

August 11, 1998 Workshop

Monitoring and Laboratory Division

Compliance Division

California Air Resources Board

California Environmental Protection Agency

www.arb.ca.gov/vapor/enhanced.htm

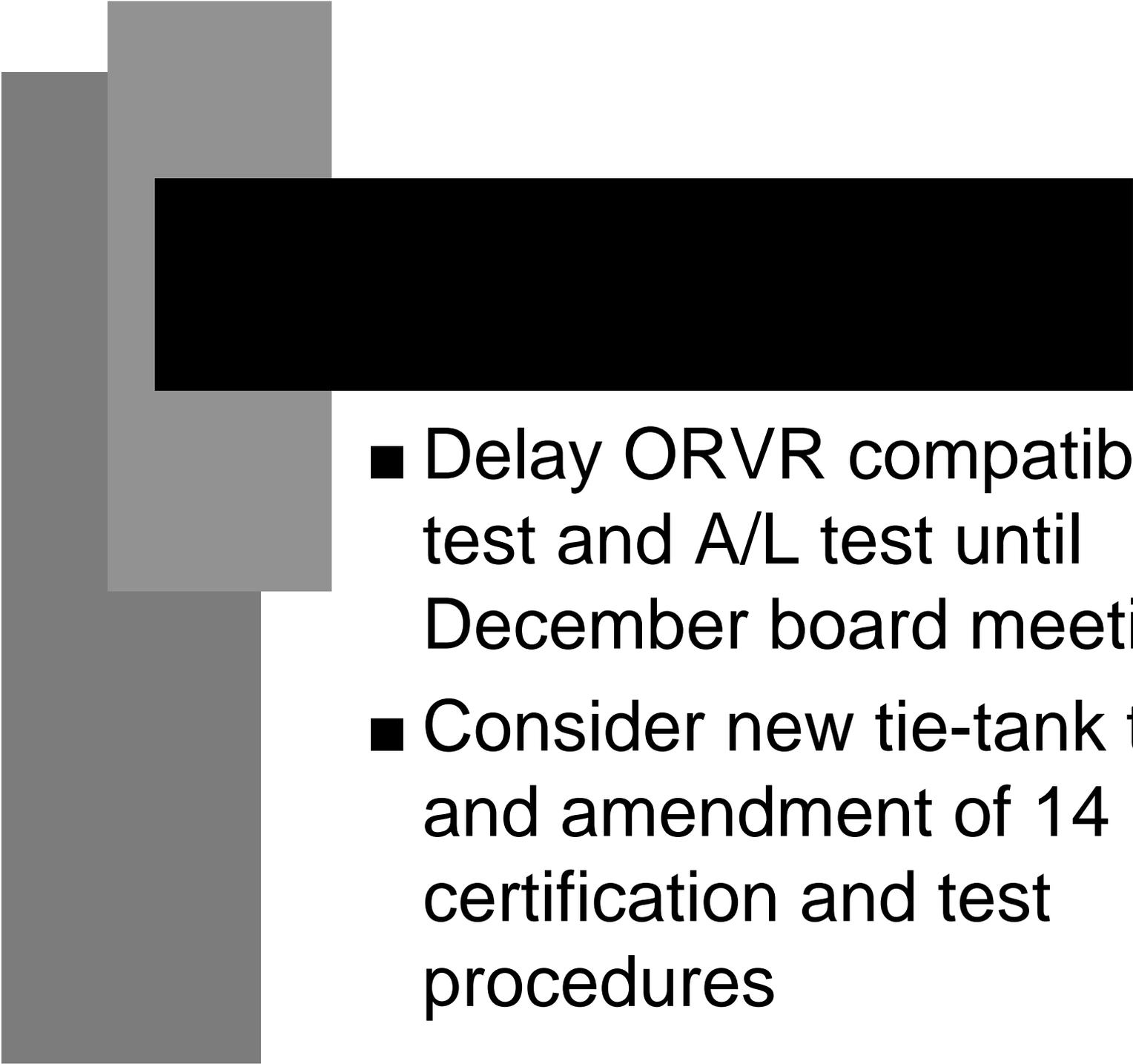
Enhanced
Vapor
Recovery

Diagnostics

ORVR
Compatibility

Program
Improvements

- 
- Program Improvements
 - test method update
 - Diagnostics
 - ORVR Compatibility

- 
- Delay ORVR compatibility test and A/L test until December board meeting
 - Consider new tie-tank test and amendment of 14 certification and test procedures

Vapor Recovery Test Procedure Update

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Test Procedure Update

- Pressure decay test
- A/L test comparisons

Pressure Decay Test

- 2 inch test proposed for clarity revisions in August
- 27 inch vacuum test suggested as companion test for hanging hardware
- ARB will work with interested parties to field test and develop test procedure for vacuum test.

