

Transport Refrigeration Unit (TRU)
Airborne Toxic Control Measure (ATCM)
2011 Amendments - Workshop #3

June 29, 2011
Byron Sher Auditorium, Sacramento, CA



California Environmental Protection Agency
 Air Resources Board

Outline

TRU Regulation

- Background Information
- Update
- Emissions Inventory
- Potential Amendments
- Public Health Risk Impacts
- Economic Analysis
- Next Steps
- Contact Information
- Discussion/Q&A



Questions and Comments

TRU Regulation

During workshop, after presentation:

- Email questions and comments during workshop (today only) to:

auditorium@calepa.ca.gov

- Conference call-in line
Toll-free in US and Canada: 800-779-1505
Toll Number: 212-2687-1669
Passcode: 55390

After workshop:

- Call Rich Boyd (916-322-8285) or Rod Hill (916-327-5636)

Background

- TRU ATCM adopted February 2004
- U.S. EPA approve waiver January 16, 2009
- 2010 Amendments - adopted November 18, 2010
 - Effective March 7, 2011
- 2011 Amendments
 - Workshop #1 - March 29, 2011
 - Workshop #2 – May 10, 2011



TRU Regulation

Basic Requirements

- Registration in ARBER
 - All TRUs based in California
 - Voluntary for TRUs based outside California
- Operator Reports
 - Affects all California terminals where TRUs are assigned
- Meet in-use performance standards
 - Affects all TRUs that operate in California – including those based outside of California if they operate in California
 - Phased compliance schedule – seven years after engine model year

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TRU Regulation

Background Why Control TRU Emissions?

- Diesel PM is a Toxic Air Contaminant
- Emissions per unit are high
- Large numbers congregate at distribution centers, cold storage warehouses, ports, and rail yards
- High near-source public health risk
- Often near residences, schools, hospitals
- Contribute to overall exposure to diesel PM

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Update

- Ramping up enforcement
- Outreach to affected stakeholders
- Mobile catering service survey
- Activity and fuel use survey
- Meetings with TRU manufacturers

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Transport Refrigeration Unit Regulatory Emissions Inventory

California Air Resources Board
June 29, 2011

6/29/2011

Draft Deliberative Process

Outline

- Revisions to Baseline Inventory
- Rule Inventory
- Analysis of Amendments Under Consideration



Revision of Baseline Inventory

- 2003 Inventory based on surveys, Power Systems Research
- 2011 Update
 - Population, Age, Survival: ARBER Database
 - Activity: 2006 TRU facility report
 - Load: OEM, Engine performance curves
 - Emission factors update from OFFROAD2007 (including Tier 4 Final standards)

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Baseline Revisions Since May Workshop: CA population

- **Comment:** Not all TRU retirements shown in ARBER **Response:** Staff modeled ongoing attrition since owners reported their TRUs
 - Modeled from the date TRU registered to the date on which CARB evaluated population
 - **Estimate:** 28 percent of retirements were reported to ARBER, 72 percent went unreported
 - CA Instate TRU population update: **36,200 to 31,700**
 - Average age of Instate TRU population reduced from **7.7 years to 6.7 years**

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Baseline Revisions Since May Workshop: Estimated Sales

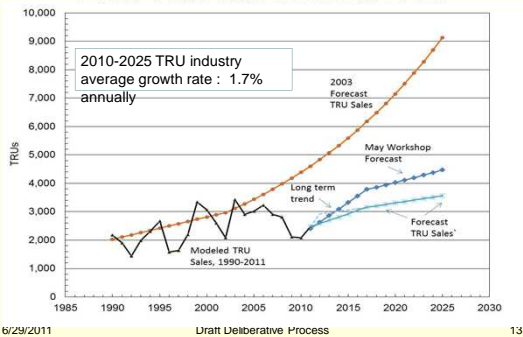
- **Comment:** ARB's baseline sales included impacts of the regulation from 2008 to 2010
- **Response:** Rule impacts analyzed and removed
 - CA sales trends compared to US trends
 - ARBER queried to analyze number of TRUs 7 years newer than associated trailer (by VIN).
 - 2008 and 2009: 600 TRU sales (unit replacements) attributed to compliance
 - 2010: 570 CA TRU sales assumed to have not occurred due to uncertainty in regulation

