



Air Resources Board



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September 8, 2011

Air and Radiation Docket and Information Center
Attention Docket ID No. EPA-HQ-OAR-2010-1076
Environmental Protection Agency
1301 Constitution Avenue, NW.
Mailcode: 6102T
Washington, D. C. 20460

I am writing to provide our response to the U.S. EPA's proposed rule regarding gasoline vapor recovery control of ozone-precursor emissions titled *Air Quality: Widespread Use for Onboard Refueling Vapor Recovery and Stage II Waiver* (EPA-HQ-OAR-2010-1076-0001), which was published in the Federal Register, Volume 76, Number 136, July 15, 2011, (Docket ID: EPA-HQ-OAR-2010-1076, pages 41731-41739). Onboard Refueling Vapor Recovery (ORVR) and Stage II (Phase II)¹ are both designed to control the vehicle refueling emissions and both are effective. In the proposed rule, ORVR would be deemed to be in national widespread use in June, 2013. This would allow states to consider removing Stage II vapor recovery requirements when revising their State Implementation Plans (SIPs).

I understand this action has been taken in response to President Obama's initiative to review potentially outdated and redundant policies in order to ensure that regulations are beneficial without being unnecessarily burdensome to American businesses. We share his goal of implementing smart regulations that protect public health with clean air while promoting job creation and a strong economy.

My staff has conducted an analysis (provided as an enclosure) of the proposed federal action in the context of California's Enhanced Vapor Recovery (EVR) Phase II Requirements and has identified a number of concerns that would make removing our vapor recovery requirements not a viable option for California in the near term. In the longer term, the same analysis suggests that there may be some opportunities for improvement of the hardware and reduction in operation and maintenance costs of the program to allow it to remain a cost-effective element of our air pollution reduction program.

First and foremost, despite great progress in achieving cleaner air, California still needs additional reduction of air pollution. The air in many regions of our state still exceeds the federal and state ambient air quality standards for ozone and major urban centers continue in nonattainment of these health-protective standards. Removal of our EVR Phase II controls would result in a significant increase in emissions of ozone precursors at a time when we are

¹ The term Phase II, instead of Stage II, applies to the California vapor recovery program.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website: <http://www.arb.ca.gov>.

California Environmental Protection Agency

searching for new control measures to reduce emissions. At this time, we cannot identify how we would make up for the lost emission reductions that would result from removal of our vapor recovery program.

Second, in spite of the growing share of ORVR-equipped vehicle refuelings, we estimate that our EVR Phase II program, in its current form, will continue to provide significant statewide emission reductions in future years well beyond the U.S. EPA's stated determination of 'widespread use' by June 2013. For example, in 2014, six months after the widespread use determination would be in effect, 17 percent of gasoline will still be dispensed to non-ORVR vehicles. At that time EVR Phase II will be achieving emission reductions of approximately 31 tons of reactive organic gases (ROG) per day. This is an enormous amount of emissions, and achieving this reduction is critical to our State Implementation Plans. Similarly, in 2020, when six percent of gasoline is still dispensed to non-ORVR vehicles, EVR Phase II will provide ROG emission reductions of approximately 15 tons per day. Even in 2028, when only two percent of gasoline is dispensed to non-ORVR vehicles, EVR Phase II will still provide emission reductions of approximately nine tons per day. The reasons these on-going benefits will exist well past 2013 are (i) our EVR Phase II program provides greater emission reductions than the federal Stage II requirements and, (ii) the refueling emissions from the remaining non-ORVR-equipped vehicles are large in the absence of vapor recovery.

Third, the California Air Resources Board's (ARB) Airborne Toxic Control Measure (ATCM) for benzene requires Phase II vapor recovery even in ozone attainment areas. Benzene is a known carcinogen for which a mitigation plan for reducing the risk of human exposure by inhalation is required by law. Removal of Phase II vapor recovery would increase benzene exposure to citizens fueling older, non-ORVR equipped vehicles, and to those living near service stations. The health impacts from exposure to increased benzene emissions that would result from removal of Phase II vapor recovery controls should be fully assessed, especially since they are likely to be disproportionately more pronounced in communities of lower socio-economic status.