A/L Test Procedure Concern

- Proposed A/L test reduces gasoline exposure to tester by routing vapor back to underground storage tank
- Revised A/L test does not give same result as previous A/L test for some vapor recovery systems - biased low
- Due to restrictions in vapor line??

A/L Test Procedure Resolution

- Revise and standardize dimensions for A/L test equipment
- Retest to verify can achieve same results with old and new procedures
- Consider correction factors to allow safer new test if bias cannot be eliminated for some systems.

EVR DIAGNOSTICS

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Diagnostic Objectives

- Provide real-time indication that vapor recovery system is working properly
- Decrease dependence on current periodic tests which disrupt station operations

Diagnostic Proposal

- Pressure monitor
- Vacuum pump monitor for assist systems

ORVR PENETRATION CURVES

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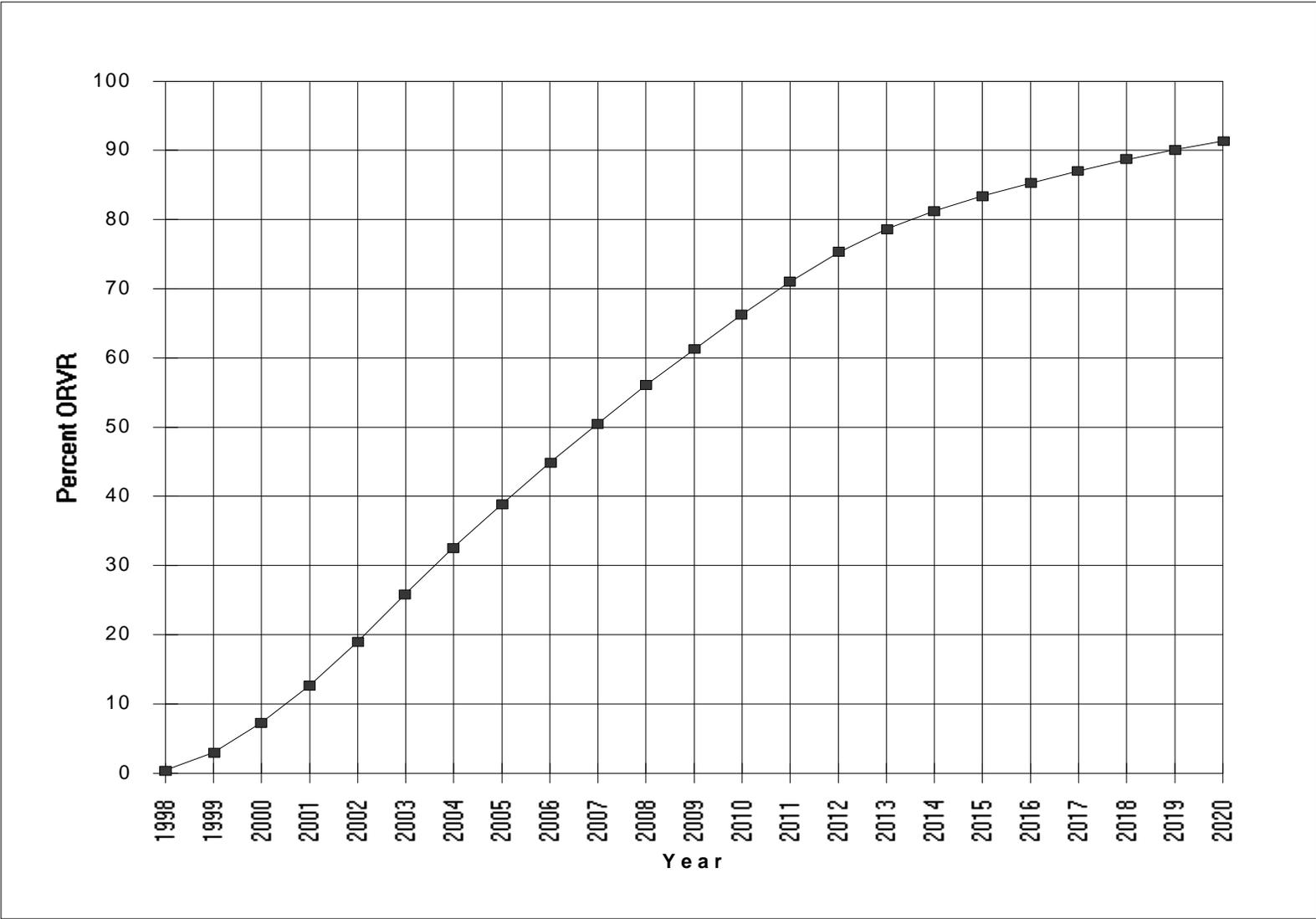
ORVR Penetration Estimation