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Baseline Revisions: Estimated Sales After Rule Impact Removed



Baseline Revisions Since May Workshop: Out of state population

- **Comment:** Age / model year distribution of out of state (OOS) should differ from instate
- **Response:** ARBER data for non-CA TRUs analyzed for new OOS age distribution
 - Instate TRU average age: 6.7 years
 - OOS TRU average age: 4.6 years

Baseline Revisions: Activity Level

- **Comment:** Suggestion that activity from 2006 facility survey was too high (1753 hrs/year)
- **Response:** Staff contacted respondents, analyzed results further
 - Highest report removed, overall average reduced
 - Evaluated activity by facility type, distribution appeared representative
 - Gensets previously modeled on TRUs, now based directly on manufacturer and industry response

Total Activity* (hours per year)

	TRUs, <25 hp	TRUs, >25 hp	Gensets
Previous estimate (2003)	1,038	1,465	1,100
May workshop (2011)	1,465	1,753 (1,379 in CA)	1,753 (1,379 in CA)
Current estimate (2011)	1,361	1,697 (1,323 in CA)	1,100 (858 in CA)

* Not all of this activity occurs in California

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Baseline Revisions: Load Factor

- Comment: Load factors might not represent in-use operation
- Response: TRU and genset manufacturers contacted, source information reviewed
 - Information from following sources averaged:
 - Engine certification process (4 mode)
 - Engine performance curves
 - Previous manufacturer responses
 - Updated manufacturer responses for Tier 4 operation

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Baseline Revisions: Load Factor

	TRUs, <25 hp	TRUs, >25 hp	Gensets, >25hp
Previous estimate (2003)	0.64	0.53	0.45
May Inventory (2011)	0.64	0.53	0.53
Current estimate (2011)	0.56	0.46	0.46

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With Rule Inventory



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Existing Rule Inventory

- Rule Summary:
 - Beginning January 1, 2009, 7 year operational life for TRUs
 - May turn over unit, or apply control strategy to extend TRU use
 - 2003 and previous models may have two-step requirements / 2004 and later models have a single compliance requirement
 - 2010 Amendments
 - Level 2 VDECS allowed, FLEX engines, effective MY

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Impact of Existing Regulation

	Estimated Population Subject to Rule (2011)	Share of Population Impacted by Rule	Share Impacted More than 2 Years Prior to Natural Turnover
Instate TRU	31,700	47%	31%
OOS TRU (And Railcars)	110,400	24%	6%
Instate Genset	6,650	18%	6%
OOS Genset	26,500	18%	6%

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Existing Rule Inventory

- Compliance assumptions based on existing ARBER population

	Replace	Repower	Retrofit	Alt Tech
Instate 25+ / OOS	10%	69%	20%	1%
Instate <25	10%	37%	21%	32%
Gensets	100%	0%	0%	0%

- Unit sales reduced by number of unit or engine replacements attributed to the regulation

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Existing Rule: Compliance

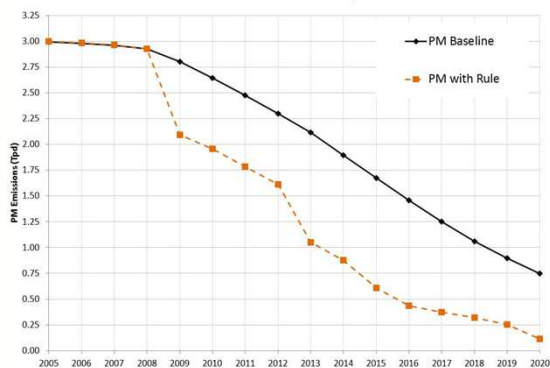
- Anticipated compliance with rule impacts emissions benefits to be forecast
- Initial compliance estimated at 60%
 - Delay in receiving waiver
 - Uncertainty in regulatory requirements
 - Challenges due to the economy
- ARB implementation and enforcement staff working toward increasing compliance
 - Fleet assistance
 - Enforcement activity

