

Enhanced Vapor Recovery

Hosted by San Diego Air Pollution
Control District

December 5, 2007

Cindy Castronovo &
Pat Bennett
Air Resources
Board
Cal-EPA



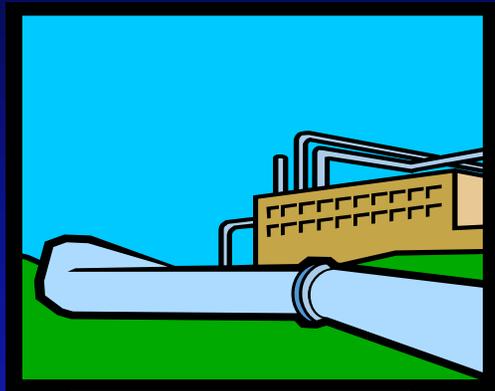
Outline

- Background & Benefits of Vapor Recovery
- EVR Applicability
- 2009 EVR Phase II Deadline
- What EVR Systems are Available?
- Do I need to be certified to install vapor recovery equipment?
- In-Station Diagnostics Overview
- How much will it cost?
- Questions?

Regulatory Roles

- **California Air Resources Board**
 - Vapor recovery rulemaking
 - Certifies Phase I and Phase II systems
- **State Water Resources Control Board**
 - USTs, Overfill Prevention, Secondary Containment
 - Develops regulations enforced by CUPAs
- **Local Air Pollution Control Districts**
 - Permit GDFs and enforce vapor recovery rules

Gasoline Pathways



Pipeline



Refinery

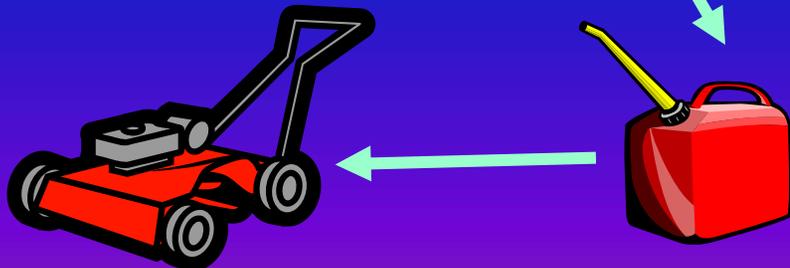
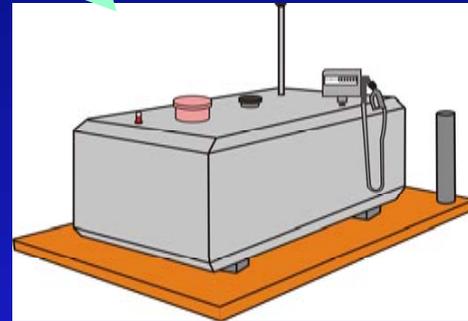
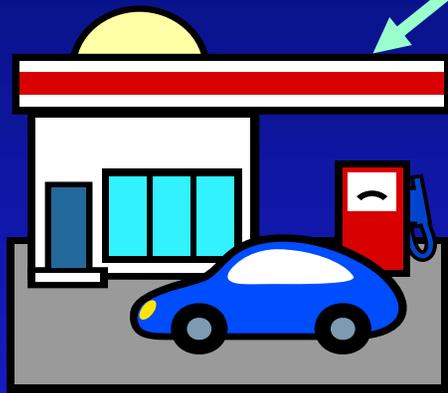


