

WORKGROUP FORMATION MEETING
REGULATORY APPROACHES
TO REDUCE PARTICULATE MATTER EMISSIONS FROM
TRANSPORT REFRIGERATION UNITS



January 16, 2002



California Environmental Protection Agency

Air Resources Board

Overview

- Background
- TRU Configurations
- Progress Since Last Workshop
- TRU Emissions and Engine Population
- Goals for Offroad Mobile (TRUs)
- Basic Control Measure Elements
- Concepts for New and In-Use TRUs
- Next Steps
- Open Discussion and Information Exchange

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Background

- What is a TRU?
 - ◆ Transport refrigeration units are refrigeration units powered by an internal combustion engine
 - ✦ Semi-trailer vans
 - ✦ Straight truck vans
 - ✦ Shipping containers
 - ✦ Rail cars.

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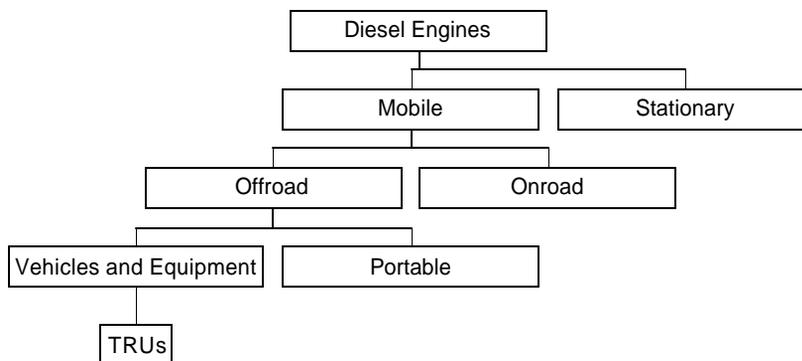


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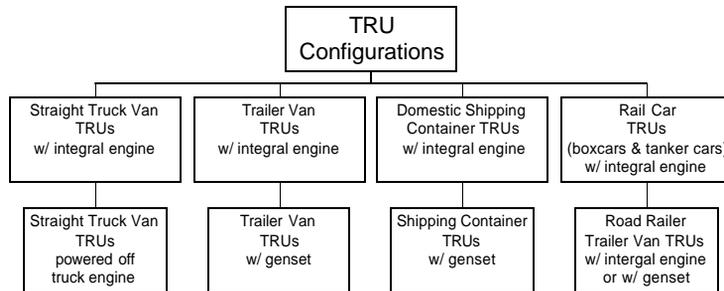
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Background (cont'd)



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TRU Configurations



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Progress Since Last Workshop

- Refining emissions & engine inventory
- Conducting surveys
- Participating in the development of the Retrofit Verification Procedure -
 - ◆ Scott Rowland (626) 575-6972 or growland@arb.ca.gov
- Developing demonstration opportunities

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TRU Emissions and Engine Inventory (2000)

Horsepower Category	Population	Emissions (tons per year)			
		TOG	CO	NOx	PM
<25	1,517	15	20	39	4
25 – 50	8,412	601	1,462	1,021	156
50 – 120	30,902	1,246	3,623	8,314	791
Totals	40,831	1,862	5,105	9,374	951

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Diesel Risk Reduction Plan Goals for Offroad Mobile (TRUs)

- Looking for PM emission reductions from both
 - ◆ New TRUs
 - ◆ Existing TRUs
- Reduce TRU-related risk to communities near
 - ◆ Facilities frequented by TRUs
 - ◆ Roadways

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Basic Control Measure Elements Typically Considered

- Emission standards (g/bhp-hr)
- Control equipment requirements
- Performance standards (percent emission reduction)
- Engine replacement requirements for older TRUs
- Phased compliance dates

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Current Offroad Compression Ignition Engine Standards

Engine Power (hp)	Tier	Model Year	[NO _x + HC] (g/hp-hr)	CO (g/hp-hr)	PM (g/hp-hr)
<11	Tier 1	2000	7.8	6.0	0.75
	Tier 2	2005	5.6	6.0	0.60
11-25	Tier 1	2000	7.1	4.9	0.60
	Tier 2	2005	5.6	4.9	0.60
25-50	Tier 1	2000	7.1	4.1	0.60
	Tier 2	2004	5.6	4.1	0.45

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Current Offroad Compression Ignition Engine Standards

Engine Power (hp)	Tier	Model Year	[NO _x + HC] (g/hp-hr)	CO (g/hp-hr)	PM (g/hp-hr)
50-100	Tier 1	NA	NA	NA	NA
	Tier 2	2004	5.6	3.7	0.30

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Possible Diesel Emission Control Technologies

- Active regeneration particle traps
- Diesel oxidation catalysts
- Fuel-borne catalysts
- Alternative Fuels - biodiesel, synthetic diesel fuel, CNG/LPG
- Water emulsion diesel fuels
 - ◆ Lubrizol/PuriNox

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Concepts for New TRUs

- Diesel Engine Options
 - ◆ Special engine category emission standards
 - ◆ Alternative “diesel” fuel
 - ◆ Electric drive requirement
- Non-diesel Engine Options
 - ◆ Alternative-fueled engines
 - ◆ Alternative refrigeration systems (LCO₂)

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Approach Options for New TRUs

- Need stakeholder input
- Two options for the basic approach
 - ◆ Regulatory
 - ✦ Manufacturer-based requirements
 - ◆ Voluntary
 - ✦ Manufacturer-based requirements

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Concepts for In-Use TRUs

- Diesel Engine Options
 - ◆ Retrofit requirements
 - ◆ Alternative “diesel” fuel
 - ◆ Replace with new diesel engine w/ electric drive
- Non-Diesel Engine Options
 - ◆ Alternative fuel engine

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Approach Options for In-Use TRUs

- Need stakeholder input
- Two options within two basic approaches
 - ◆ All TRUs affected or
 - ✦ All “mobile” TRUs (e.g. trailer)
 - ◆ And, Fleet-based approach or
 - ✦ Fleet/Facilities-based approach

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Next Steps

- Workgroup organization
 - ◆ Sign up committed workgroup partners
 - ◆ Workgroup meetings
 - ◆ Meeting locations - TBD
 - ◆ Communication via email and telephone

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Next Steps (cont'd)

- Workgroup objectives
 - ◆ Refine engine inventory
 - ◆ Understand fleet issues, engines, TRUs and control technology issues
 - ◆ Explore demonstration partners
 - ◆ Discuss control measure approaches

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Tentative Schedule

- Workshops between now and October 2002
- Release draft regulation and staff report October 2002
- Board Hearing - December 2002

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