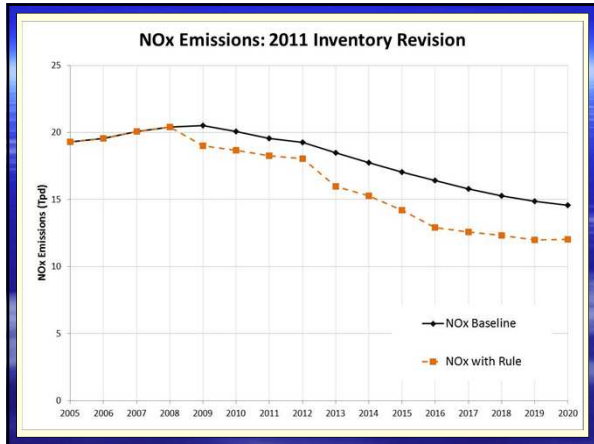
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PM Emissions: 2011 Inventory Revision

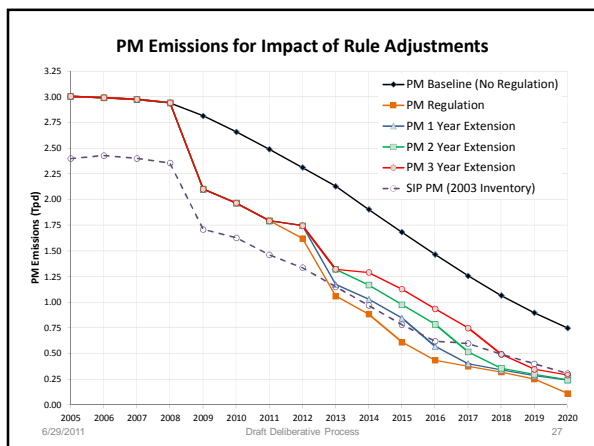


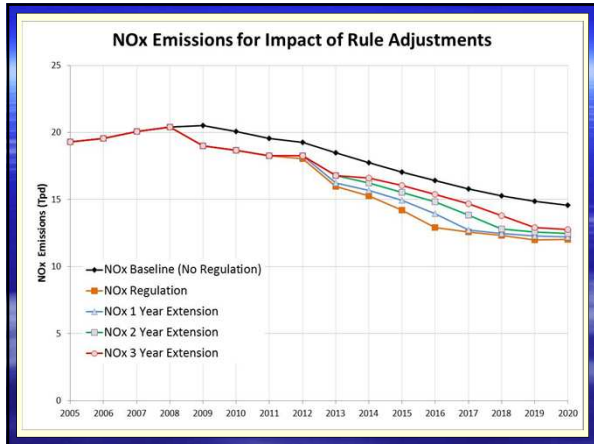


Impact Analysis for Rule Amendments Under Consideration

- Extension of operational life from seven years to eight, nine, or ten years
 - Assumes full compliance in 2012 and future years
 - Previous compliance dates not adjusted

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Impact Analysis for Rule Adjustments 2

- Delay ULETRU for units meeting LETRU
 - 1 additional year before TRUs that met LETRU by initial compliance date would be required to meet ULETRU requirements
- Emission Impact
 - 2015: 3 percent of 2015 benefits delayed
 - 2016 and 2017: 1 percent of in-year benefits delayed