California has been a leader in the area of gasoline vapor recovery with the most comprehensive program in the nation. This program has been an important part of the State's air quality strategy for over 35 years and yields cost-effective emission reductions in our most ozone impacted areas; areas deemed in nonattainment of the air quality standards. Furthermore, Phase II vapor recovery requirements were extended into ozone attainment areas to reduce the public's exposure to benzene. Over the years, our vapor recovery program has grown into a strong partnership between ARB; the 35 local air quality management districts in California who share responsibility for clean air; the equipment manufacturers who continue to deliver superior technology for the California market; and the gasoline marketing industry that includes over 10,000 gasoline service stations that make daily use of EVR Phase II certified equipment. In its current form, our EVR program surpasses the federal Stage II requirements. EVR standards that exceed federal requirements include:

1. ORVR compatibility and pressure management to control emissions lost from the underground storage tanks through vent lines, vapor processor exhaust, and fugitive leak sources;

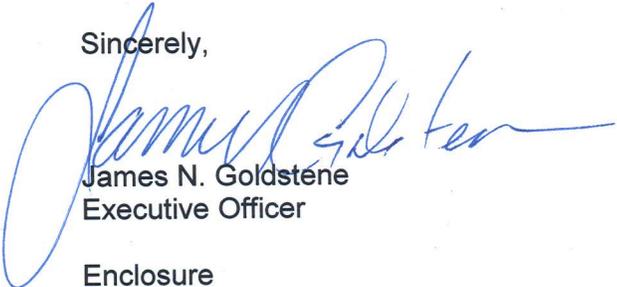
2. In-Station Diagnostics requirements (similar to vehicle OBD) that help maintain in-use effectiveness;
3. Stringent standards for specially designed nozzles that reduce emissions from liquid retention, drips, and spills; and
4. Further emission reductions are anticipated from a newly proposed low permeation fuel hose standard that the ARB will consider at its September 2011 hearing.

We estimate that the effect of these unique program elements provide emission reductions that exceed those of Stage II alone by approximately five tons per day. These reductions are unaffected by increasing ORVR penetration.

In summary, our critical need for reduction of smog-forming emissions and our responsibility for public health protection from exposure to air toxics make it very unlikely that we could contemplate any substantive changes to our vapor recovery program in the near future and certainly not by 2013. Looking further into the future, we have always understood that the success of the ORVR program would bring a time when the vapor recovery program would merit re-examination. To this end, we will continue our analysis of the program, in collaboration with our program stakeholders, as we attempt to identify potential areas of technical and operational improvements that address the decreasing vehicle refueling emissions due to ORVR.

We thank the U.S. EPA in advance for the attention to our comments and welcome the opportunity to collaborate in this assessment. Inquiries concerning our comments can be directed to me by email at jgoldste@arb.ca.gov or by telephone at (916) 445-4383 or to Dr. Alberto Ayala, Chief, Monitoring and Laboratory Division by email at aayala@arb.ca.gov or by telephone at (916) 445-3742.

Sincerely,



James N. Goldstone
Executive Officer

Enclosure

cc: Tom Cackette
Chief Deputy Executive Officer

Dr. Alberto Ayala, Chief
Monitoring and Laboratory Division

White Paper

Preliminary Analysis of U.S.EPA's Proposed Rule on Onboard Refueling Vapor Recovery Widespread Use Determination and California's Enhanced Vapor Recovery Requirements

Introduction

The U.S. EPA has proposed waiving the federal vapor recovery control requirements for gasoline service stations (known as "Stage II" vapor recovery) due to the widespread use of equally effective vehicle-based controls. The U.S. EPA's action acknowledges the fact that both Stage II vapor recovery systems and vehicle based Onboard Refueling Vapor Recovery (ORVR) systems are targeting the same emission source: the vapors displaced from vehicle tanks during refueling events. Both approaches are certified to be roughly equivalent in emission control efficiency.

U.S. EPA's proposed rule would allow the removal of existing Stage II vapor recovery installations after June 2013. The proposal is part of the Obama Administration's initiative to review outdated and redundant rules and ensure that regulations are beneficial without being unnecessarily burdensome to American businesses. California Air Resources Board (ARB) staff has evaluated how the U.S. EPA proposal would affect California's vapor recovery program. This paper presents the staff's analysis and findings and identifies areas in need of further analysis.

