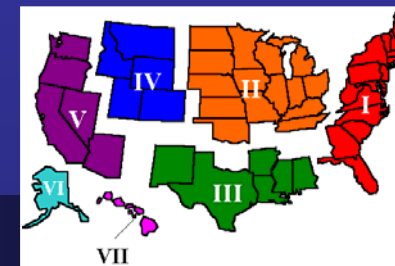
Highway Diesel Fuel Provisions



- 15 ppm cap on sulfur for highway diesel fuel
 - Known technology; an extension of current diesel desulfurization technology
- Key dates
 - June 1, 2006 at refinery
 - Sept 1, 2006 at retail
- Transitional flexibilities applicable until 2010
 - Voluntary Temporary Compliance Option (TCO): 80% by 2006, 100% by 2010
 - Designed to ensure adequate fuel supply & availability
 - Includes hardship provisions for challenged refiners



TCO and Regional ABT



- **Generating credits**
 - *From June 1, 2001 through May 31, 2005*
Volume of 15 ppm sulfur diesel fuel that is used in vehicles with engines that are certified to meet the 0.01 g/bhp-hr PM standard
 - *From June 1, 2005 through May 31, 2006*
Volume of 15 ppm sulfur diesel fuel that is dispensed at retail outlets or wholesale purchaser-consumer facilities
 - *From June 1, 2006 through December 31, 2009*
Volume of 15 ppm sulfur diesel fuel produced above the 80 percent threshold

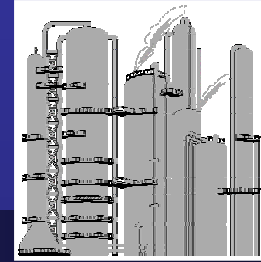
- **Using credits**
 - Limited to credits generated by refineries within the same PADD
 - Credit deficits allowed but limited to 5% of annual highway diesel fuel production

- **Credit life**
 - Credit generation allowed through December 31, 2009
 - Credit use allowed through May 31, 2010

- Credits are not allowed for State programs that are more stringent than the Federal program



Small Refiner Hardship



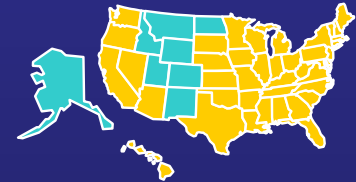
Menu of 3 options to choose from:

1. Delay 15 ppm compliance until 2010
2. Produce 15 ppm and sell credits for any volume produced prior to 2010
3. Delay gasoline sulfur compliance for 3 years if they comply with 15 ppm diesel standard on time



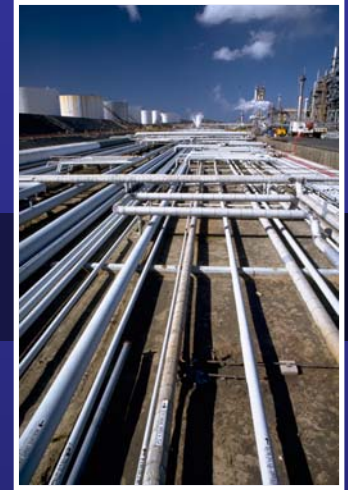
Other Hardship Provisions

- Western refiners can delay compliance with gasoline sulfur requirements by two years if they produce 15 ppm diesel on time
- General Hardship for Any Refiners: Temporary relief if they demonstrate severe economic hardship
 - Extreme unforeseen circumstances (e.g., natural disaster)
 - Extreme hardship circumstances (e.g., financial hardship)



Downstream Provisions

- 2 ppm allowance for test variability
- 20% downgrade limitation
- Product Transfer Document (PTD) requirements
- Diesel fuel pump labeling requirements
- Blending 15 ppm sulfur diesel fuel with other products
 - Diesel fuel additives
 - Kerosene
 - Used Oil