Marine loading

Terminal

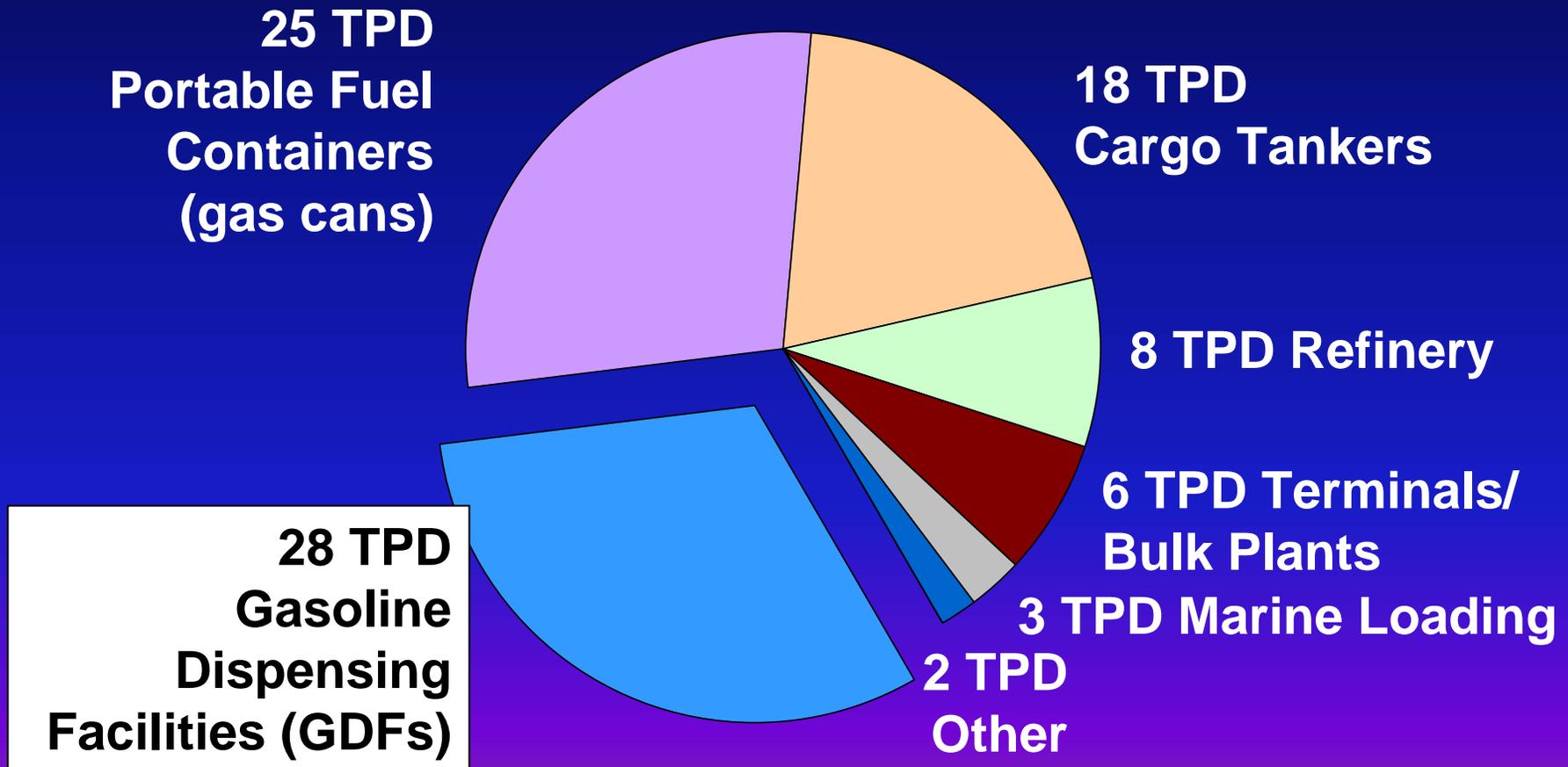


Gasoline Pathways



Petroleum Marketing & Fuel Storage Statewide 2010 ROG Emissions

89 tons per day*



* calculated in 2004

GDF Vapor Recovery Benefits

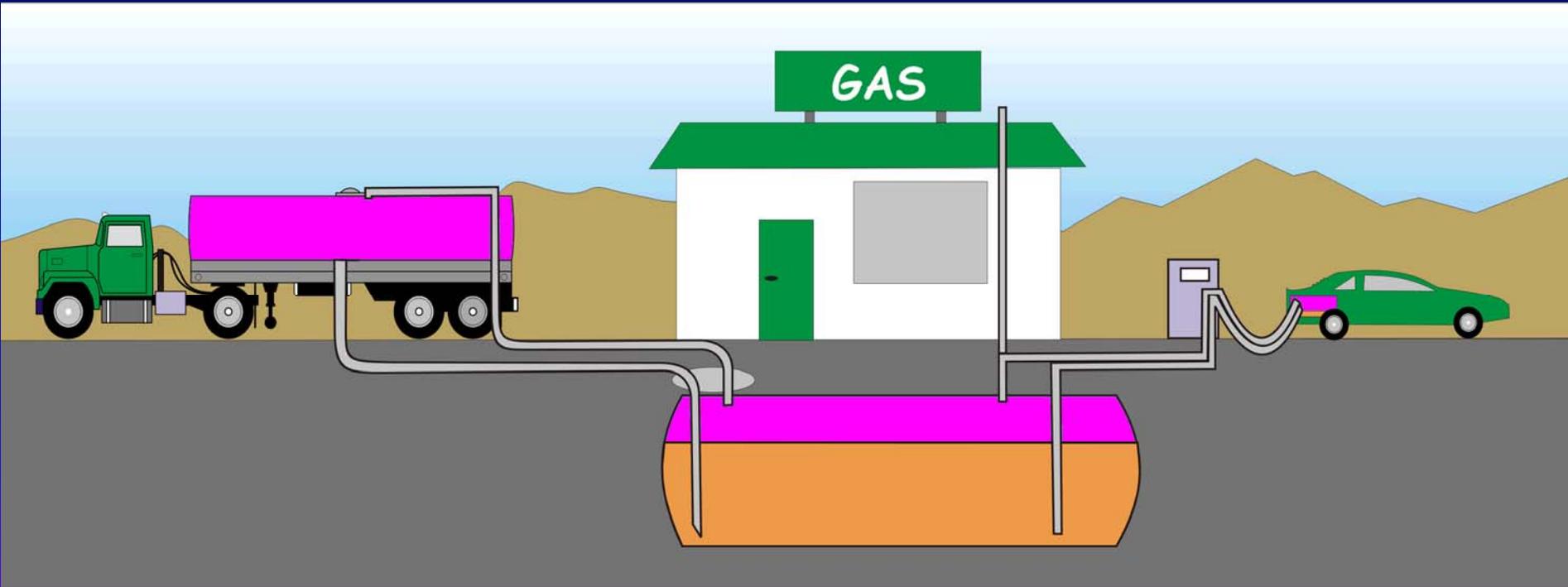
- **16 billion gallons/year CA gasoline sales**
- **Uncontrolled emissions of 8.4 lbs of gasoline vapor for each 1000 gallons gasoline transferred**
- **347 tons/day vapor recovery emission reductions from pre-EVR systems**
- **25 tons/day from Enhanced Vapor Recovery**

**Total Benefit: 372 tons/day or
120,000 gallons liquid gas/day or
\$360,000 savings/day (\$3.00/gal)**

EVR Improvements

- More stringent certification requirements
- “Dripless” nozzles – less spillage
- Control of fugitive emissions
- Better components – less system leaks
- Compatible with vapor recovery systems on newer vehicles (ORVR)
- Vapor recovery system monitor (ISD)

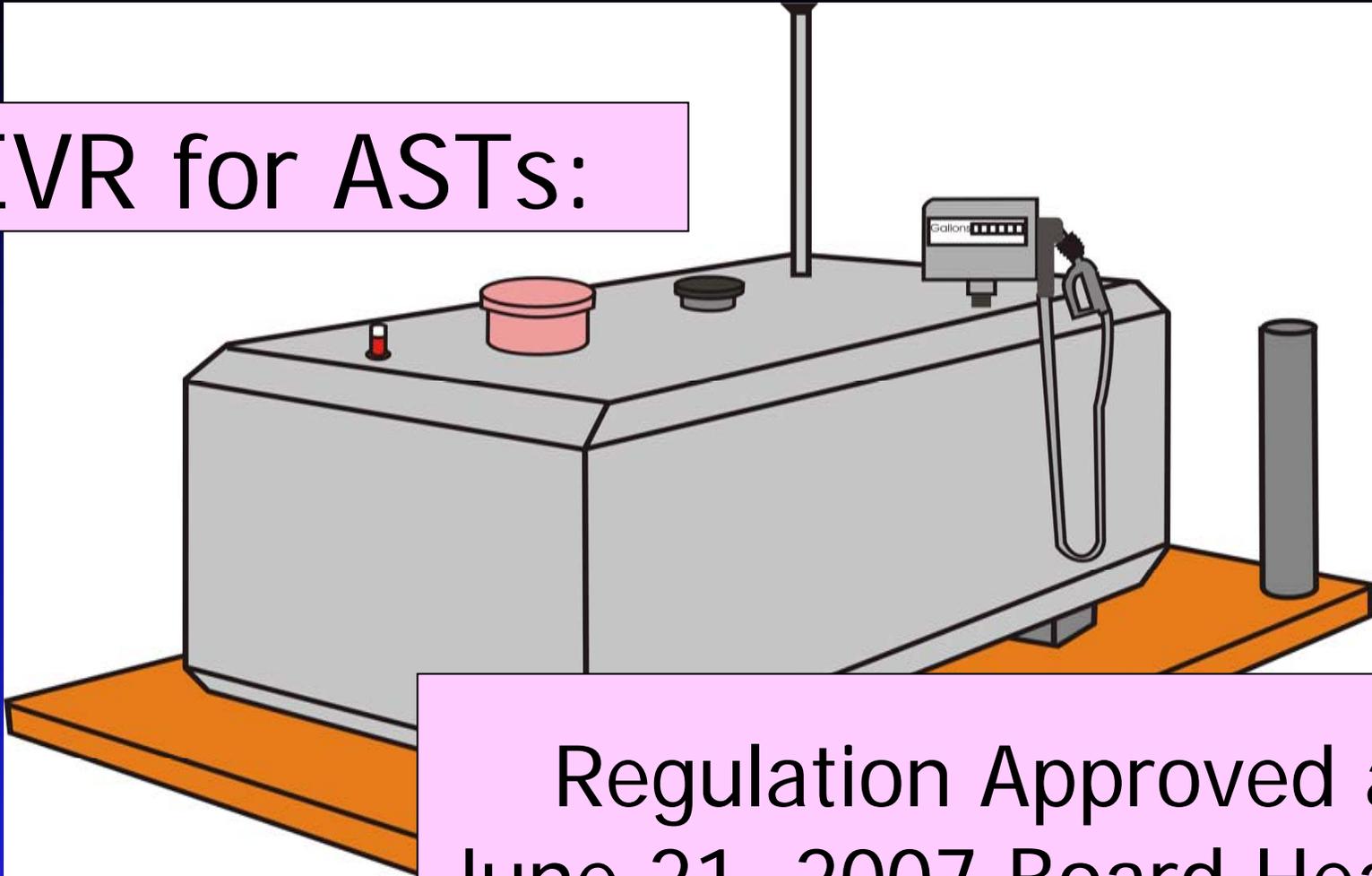
Vapor Recovery at Service Stations



Phase I

Phase II

EVR for ASTs:



Regulation Approved at
June 21, 2007 Board Hearing
Effective January 2009

Partial EVR Exemption for Districts in Attainment with State Ozone Standards

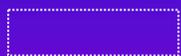
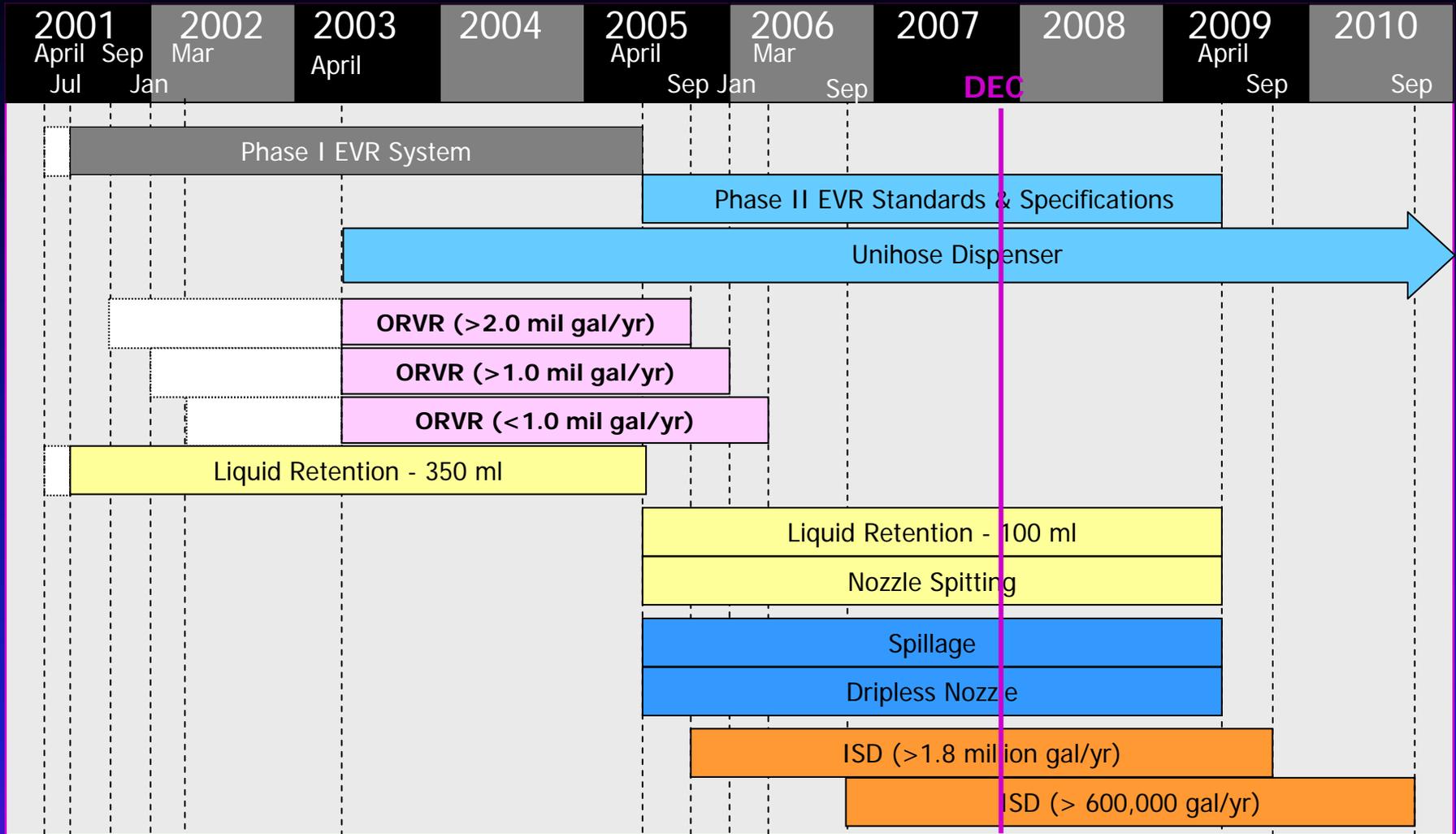
- Exempt existing sites from all EVR modules except ORVR compatibility
- ORVR compatibility to minimize benzene exposure
- New and modified stations must comply

Status of E85 Dispensing in California

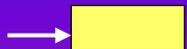
- Currently, no certified vapor recovery (VR) systems for E85
- Several E85 R&D facilities in California
- Phase II VR for E85
 - Districts evaluating USEPA Phase II waiver
- Phase I VR for E85
 - ARB staff evaluating Phase I E85 compatible components
- UL Update
 - certification to begin fourth quarter 2007



EVR Timeline (updated June 2006)



Dotted box: time between start of 4-year clock and operative date



Start of solid bar: date required for new or modified facilities (operative date)



End of solid bar: date required for existing facilities (installed before start of bar)



Not required for dispensers installed before April 2003

Phase II EVR 2009 Deadline

- **13,000 GDFs have 16 months to upgrade to EVR Phase II systems!**
 - Obtain permits
 - Purchase equipment
 - Install using certified contractor
- Potential contractor shortage if wait until last minute
- See Advisory 359



EVR Phase II Certified Systems

- Two EVR Phase II systems certified!!!!

Healy EVR Phase II System (assist)

Not including ISD: VR-201

Including ISD: VR-202

VST EVR Phase II System (balance)