California's existing Enhanced Vapor Recovery (EVR) Phase II program achieves greater emission reductions than the federal Stage II program because it includes other elements in addition to the control of the vapors displaced during vehicle refueling. Thus, Stage II can be said to be one of the elements embedded in the EVR Phase II program. This distinction is important in order to ascertain the impact of potential Stage II removal in California.

Preliminary staff findings

The State still needs additional reduction of air pollution. The air in many regions of our State still exceeds the federal and state ambient air quality standards for ozone and major urban centers continue in nonattainment of these health-protective standards. For reference, California maps showing the "Area Designations for National Ambient Air Quality Standards 8-Hour OZONE" and "2010 Area Designations for State Ambient Air Quality Standards OZONE" are included at attachments. Removal of the applicable EVR Phase II controls would result in a significant increase in emissions of ozone precursors and it is not clear there are strategies available to replace the substantial emission reductions that are obtained from EVR Phase II requirements, both now and in the future.

Due to significant emission increases associated with the removal of Phase II vapor recovery equipment, the current EVR Phase II program is indispensable. Staff estimates that the EVR

Phase II program will continue to provide the following statewide emission reductions in the near term and in future years:

30.7 tons per day in the year 2014, six months after the ORVR widespread use determination, when 17 percent of gasoline is still dispensed to non-ORVR vehicles.

14.7 tons per day in the year 2020, when 6 percent of gasoline is dispensed to non-ORVR vehicles.

8.8 tons per day in the year 2028 and beyond, when only 2 percent of gasoline is expected to be dispensed to non-ORVR vehicles.

ARB has adopted an Airborne Toxic Control Measure for benzene that requires Phase II vapor recovery. Removal of Phase II vapor recovery would increase benzene exposure to citizens fueling older vehicles and those living near service stations. These health impacts are likely to be more pronounced in communities in the lower ranks of socio-economic status. The ARB's Environmental Justice policy commits us to including a discussion of whether proposed major programs, policies, and regulations treat fairly people of all races, cultures, geographic areas, and income levels, especially low-income and minority communities.² This policy will need to be implemented with respect to any decisions related to ORVR widespread use.

The remainder of this document contains the technical detail of our analysis.

Background

In California, approximately 15 billion gallons of gasoline are dispensed through service stations each year. For over 35 years, gasoline vapor recovery systems have been operating in California service stations. Phase I vapor recovery is used to contain vapor in the storage tanks and to recover vapors displaced from the storage tank during the delivery of fuel from cargo tank trucks. ARB certified EVR Phase II systems use specially designed nozzles to capture emissions displaced from vehicle tanks during refueling events and also include features designed to minimize liquid spills and evaporation and reduce hydrocarbon emissions lost from the underground storage tanks through vent lines, vapor processor exhaust, and fugitive leak sources. Vapor recovery systems are currently installed in over 10,000 stations in California. These systems were originally required to control the emission of ozone precursors and became more widely used in ozone attainment areas as a measure to reduce public exposure to the toxic air contaminant benzene. The vapor recovery controls that are in operation at California service stations are illustrated in Figure 1.

The 1990 Clean Air Act (CAA) amendments mandate the vapor recovery control strategy for nonattainment areas classified as, serious, severe or extreme. As a result 26 other states and the District of Columbia implemented vapor recovery controls, at service stations, for some or all of their jurisdictions.

ORVR regulations were promulgated by U.S. EPA in 1994. ORVR systems create a seal in the vehicle fill pipe during dispensing to route vapors, which are normally displaced through the fill pipe, to an onboard canister containing activated carbon. In-use testing data collected by the U.S. EPA suggests that the average control efficiency of ORVR systems is better than 95 percent.³ ORVR