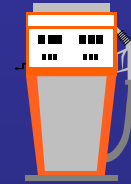
Downgrade Volume Restriction



- Incorporated into the program due to availability concerns associated with intentional commingling of 15 ppm and 500 ppm fuel
- Intended to allow for contamination of 15 ppm fuel that will occur throughout the distribution system
- 15 ppm to 500 ppm: maximum of 20% annually at each facility in the distribution system
- 15 ppm to off-highway fuel: no restrictions
- Retailers and wholesale purchaser-consumers
 - Sell only 15 ppm fuel; restriction doesn't apply
 - Sell only 500 ppm fuel; restriction applies such that a max. of 20% of the total fuel volume can be downgraded 15 ppm fuel
 - Sell both 15 ppm & 500 ppm fuel; restriction doesn't apply so long as 15 ppm fuel is available for sale concurrently with 500 ppm fuel



Misfueling Mitigation



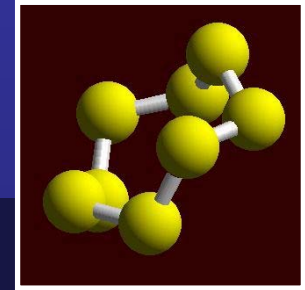
- In the final rule we stated our belief that misfueling will be limited for the following reasons:
 - Prices for 15 ppm and 500 ppm fuel should be similar
 - 15 ppm fuel will be the dominant fuel in the market beginning in 2006
 - Limited duration/fleet size
 - Risk of loss in performance such as poor acceleration or engine stalling
 - Risk of voiding manufacturer emission warranty
 - Illegal



- We acknowledged that unique nozzles, color-coded scuff guards, or transponders could also help to prevent misfueling
- We took action only on pump labeling requirements for low sulfur (15 ppm), high sulfur (500 ppm), and nonroad diesel fuel
- However, we committed to work with vehicle manufacturers, fuel marketers, nozzle manufacturers, and other interested stakeholders to further evaluate the need for and possible solutions to mitigate misfueling concerns.



Sulfur Test Methods

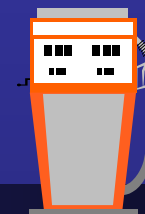


- For 15 ppm sulfur diesel fuel:
 - designated test method—ASTM D 6428-99
 - alternative test methods—
 - ASTM D 5453-00
 - ASTM D 3120-96
 - ASTM D 2622-98 as modified
- For 500 ppm sulfur diesel fuel:
 - designated test method—ASTM D 2622-98
 - alternative test methods—
 - ASTM D 5453-00
 - ASTM D 6428-99
 - ASTM D 4294-83 (updated to the current version)





Progress Toward 2007



- Final rule reaffirmed by Administration last year
- All litigation resolved by Court in EPA's favor
- Report from EPA's first biennial progress review published June 2002
- Independent review also conducted this year
 - Panel convened in May
 - Reached consensus at final meeting in September
 - Final report released October 30



Clean Diesel Independent Review Panel Findings

Engine Emission Control Technology

- Very encouraging rate of progress to date
- No insurmountable issues at this time
- Key technical challenge remaining is NOx adsorber durability

15ppm Desulfurization Technology

- No technological impediments to going forward
- In general, refiners are where they are expected to be.
- Some are proceeding ahead of schedule, others are evaluating compliance options
- New technologies have been introduced which could potentially assist refiners in producing 15 ppm S fuel

Implementation Workshops

- A number of other refining, distribution, and delivery system issues were raised
- We agreed to conduct meetings and public workshops to address such issues

For More Information

- http://www.epa.gov/air/caaac/clean_diesel.html

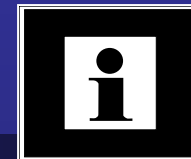


Progress Toward 2007— Next Steps

- Ongoing progress review —
2nd EPA progress review by end of 2003
- Series of implementation workshops
 - Today's workshop is the first
 - Engine workshop early next year
 - Additional workshops as needed
- Technical amendments, minor adjustments to the rule
- Guidance and Q&A documents
- Also gearing up to review the pre-compliance reports which refiners and importers must submit annually from June 2003 through 2005



For More Information...



- 2007 Heavy-duty Engine and Vehicle home page:

<http://www.epa.gov/otaq/diesel.htm>

- Contact:

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