Not including ISD: VR-203

Including ISD: expected March 2008

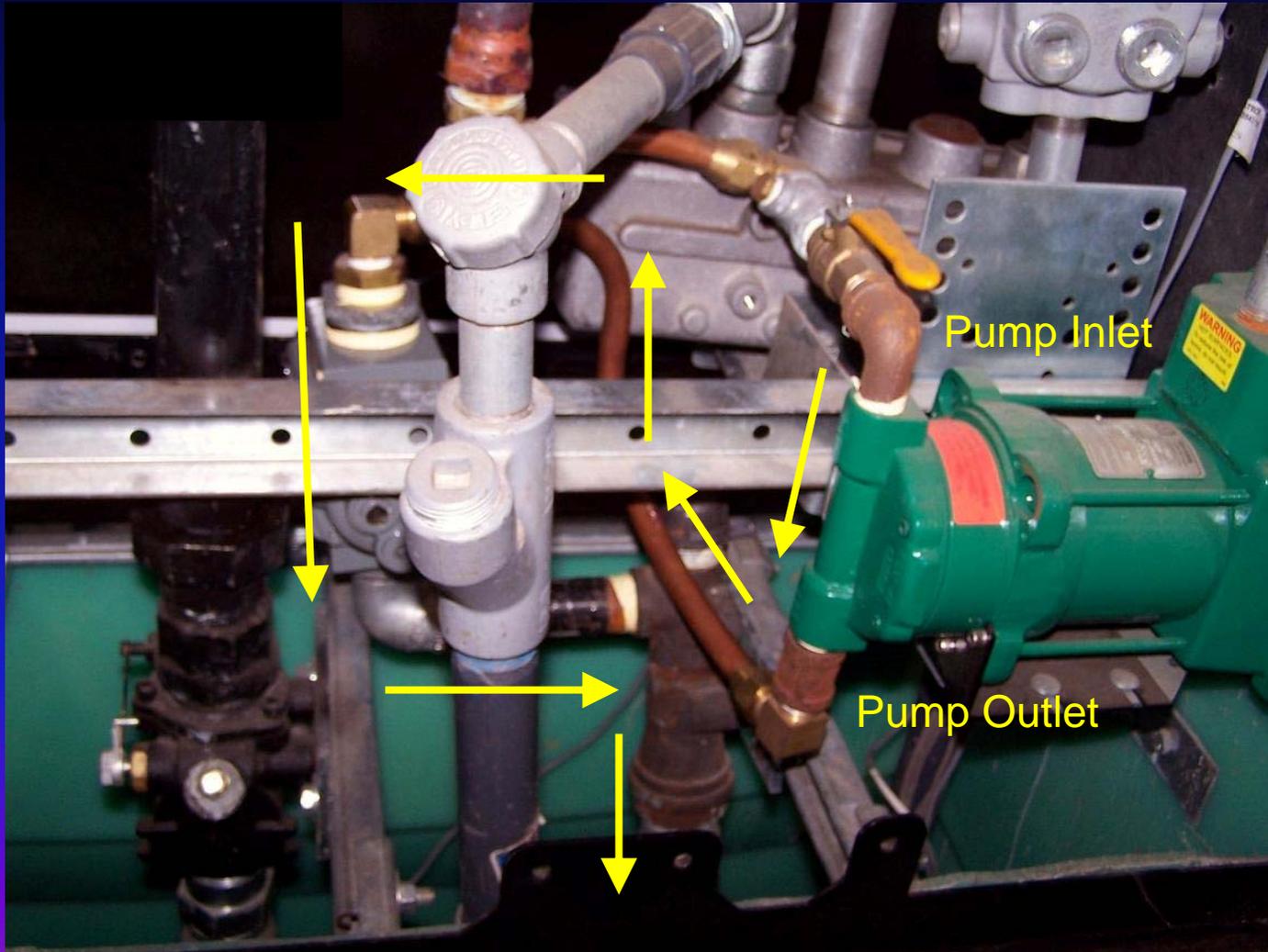
Phase II EVR Certification Update

- Additional Balance Systems?
 - 3 other balance system applications received, all include processors.
 - One “sealed” by ARB on 7/31/07 to begin field testing.
 - New system certification takes at least 1 year to complete.

Franklin Fueling Systems /Healy Phase II EVR System

- Executive Orders VR-201-C and VR-202-C signed May 9, 2007.
- Includes a new “Universal Dispenser Manual”, any existing dispenser can be upgraded to Healy EVR
- Allows for flexibility in component installation as long as system passes performance tests.
- Negative slope in dispenser piping is allowable if necessary.