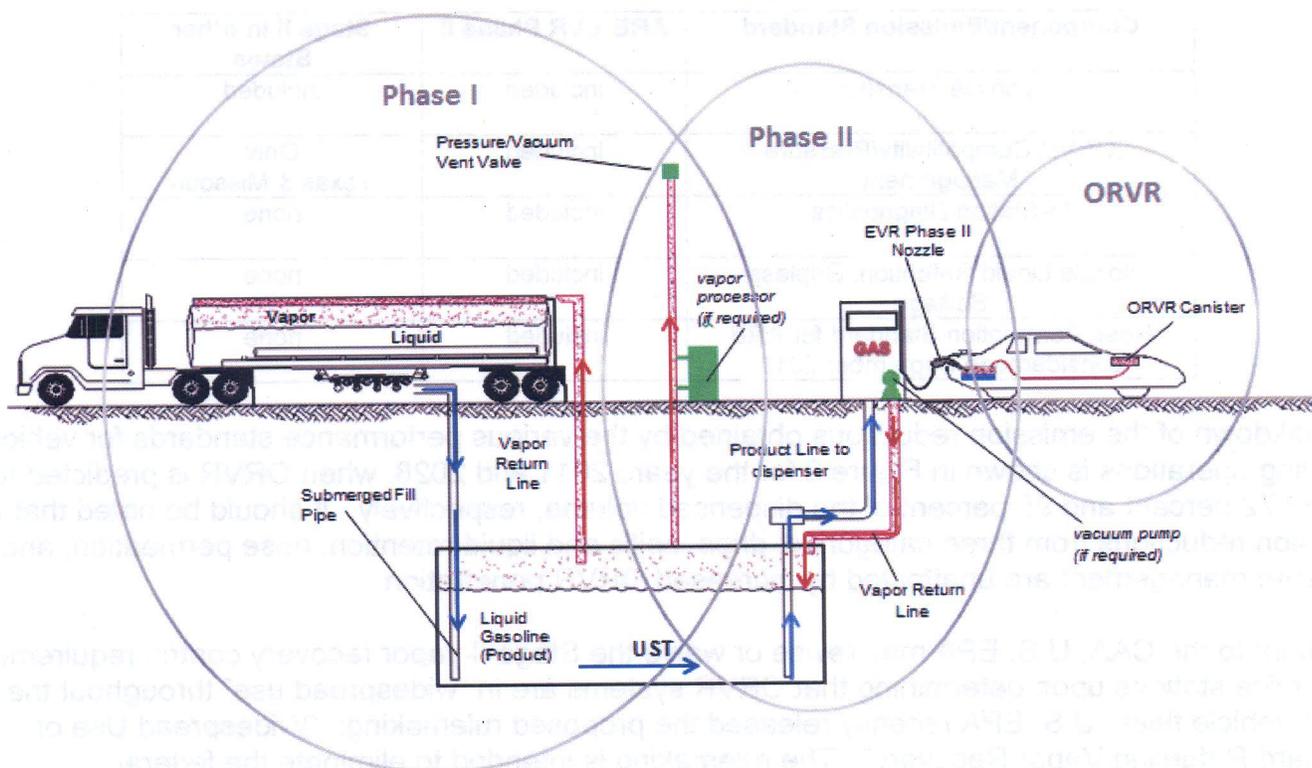
²Air Resources Board Policies and Actions for Environmental Justice, approved December 13, 2001.

³NESCAUM Report – Onboard Refueling Vapor Recovery Systems Analysis of Wide spread Use, pages 9-10, Skelton & Rector, 8/20/2007.

controls were phased-in beginning with 1998 model year passenger vehicles. Since the 2006 model year, ORVR has been required on all passenger, light-duty and medium-duty vehicles less than 10,000 lb gross vehicle weight rating (GVWR). In 2011, the ARB will consider a regulation (LEV III) that would extend ORVR requirements to medium-duty vehicles up to 14,000 GVWR and increase the penetration of ORVR in future vehicle fleets. This analysis assumes this regulation will be adopted and ORVR penetration will plateau at 98 percent.