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Potential 2011 Amendments

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Operational Life Extension

- ULETRU compliance extension for MY 2004 and subsequent – change operational life from 7 yrs to 10 yrs
 - Staff recommendation – Maintain existing 7-yr operational life
 - Potential for elevated near source risk
 - Need reductions for 2014 PM 2.5 SIP
- Second step to ULETRU for MY 2003 and older
 - Near source risk impacts not as great in 2015

Amendments Not Being Proposed

- Low-use exemption
 - Difficult to enforce
- 3-Day pass
 - Difficult to enforce
 - Unfair to California fleets

ULETRU Compliance Extension if Compliance by Original Deadline §2477.5(g)

- One-year ULETRU compliance extension applies to:
 - MY 2001 and older units that complied by December 31, 2008
- Qualify if certain conditions are met:
 - Compliance achieved by
 - Retrofitting with Level 2 VDECS, or
 - Repowering with Tier 4i or Tier 4f (less than 25 hp) engine, or
 - Replacing unit equipped with Tier 4i or 4f engine, and
 - Unit must be registered in ARBER and IDN affixed to TRU housing
 - Must apply for extension and provide documentation

ULETRU Compliance Extension if Met LETRU - §2477.5(m)

- One year compliance extension applies to:
 - Units with MY 2003 and older engines that complied by meeting LETRU
- Qualify if certain conditions are met:
 - Retrofitted engine with Level 2 VDECS to meet LETRU
 - Repowered with engine that meets LETRU
 - Tier 4f for less than 25 hp engines (0.30 gram/hp-hr)
 - Tier 4i for 25 hp to less than 50 hp engines (0.22 gram/hp-hr)
 - Or, replaced unit with a unit that is equipped with engine that meets LETRU, and
 - Unit must be registered in ARBER
 - Application for extension with documentation

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Electric Standby Recordkeeping & Reporting - §2477.5(a)(3)(A) & (d)(3)

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- Requirements to ensure Electric Standby (E/S) is being used in a way that qualifies as Alternative Technology:
 - Manual recordkeeping
 - Automated, GPS-based electronic tracking and reporting:
 - 50 percent of fleet by December 31, 2012
 - 100 percent of fleet by December 31, 2013
 - Nonretail delivery or pick-up points: must have electric plugs at loading and parking spaces
 - At retail delivery or pick-up points: must plug in or limit TRU engine operation to 30 minutes
 - Registration in ARBER

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Compliance Responsibility to Drivers, Brokers, Carriers, Shippers, & Receivers §2477.7, .8, .9, .10, & .11

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- The entity responsible for arranging transport of goods must only hire/contract with compliant carriers
- Drivers – must provide license, registration, origin & destination of freight, motor carrier, broker, shipper, and receiver information;
- Freight Brokers & Forwarders – must also provide broker information to dispatched driver;
- Carriers – must dispatch only compliant equipment and must also provide motor carrier information to dispatched driver;
- California-based shippers - must also provide shipper information to dispatched driver;
- California-based receivers - must also provide receiver information to dispatched driver

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Clarify Compliance by Replacing Engines §2477.5(i)

- **New or rebuilt replacement engines**
 - Must meet more stringent standard than original engine
 - Otherwise, must retrofit with highest level of VDECS available
- **New replacement engines must meet in-use standards by compliance dates based on:**
 - Engine model year (current-tier replacement engines), or
 - Effective model year (prior-tier replacement engines)
- **Rebuilt engines must meet in-use standards based on:**
 - Model year (year of rebuild), if meets current tier
 - Effective model year, if meets prior-tier

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Dealer Requirements §2477.14

- **Registration and in-use compliance are not required for operational, noncompliant units in a dealer's yard, provided:**
 - Unit not operated except as demonstration or repair
 - Unit is not offered for sale, rent, or lease to a person doing business in California
- **Operational noncompliant units can be moved on road provided:**
 - Unit is not operating/not loaded with perishable goods
 - Documentation is maintained supporting reason for transit

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TRU Regulation

EO Authority to Grant Limited Extensions §2477.5(k)