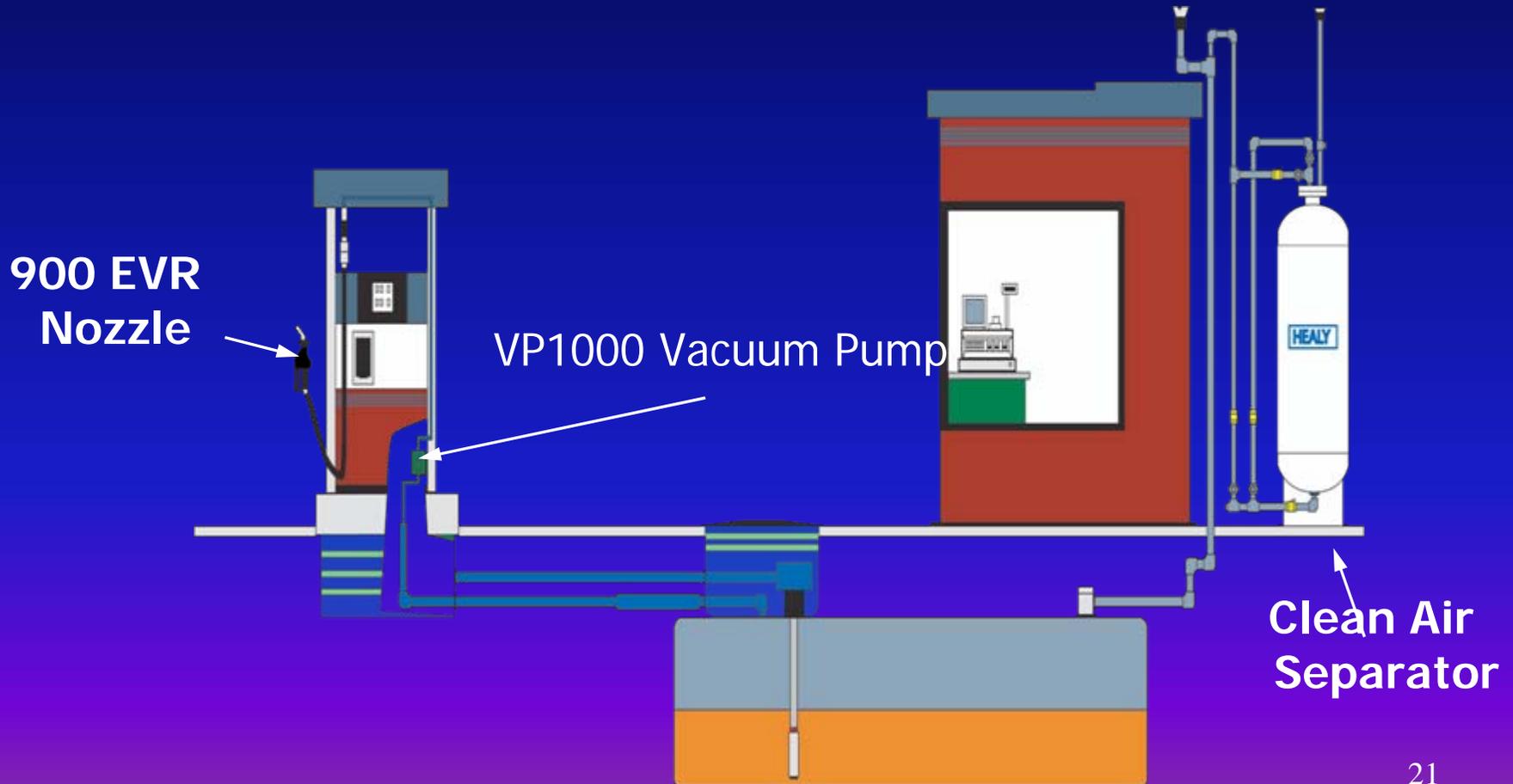
Negative Slope in Dispenser Piping



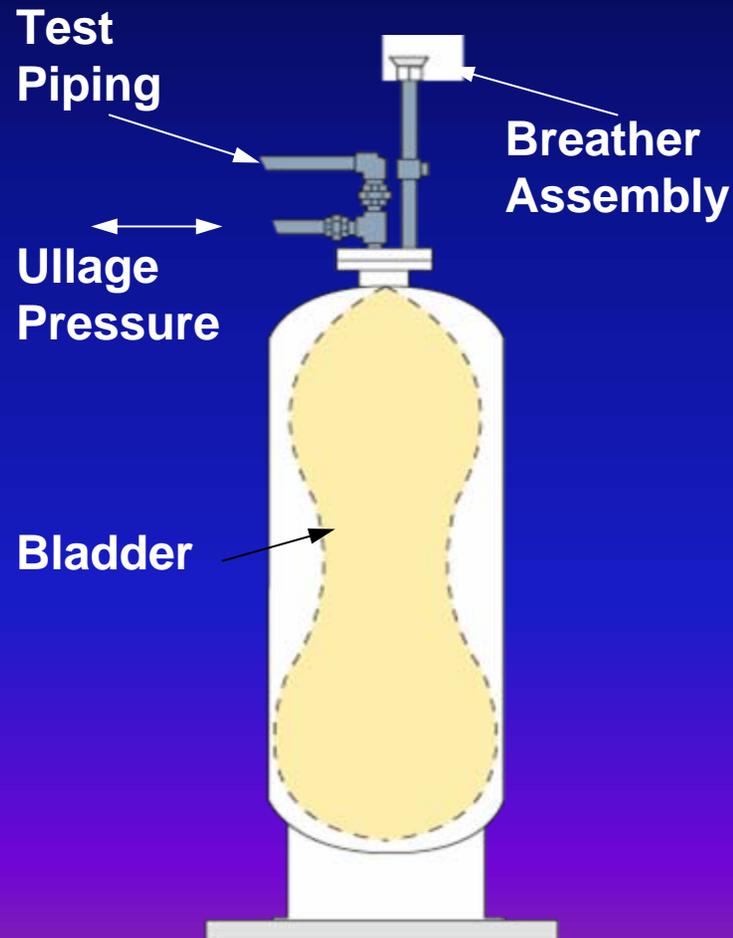
FFS/ Healy Phase II System (cont..)

- Flushing Procedure for Dispenser Piping?
 - There is no FFS approved flushing procedure. If rotor/vanes need cleaning, follow cleaning procedure in the IOM.
 - “VP-1000 Vane & Rotor Service & Replacement Guide” page 61 of Installation, Operation and Maintenance Manual (IOM).

Healy EVR Phase II System



Healy Clean Air Separator (CAS)



Healy Clean Air Separator



Healy Clean Air Separator



Expected Soon!
Horizontal CAS



VST EVR Phase II System



VST EVR Phase II System



VST EVR Phase II System



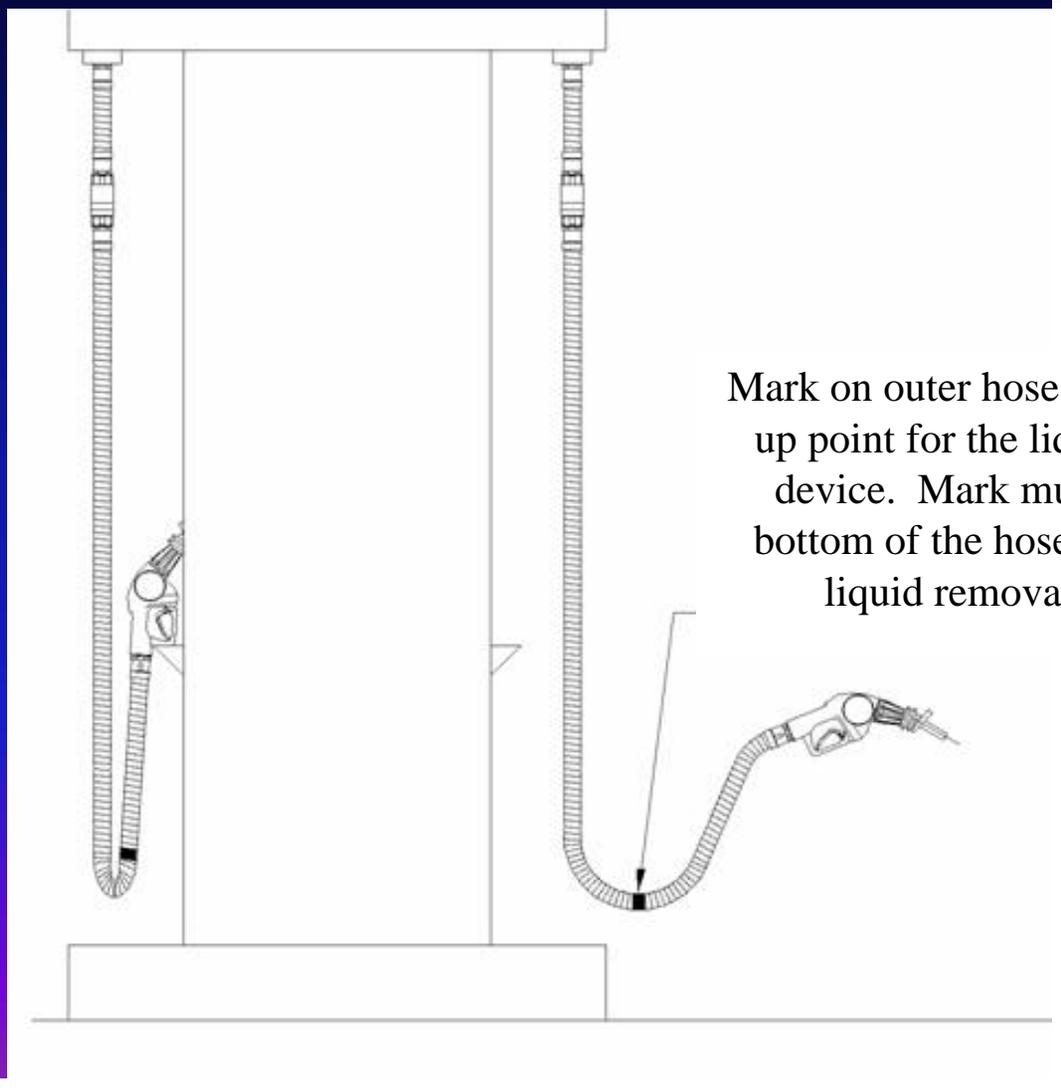
VST EVR Phase II System

- What's Different?
 - Lever-Actuated Vapor Valve
 - Liquid Pick-Up Mark on Hose
 - Hose Installation Procedure
 - Liquid Removal Test (Exhibit 5)

VST EVR Phase II System



VST EVR Phase II System



Mark on outer hose indicates pick up point for the liquid removal device. Mark must be at the bottom of the hose loop during liquid removal testing.

Replacement Parts

(per section 19.1, CP-201)

- EVR certified components can be used (optional) as pre-EVR replacement parts if determined compatible by ARB.
 - VST EVR balance system hanging hardware approved for pre-EVR systems 11/27/07
 - Approval letter #07-09
- EVR certified components shall be used (mandatory) as pre-EVR replacement parts if determined compatible and commercially available by ARB.

Balance vs. Assist EVR Systems

- Most GDF operators believe EVR balance system will be cheaper than EVR assist as they already have the balance system
- Total cost depends more on which EVR processor is more compatible with GDF site layout
- Healy: large, but no electrical or sensors
- VST: small, but requires 2 vent lines, electrical & sensor conduit (even the non-ISD version)

EVR Installation Training

- Manufacturer's training plan is part of ARB certification requirements
- Executive Orders require that installers be trained
- Districts will check contractor certification
- Warranty may be conditioned upon use of trained installers

Number of Trained EVR Contractors in California

	Franklin/ Healy	Veeder- Root (ISD)
Number of Certified Individuals	952	545
Number of Certified Companies	224	135

FFS/ Healy Phase II System (cont.)