Figure 1

Phase I, Phase II & ORVR Vapor Recovery Operations at California Service Stations



The adoption of the U.S. EPA's ORVR requirement resulted in an incompatibility issue with the Phase II vapor recovery systems in existence at the time. For some of the older ARB certified systems, it was determined that this incompatibility could cause higher pressure in the underground storage tank due to the return of air instead of saturated vapor, and result in increased emissions from vent lines, vapor processors and fugitive leaks. With the adoption of EVR regulations in the year 2000, ARB sought to address this incompatibility by incorporating new performance standards in the vapor recovery certification procedures. These new procedures were adopted during the time period that ORVR systems were being installed on a steadily increasing number of vehicles. Now, all EVR Phase II vapor recovery systems must demonstrate ORVR compatibility before they can be certified by ARB. Outside of California, only Texas and Missouri have adopted requirements requiring Stage II-ORVR compatibility. For states without ORVR compatibility, the emission increases associated with fueling non-ORVR vehicles without Stage II controls could be partially mitigated by a reduction in emissions from the underground storage tank that are related to ORVR compatibility.

Additionally, EVR includes requirements for the use of In-Station Diagnostics (ISD) to continuously monitor critical system parameters and alert the operator to equipment problems, if they occur. The EVR regulations also introduced liquid retention and dripless nozzle standards and revised the nozzle spillage standard. Virtually all service stations in California have complied with the EVR upgrade requirement. ARB is continuing efforts to strengthen emission requirements for gasoline dispensing operations. In September 2011, staff will be presenting a proposal that the ARB adopt new permeation standards for gasoline dispensing hoses that will further reduce emissions at gasoline dispensing facilities. Table 1 provides a comparison of the ARB EVR Phase II requirements with the federal Stage II requirements of other states.

Table 1
Comparison between Phase II and Stage II emission control

Component/Emission Standard	ARB EVR Phase II	Stage II in other States
Vehicle Transfer	included	included
ORVR Compatibility/Pressure Management	included	Only Texas & Missouri
In-Station Diagnostics	included	none
Nozzle Liquid Retention, Dripless, Spillage	included	none
Hose Permeation Standard for ARB consideration September 2011	included	none

A breakdown of the emission reductions obtained by the various performance standards for vehicle refueling operations is shown in Figure 2 for the years 2011 and 2028, when ORVR is predicted to control 72 percent and 98 percent of the dispensed volume, respectively. It should be noted that the emission reductions from three categories: drips, spills and liquid retention; hose permeation; and pressure management are unaffected by increased ORVR penetration.

Pursuant to the CAA, U.S. EPA may revise or waive the Stage II vapor recovery control requirements for service stations upon determining that ORVR systems are in "widespread use" throughout the motor vehicle fleet. U.S. EPA recently released the proposed rulemaking: "Widespread Use of Onboard Refueling Vapor Recovery". The rulemaking is intended to eliminate the federal requirement for vapor recovery controls at service stations and provide guidance to the states on the requirements for decommissioning existing installations. The proposal establishes June 30, 2013 as the date that ORVR vehicles are in widespread use, when these vehicles will use approximately 79 percent of the dispensed gasoline volume. U.S. EPA had previously determined that States could apply for an exemption to the vapor recovery requirement for non-retail stations that service a fleet of at least 95 percent ORVR equipped vehicles. Some local air districts in California have eliminated the vapor recovery requirement for these types of stations which service 100 percent ORVR equipped vehicles.

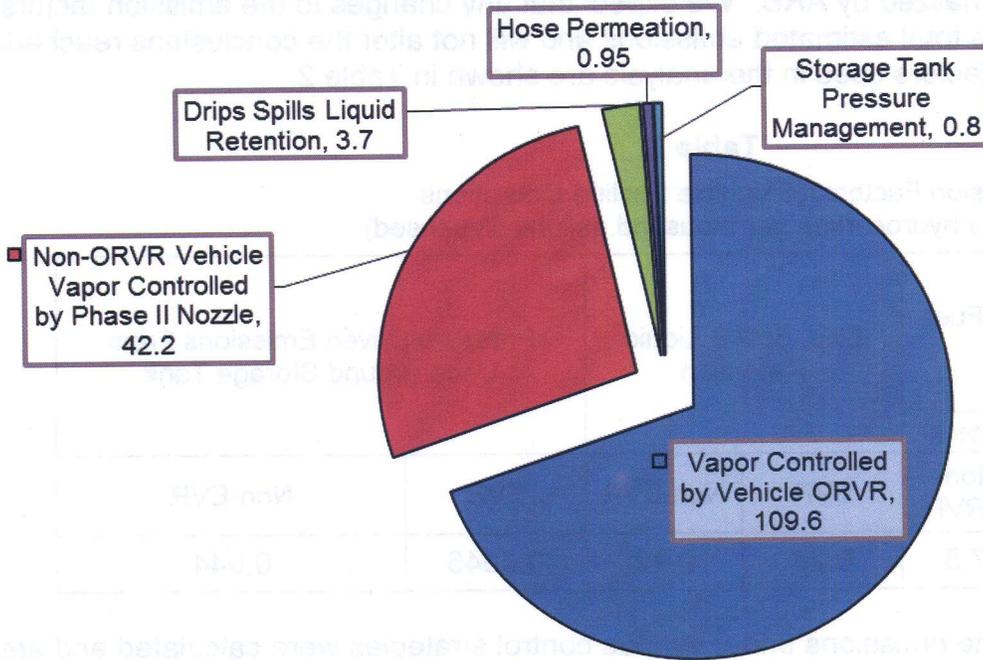
The impact of removing vapor recovery controls from service stations in California