- Age profile for 100-Car matrix was used
 - DMV and modeling data
- Mandated ORVR introduction dates
- Estimate is approximate
 - Could be affected by economic factors, vehicle manufacturers' decisions, change in buying or driving habits, impact of electric vehicles or other alternative technologies, fuel economy differences between trucks and autos, etc. etc.

ORVR Penetration Estimates

- Units: Percent of Vehicle Miles Traveled by ORVR-equipped Vehicles
- Estimated Values... Previous Values
 - 1/1/1998: 0.4% 1/1/1998: 3.3%
 - 1/1/2001: 12.7% 1/1/2001: 33.9%
 - 1/1/2003: 25.9% 1/1/2003: 50.8%
 - 1/1/2007: 50.5% 1/1/2007: 74.2%
 - 1/1/2012: 75.3% 1/1/2012: 87.1%
 - 1/1/2020: 91.3% 1/1/2020: 92.1%

Estimated ORVR Penetration



Emissions Estimates for Four Cases at Gasoline Dispensing Facilities

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Emissions Estimates for Four Cases at Gasoline Dispensing Facilities

1. Baseline, No Onboard Refueling Vapor Recovery (ORVR) Vehicles (1995 Emissions Inventory)
2. Year 2007, without ORVR Compatibility (ORVRC) and without In-Station Diagnostics & Program Improvements (ISD & PI)
3. Year 2007, with ORVRC and w/o ISD & PI
4. Year 2007, with ORVRC and w/ ISD & PI

Emission Categories

- Working emissions = Phase I
 - bulk fuel deliveries
- Spillage emissions
- Displacement emissions
 - nozzle/fillpipe interface
- Breathing emissions
 - temperature and pressure variations

(1) Baseline, No Onboard Refueling Vapor Recovery (ORVR) Vehicles (1995 Emissions Inventory)

- Assume:
 - all systems are assist vapor recovery without vapor processors
 - installed systems operate at 86% efficiency
- Values taken from ARB 1995 emission inventory

(1) Baseline, No ORVR Vehicles (1995 Emissions Inventory)

Baseline	Controlled (tons/day)	Uncontrolled (tons/day)	% Control Assumed
Working Emissions	13.65	136.50	90%
Spillage Emissions	11.71	11.71	constant @ 0%
Displacement Emissions	19.64	140.29	86%
Breathing Emissions	2.84	20.29	86%
Totals	47.84	308.79	

(2) Year 2007 (without ORVRC and without ISD & PI)

- Assume:
 - 50% ORVR penetration
 - ORVR performs at 95% efficiency
 - working and spillage unchanged
- Displacement emissions reduced 32%
- Breathing emissions increase (worst case calculation)

(2) Year 2007 (without ORVRC and without ISD & PI)

w/o ORVRC w/o EVR	Controlled (tons/day)	Uncontrolled (tons/day)	% Control Assumed
Working Emissions	13.65	136.50	90%
Spillage Emissions	11.71	11.71	constant @ 0%
Displacement Emissions	9.82	70.15	50% @ 86%
	3.51	70.15	50% @ 95%
Breathing Emissions	1.42	10.15	50% @ 86%
	26.83	26.83	50% @ 0%
Totals	66.94	325.49	