- Contractor Training
 - Contractor list available at:
www.franklinfueling.com/pdfs/HealyCerts.pdf
 - For training, contact:
Steve Langlie
800-225-9787
langlie@franklinfueling.com

FFS/ Healy Phase II System (cont.)

- Veeder Root ISD System Training
- For training contact Dave Emmington
demmington@veeder.com.
- Contractor list available at:

www.veeder.com/cfusion/veeder/ascsearch/index.cfm

ISD Contractor Training

- Alpha Petroleum Inc. - Dixon
 - www.alphapetro.com
- Banks and Co. - Fresno
 - www.banks-co.com/training.htm
- Northwest Pump - San Diego
 - www.nwpump.com
- CE Thomas – Los Angeles
 - www.charlesethomas.com

VST Training Levels

- Level A – Hanging Hardware
- Level B - Processor installation
 - Prerequisite: Veeder-Root level 1/2/3 or 4
- Level C – Processor Start-up and Maintenance
 - Prerequisite: VST Level B and Veeder-Root level 2/3 or 4 and PMC/ISD

VST Training (cont.)

- Contractor Training
 - Complete VST enrollment form
 - Once enrollment form is approved, enroll in training class with certified trainer
 - Enrollment form and class schedule should be available January 2008 at:

www.vsthose.com

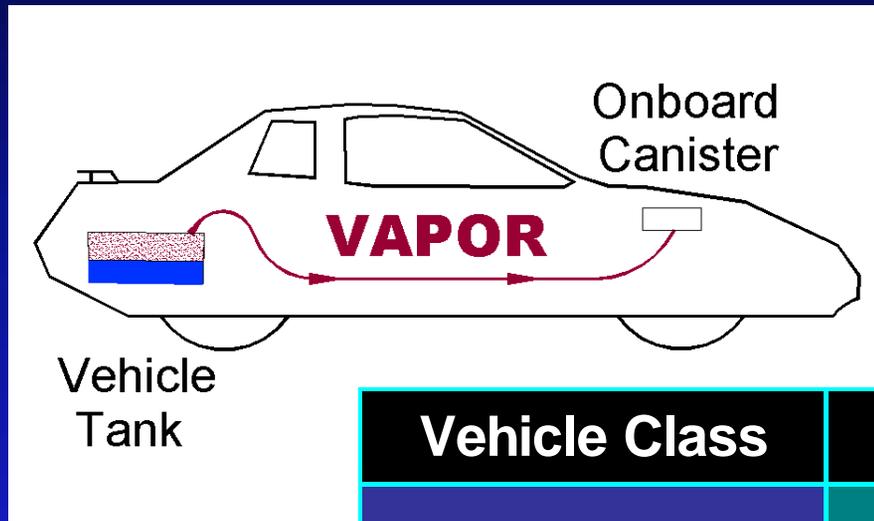
ICC Vapor Recovery System Installer Exam

- ICC = International Code Council
- Maintain exams for UST program
- Exam panel includes ARB, SWRCB, contractors and gasoline marketers
- Exam available as of March 2007
- May be required by district rule or permit condition

Trouble Getting EVR Equipment or EVR Trained Contractor?

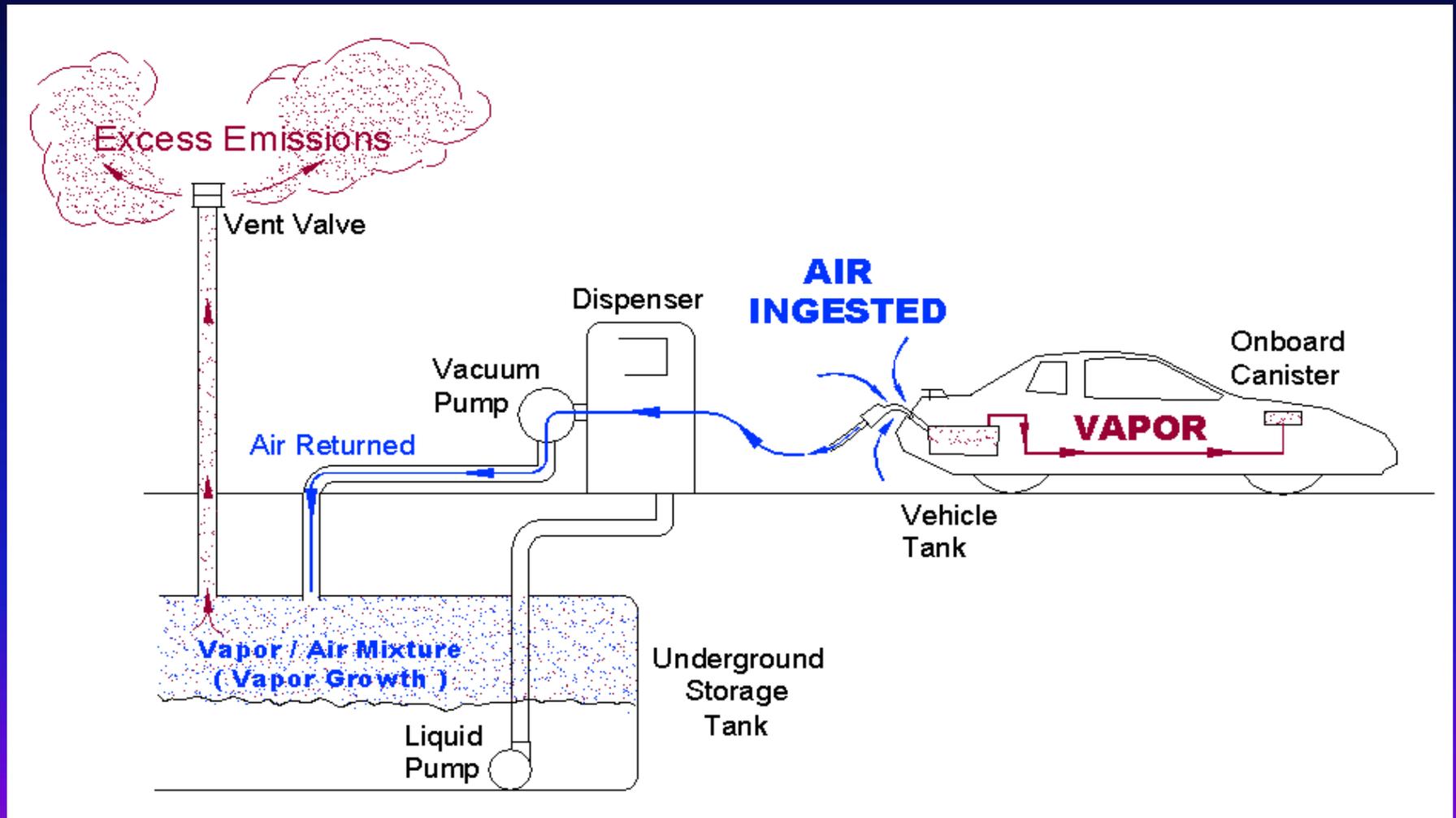
- Let ARB know!
- Form to document unavailability of vapor recovery equipment or certified contractor at www.arb.ca.gov/vapor/vapor.htm

Onboard Refueling Vapor Recovery or "ORVR"