- **EO can grant a one-year extension if compliance technology not available on market, provided:**
 - Owner submits application six months before compliance date
 - Owner demonstrates rest of fleet is in compliance with ARB regulations
 - Each affected unit is identified
 - Detailed description of reasons compliance not possible is provided

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Exemption for Nonoperational Units - §2477.3(b)

- Applies to TRUs that meet any of the following scenarios:
 - TRUs separated from van
 - Trailer TRUs – if fuel tank and battery removed, and unit labeled “NONOPERATIONAL”
 - Truck TRUs – if umbilical connections removed, and unit labeled “NONOPERATIONAL”
 - Units with no engine or fuel injection system
 - TRU generator sets - quarantined to cordoned off area or behind barrier with signs and control panel tags: DO NOT OPERATE IN CALIFORNIA”

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Exemption for Declared Emergencies §2477.3(d), §2477.4(a)(37), & §2477.5(o)

- Applies to TRUs used during federal- and/or state-declared emergencies
- Emergency must be declared by the President of the United States or the Governor of California, or
- Mobile Catering Services dispatched by National Interagency Fire Center
- Affects TRU-equipped trucks or trailers that provide foodservice to response crews, including, but not limited to, forest fires and earthquakes”

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Clarify the Prohibitions on Sale of Noncompliant Units §2477.18

- Prohibitions on sale of noncompliant units:
 - Prohibits selling noncompliant units in California to persons that could be reasonably expected to do business in California
 - Allows dealers to sell noncompliant units outside of California with disclosure documentation
 - Allows dealers to purchase noncompliant units but restricts resale to California business unless brought into compliance prior to resale
 - Written disclosure on bill of sale if noncompliant unit sold to person residing outside of California

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**Clarify Lessor/Lessee Requirements
§2477.12 & 2477.4(a)(70)**

- Clarify lessor and lessee requirements, consistent with Advisory 08-04
 - Revised definition of owner to clarify that lessor is responsible for registration and compliance with in-use performance standards unless contractually delegated to lessee
 - Added a provision for delegating responsibilities to lessee
 - Lessees must submit Operators Report

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TRU Regulation

**Allow Unit Model Year to Determine
Compliance Requirements and Dates
§2477.5(b)(6)**

- Use of unit model year instead of engine model year allowed, if difference between unit and engine model year is no greater than one year
- If difference is more than one year, then engine model year must be used to determine compliance
- Consistent with TRU Advisory 08-01

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TRU Regulation

**Allow Use of Unique Equipment ID
Number Instead of ARB IDN
§2477.5(e)(3)**

- Requirements for use of unique equipment ID numbers:
 - Owner must still register unit in ARBER
 - Alternative equipment ID must be truly unique
 - Alternative ID must be affixed to both sides of unit housing
 - ARB IDN must be used in Operator Report
- Consistent with TRU Advisory 08-03-R2

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TRU Regulation

**EO Authority to Grant Limited Extensions
§2477.5(l)**

- **ARB Executive Officer (EO) can grant an extension up to 4 months if financing, delivery, or installation is delayed, provided:**
 - TRU is registered in ARBER
 - Extension request form is submitted before the original compliance deadline
 - Documentation showing timely orders placed is provided
 - Installer statements certifying installation difficulties is provided

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TRU Regulation

**Requirements for TRU Manufacturers
§2477.13(c)**

- **TRU manufacturers must provide supplemental label with new replacement engines and flexibility engines for registration in ARBER:**
 - Engine manufacturer
 - Engine serial number and model
 - Engine model year or effective model year (if prior-tier engine)
 - Emissions standard tier met (e.g. Tier 2)
 - Engine power rating
- **Provide notice if new unit is equipped with flexibility engine and ULETRU compliance date**