(3) Year 2007 (with ORVRC and without ISD & PI)

- Assume:
 - working and spillage unchanged
 - ORVR performs at 95% efficiency
 - Phasell performs at 86% efficiency
- Emissions decrease from baseline as ORVR penetration increases

(3) Year 2007 (with ORVRC and without ISD & PI)

w/ ORVRC w/o EVR	Controlled (tons/day)	Uncontrolled (tons/day)	% Control Assumed
Working Emissions	13.65	136.50	90%
Spillage Emissions	11.71	11.71	constant @ 0%
Displacement Emissions	9.82	70.15	50% @ 86%
	3.51	70.15	50% @ 95%
Breathing Emissions	1.42	10.15	50% @ 86%
	1.34	26.83	50% @ 95%
Totals	41.45	325.49	

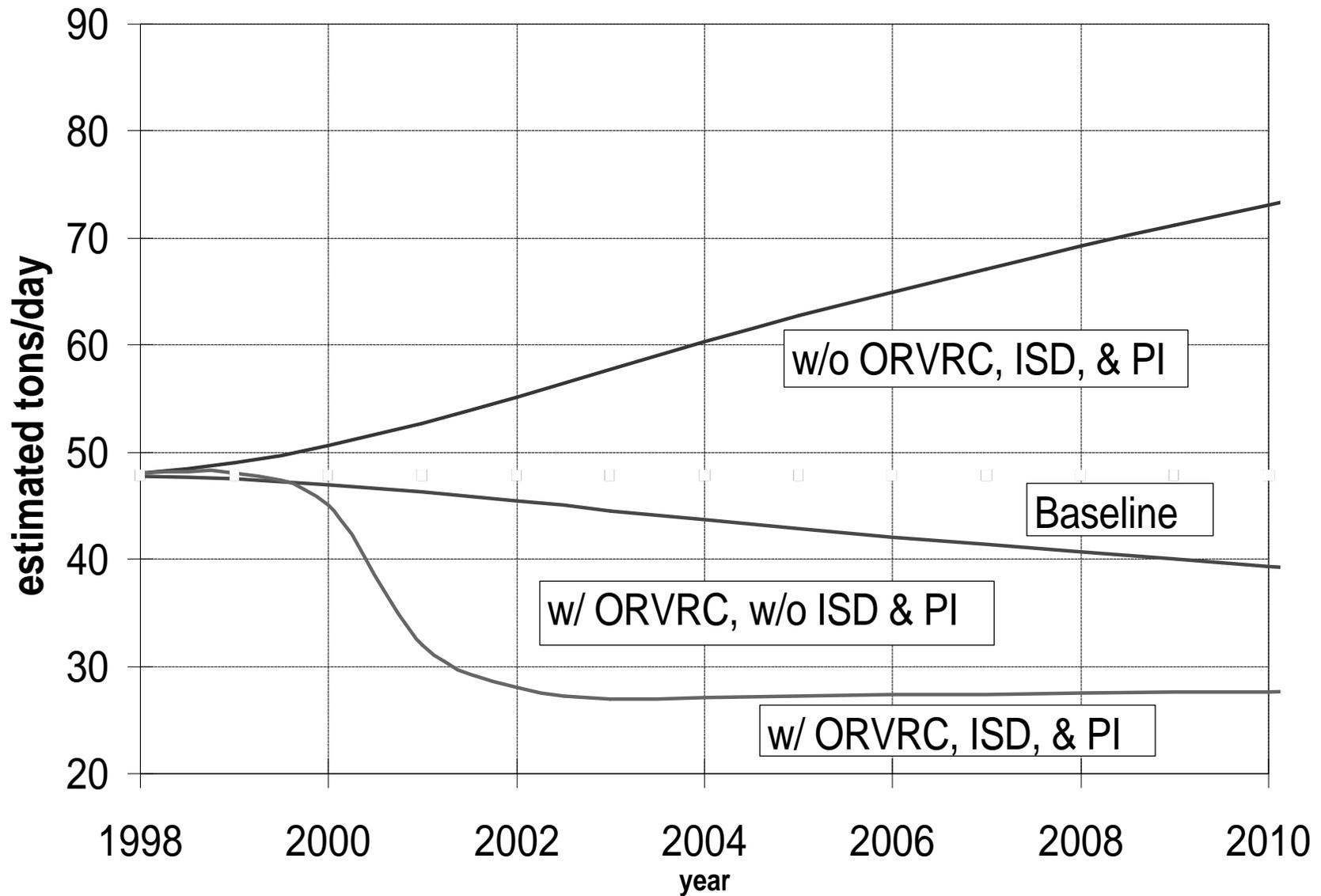
(4) Year 2007 (with ORVRC and with ISD & PI)