Vehicle Class	40%	80%	100%
Passenger	1998	1999	2000
LD Trucks & MDV (<6000 lbs)	2001	2002	2003
MD Vehicles (6001-8500 lbs)	2004	2005	2006

ORVR - Phase II Incompatibility

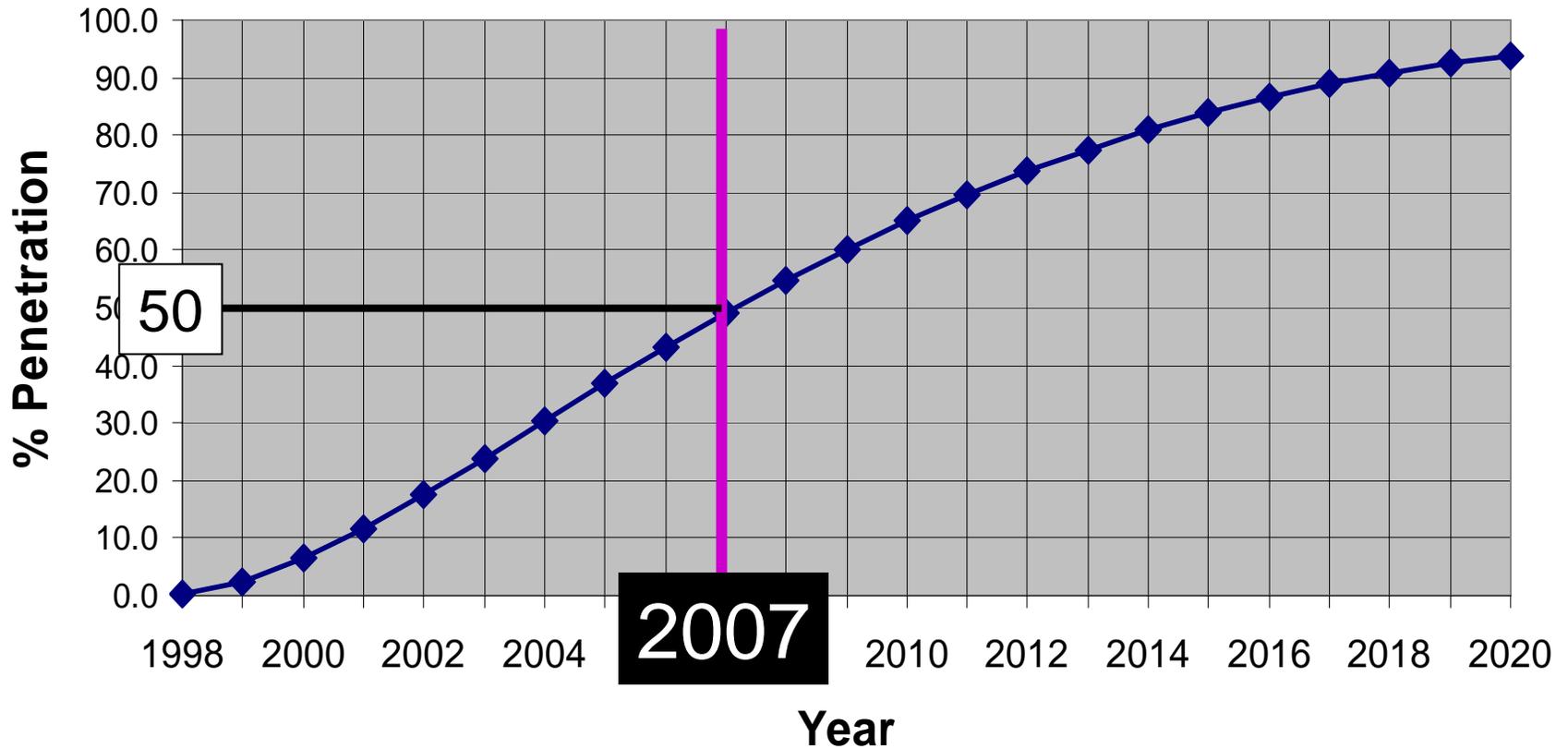


US EPA "widespread use" of ORVR Vehicles

- Phase II systems are required by federal, state and local agencies
- US EPA may allow removal of Phase II vapor recovery systems in next 10 years
- CA expects to keep Phase II systems until 2020 or longer to maintain emission reductions

ORVR Vehicle Penetration

(vehicle miles traveled - VMT)



Limited “Widespread Use” Designations

- US EPA 12/12/06 memo
 - Initial fueling of new vehicles at automobile assembly plants
 - Refueling of rental cars at rental car facilities
 - Refueling of flexible fuel vehicles at E85 dispensers
- US EPA 11/28/07 memo
 - Expand “widespread” use to ORVR fleets

In-Station Diagnostics (ISD)

- Identifies failures automatically
- Notifies station operator
- Reduces emissions by early detection and prompt repair
- Supplements district inspections
- Concept similar to OBD for vehicles
- Tie-in to existing UST leak monitors

ISD Implementation Deadlines

**> 1.8 million
gallons/yr**

**600,000 – 1.8 million
gallons/yr**

**\leq 600,000
gallons/yr**

**New and Major
Mod Sites:
Sept. 2005**

**Existing Sites:
Sept. 2009**

**New and Major
Mod Sites:
Sept. 2006**

**Existing Sites:
Sept. 2010**

**Exempt
From
ISD**

ISD Certification Update

- Second ISD System Completed Testing
 - Healy Phase II with Franklin Fueling ISD
 - Final EO expected Jan/Feb 2008

- VST EVR Balance with Veeder-Root ISD
 - Draft EO by January
 - Final EO expected Feb/Mar 2008

How ISD Works

Monitors Two Primary VRS Functions:

1. Collection of Vapors during Fueling
 - ISD flow monitor
2. Containment of Vapors in UST system
 - ISD pressure monitor
 - ISD leak test

ISD Sensors

← Pressure Sensor
Flow Meter ↓



Veeder-Root TLS-350



ISD Failure Modes & Assessment Frequency

	Degradation Failure	Gross Failure
A/L Ratio	Weekly	Daily
Balance vapor collection	---	Daily
UST Pressure	Monthly	Weekly
Pressure Integrity (leaks)	---	Weekly
Vapor Processor	---	Daily

VR-202 ISD Alarm Thresholds

Daily
1 day of data

Weekly
7 days of data

Monthly
30 days of data

	Degradation Failure	Gross Failure
A/L Ratio	A/L \leq 0.81 or A/L \geq 1.32	A/L \leq 0.33 or A/L \geq 1.90
UST Pressure	> 0.5 in WC > 25% of time	> 1.3 in WC > 5 % of time
Containment (leaks)	---	> 8 – 14 CFH leak @ 2 in WC

Example ISD Daily Report

Got Gas?