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TRU Regulation

**OEMs, Dealers, & Repair Shops
§2477.13(c), §2477.14, & §2477.15**

- **TRU manufacturers must provide registration information document with new units and replacement engines:**
 - Facilitates unit registration in ARBER
 - Provides unit and engine information
 - Must be consistent with labels
 - Must be given to owners upon sale
- **Dealers and installers required to pass document on to ultimate purchaser at point of sale**
- **TRU manufacturers must notify buyers if unit is equipped with flex engine and the resulting compliance date**

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Requirements for Engine Rebuilders §2477.16

- Clarify engine rebuild requirements
- Require engine rebuilders to provide supplemental label and information document with rebuilt engines:
 - Facilitates registration in ARBER
 - Provides rebuilt engine information
 - Must be consistent with labels
 - Must be given to owners upon sale
- Require engine rebuilders to provide a registration information document to owner at point of sale
- Require engine rebuilders to provide emissions certification configuration documentation to ARB

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Economic Analysis

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Economic Assumptions: Weighted Compliance Methods

- Compliance options based on 2001-2003 ARBER data
 - < 25 hp TRUs:
 - 21% VDECS
 - 37% Engine repowers
 - 32% Electric Standby
 - 10% TRU Replacements
 - 25-50 hp TRUs:
 - 20% VDECS
 - 69% Engine repowers
 - 1% Electric Standby
 - 10% TRU Replacements
 - 25-50 hp Gensets:
 - 100% Genset Replacements

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Economic Assumptions: Updated Capital Costs

- **Updated capital costs**
 - **< 25 hp TRUs:**
 - Level 2 VDECS - \$3,600
 - Level 3 VDECS - \$5,600
 - Tier 4 Engine repowers - \$5,750
 - Electric Standby option - \$675
 - TRU Replacements - \$16,300
 - **25-50 hp TRUs:**
 - Level 3 VDECS - \$5,448
 - Tier 4 Engine repowers - \$8,400
 - Electric Standby option - \$3,000
 - TRU Replacements - \$21,600
 - **25-50 hp Gensets:**
 - Genset Replacements - \$14,500

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Economic Overview:

- **Preliminary cost effectiveness calculations show approximately \$80/lb for current TRU ATCM**
- **Higher cost effectiveness based on:**
 - Higher Out-of-State Populations
 - Higher Equipment Costs
 - Weighted use of options that were used by industry

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Health Impacts

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Health Impacts Modeling Assumptions

- AERMOD Air Dispersion Model
- West LA Meteorological Data (2005-2007)
- Key Emission Parameters
 - Area source
 - Large distribution facility
 - Engine size – 35 hp
 - Load factor – 0.46
 - Facility hours of operation – 17 hrs/day (2 pm – 7am)
 - Fleetwide emission factor (2014) – 0.33 g/bhp-hr

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TRU Regulation

Health Impacts Preliminary Cancer Risk Results

- Preliminary potential cancer risk estimates
(@ 200 meters from center of facility)

Engine Operation (Hours Per Week)	Engine Operation (Hours Per Year)	Cancer Risk (Chances Per Million)
100	5,200	15
500	26,000	80

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TRU Regulation

Overview of Rulemaking Process

- Workshops - informal comments
 - March 29, 2011 - Draft concepts
 - May 10, 2011 – Emissions Inventory
 - June 29, 2011 – Draft language, emissions & public health risk
- 45-Day Public Notice of Rulemaking
 - Formal comment period begins September 5, 2011
- Board Public Hearing – October 20, 2011

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TRU Regulation Contact Information

- TRU website: <http://www.arb.ca.gov/diesel/tru/tru.htm>
- TRU List Serve: <http://www.arb.ca.gov/listserv/tru.htm>
- TRU Help Line: 1-888-878-2826 (1-888-TRU-ATCM)
- Comments after workshop:
Rich Boyd (rboyd@arb.ca.gov, 916-322-8285) or
Rod Hill (rhill@arb.ca.gov, 916-327-5636)



Proposed Revision Concepts

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