- Assume:
 - spillage emissions constant
 - ORVR performs at 95% efficiency
 - working emissions improve to 95% efficiency
 - EVR achieves in-use efficiencies of 95%

(4) Year 2007 (with ORVRC and with ISD & PI)

w/ ORVRC w/ EVR	Controlled (tons/day)	Uncontrolled (tons/day)	% Control Assumed
Working Emissions	6.83	136.50	95%
Spillage Emissions	11.71	11.71	constant @ 0%
Displacement Emissions	3.51	70.15	50% @ 95%
	3.51	70.15	50% @ 95%
Breathing Emissions	0.51	10.15	50% @ 95%
	1.34	26.83	50% @ 95%
Totals	27.41	325.49	

Estimated Emissions by Year



ORVR COST EFFECTIVENESS DATA NEEDS

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ORVR-Compatibility Economic Impact Analysis

- Data requested for:
 - Number, Type and Throughput of Phase II Vapor Recovery Systems
 - Emission Data for ORVR / Phase II Interaction
 - Costs for Phase II Equipment or Vehicle Modifications
 - Useful Life and Component Replacement Costs for Phase II Equipment
 - Other Alternatives?

Matrix of Impacted Businesses and Individuals

- Individual California Residents
 - slight increase in the cost of gasoline
 - possible slight increase in cost of ORVR vehicle
 - benefits from improved air quality

Matrix of Impacted Businesses and Individuals

- Gasoline Service Stations
 - required to modify vapor recovery system as necessary to comply with revised regulation
 - required to maintain modified vapor recovery system once installed
 - indirect benefits from improved air quality

Matrix of Impacted Businesses and Individuals

- Vapor Recovery System Manufacturers
 - possible decline in value of inventory made obsolete by regulation if it can not be sold in a timely fashion
 - required to redesign and test vapor recovery systems as necessary to comply with revised regulation
 - required to recertify vapor recovery systems as necessary to comply with revised regulation
 - short-term increase in sales of equipment
 - possible continuing increase in gross sales due to slightly more complex & costly product
 - indirect benefits from improved air quality

Matrix of Impacted Businesses and Individuals

- Gasoline Service Station Designers/Builders
 - slight increment in cost of required vapor recovery system
 - revenue from passing impact costs on to customers
 - increase in business from retrofit and replacement of existing systems

Matrix of Impacted Businesses and Individuals

- Vapor Recovery System Equipment and Parts Vendors/Distributors (other than manufacturers)
 - possible decline in value of inventory made obsolete by regulation if it can not be sold in a timely fashion
 - possible slight cost associated with stocking new inventory
 - possible slight increase in long-term volume of business selling newly required equipment

Presented by:
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Equipment Replacement Policy (4 year phase-out)

- Adoption of regulation begins 4 year clock.
- Regulation will provide for :
 - **Repair and replacement of malfunctioning component parts**
 - **Certification of replacement parts as good as or better than the existing equipment, for use during the 4 year period.**
 - **increments of progress to assure that phase-out is complete in 4 years.**

Proposed Changes to System and Component Liability

- Two possible approaches:
 - All manufacturers applying for certification make a joint application agreeing to the use of the equipment together and acknowledge joint and several liability; or
 - Prescribe in the regulation how liability for warranty and other risk is to be covered, possibly by insurance, bonding, or joint warranty.

Additional Program Improvements

- Clarify the warranty requirements, possibly establishing minimum warranties specific to the type of equipment.
- Limited Term Certifications
- Address various identified problems, such as integrity of Phase I fittings and drain valves.
- Develop additional inspection and maintenance tools, such as the 27" vacuum dispenser test and the 10" drop tube test.