1333 State Street

Sac. CA 96843

Nov 14, 2006 10:20 am

EVR Type: Vacuum Assist

ISD Version 01.00

Overall Status PASS

EVR Containment PASS

EVR Collection PASS

Stage 1 1 of 1 PASS

Self Test PASS

ISD Monitor Uptime 100%

Containment Tests

Gross 95% 0.1 "WC

Dgrd 75% -0.4N "WC

Vapor Leak 4 CFH

Max 0.5 "WC

Min -5.0 "WC

Collection Tests

Gross	Dgrd
-------	------

A/L(#)	A/L(#)
--------	--------

FP 1: Blend3

0.99 (46)	0.98 (305)
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FP 2: Blend3

1.09 (39)	1.13 (215)
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Self Test

Setup Test PASS

Sensor Out Test PASS

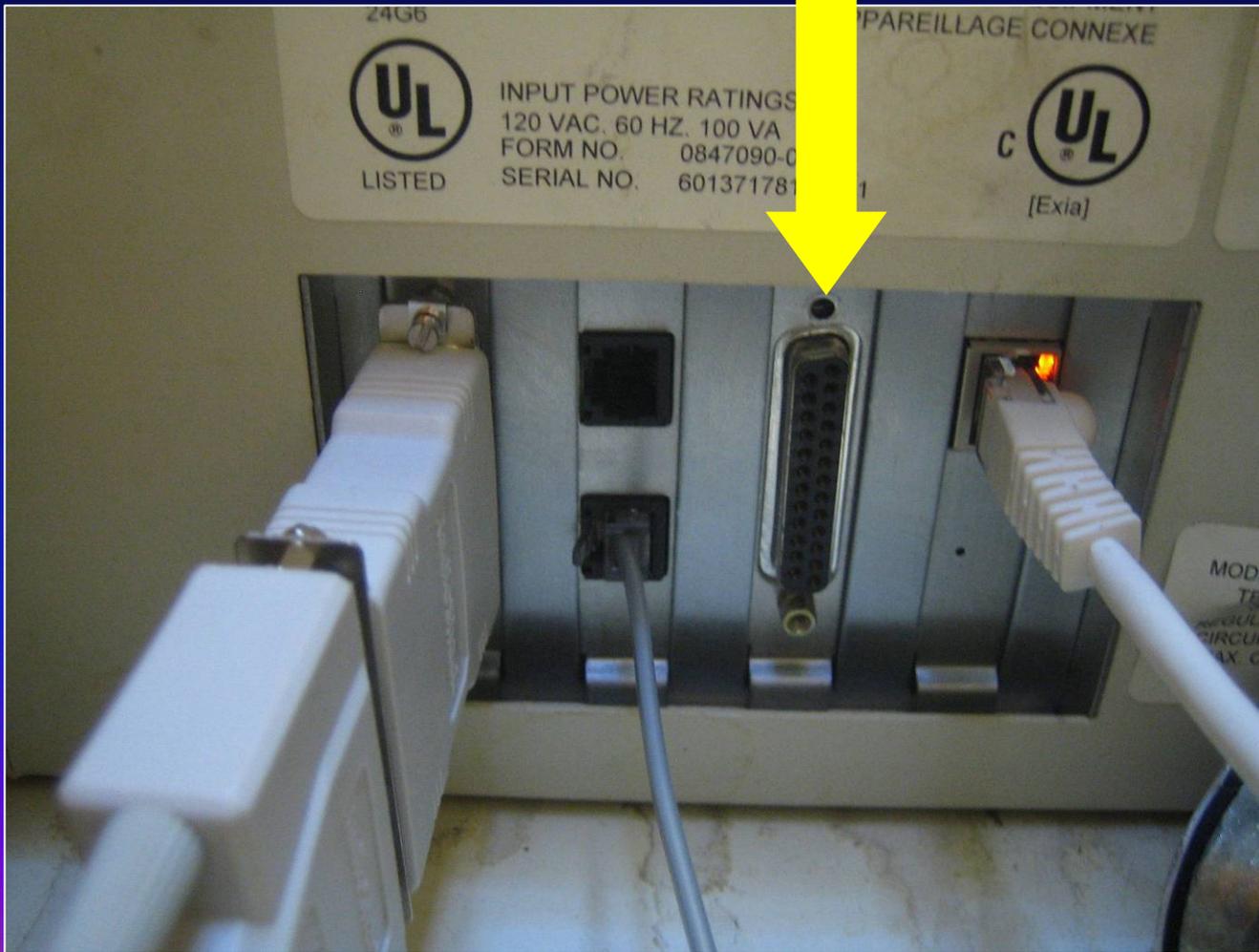
Vapor Recovery Advisory No. 355
October 10, 2006

In-Station Diagnostic Systems

Electronic Access: Availability of an RS 232 Port

- Requires that a vacant RS 232 port must always be available to electronically download reports.
- If no vacant RS 232 port exists, Gasoline Dispensing Facility owners must install an additional RS 232 port that remains vacant for Certified Veeder-Root Technicians and District staff to access daily and monthly reports.

Illustration of an available RS 232 port



ISD 18-Month Field Study

To determine whether installed systems perform similar to ISD system tested in certification. Monthly tests include:

- Vapor Flow Meter Operability Test
- Vapor to Liquid (V/L) Ratio Testing
- Identification of Onboard Refueling Vapor Recovery (ORVR) equipped Vehicles
- Pressure Sensor Verification
- Vapor Pressure Sensor Ambient Reference Test

Status of ISD Field Study

- ISD working as expected
- Data from the first 15 months of the study are posted at www.arb.ca.gov/vapor/isdtestdata.pdf
- Data collection completed by January 2008

ISD Enforcement Policy

- ARB Policy
 - ISD output not currently appropriate for enforcement
 - No response by station operator to ISD failure signal is enforceable
- CAPCOA recommended policy (6/27/06) posted on ARB website

Estimated Phase II EVR Costs (Franklin/Healy without ISD)

	Number of Dispensers			
	2	4	6	12
Dispenser Equipment	\$7,240	\$14,480	\$21,720	\$43,440
Dispenser Equipment Installation*	\$600	\$1,200	\$1,800	\$3,600
Clean Air Separator	\$7,245	\$7,245	\$7,245	\$7,245
CAS Installation*	\$2,000	\$2,000	\$2,000	\$2,000
TOTAL	\$17,240	\$24,925	\$32,765	\$56,285

* Assumes installation labor cost of \$75/hr

Estimated ISD Costs (Veeder-Root)

	Number of Dispensers			
	2	4	6	12
Equipment*	\$12,300	\$14,000	\$15,900	\$21,300
Installation**	\$1,300	\$2,500	\$3,800	\$7,600
TOTAL	\$13,600	\$16,500	\$19,700	\$28,900

* Includes purchase of TLS-350 (retrofits will cost less)

** Assumes installation labor cost of \$135/hr

Total Estimated Cost for EVR Phase II and ISD

	Number of Dispensers			
	2	4	6	12
EVR Phase II	\$17,240	\$24,925	\$32,765	\$56,285
ISD	\$13,600	\$16,500	\$19,700	\$28,900
TOTAL (rounded to nearest \$100)	\$30,800	\$41,400	\$52,500	\$85,200

Does not include cost to replace dispensers, obtain permits, install electrical lines or conduct start-up tests

RUST program

- Small business assistance to comply with SB 989
- Also covers Enhanced Vapor Recovery and electronic monitoring system (ISD)
- Grants: \$3,000 to \$50,000
- Loans: \$10,000 to \$750,000
- www.waterboards.ca.gov/cwphome/ustcf/rust.html

EVR Contacts

- **EVR Regulations** - Cindy Castronovo
 - ccastron@arb.ca.gov (916) 322-8957
- **EVR Certification** - Pat Bennett
 - pbennett@arb.ca.gov (916) 322-8959
- **ISD and AST certification** - Joe Guerrero
 - jguerrer@arb.ca.gov (916) 324-9487
- **In-Use Vapor Recovery** - Ranjit Bhullar
 - rbhullar@arb.ca.gov (916) 322-0223

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

Questions?