Staff has estimated the emission impact of removing control requirements associated with ARB's EVR Phase II vapor recovery standards. These standards control the following emission categories: fill pipe vapor displacement during vehicle fueling, drips, spills and liquid retention at the nozzle and pressure related losses from the storage tank.

Figure 2

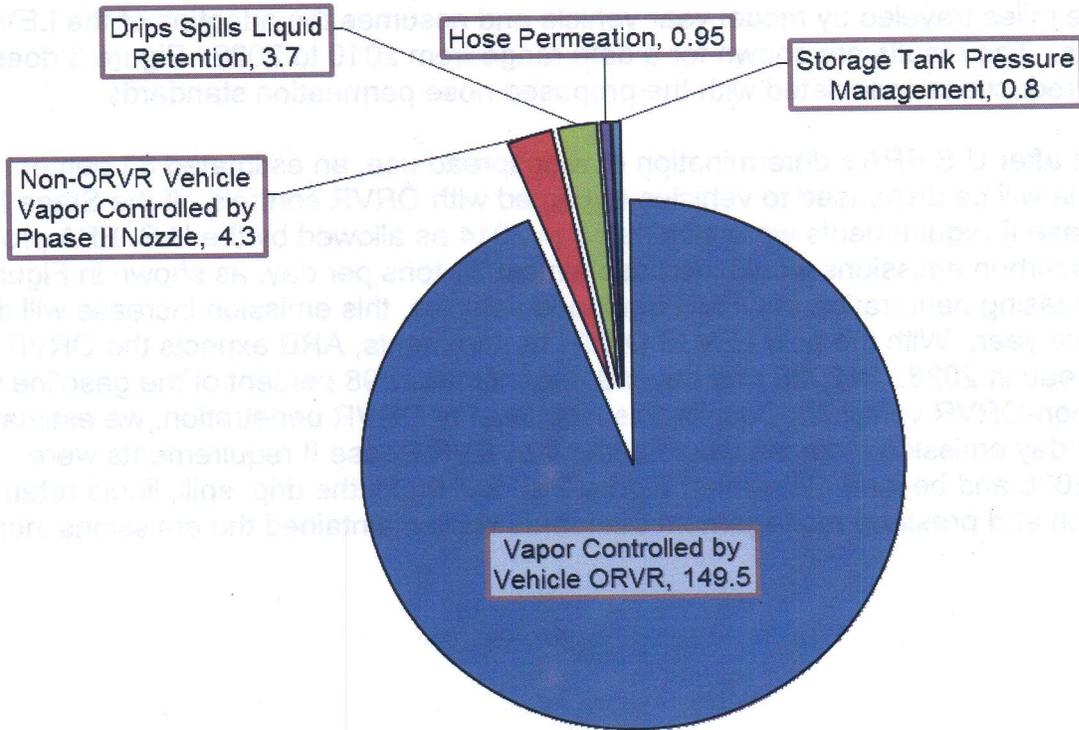
Year 2011 Refueling Emission Reductions (tons/day)

(72% of volume dispensed to ORVR vehicles)



Year 2028 Refueling Emission Reductions (tons/day)

(98% of volume dispensed to ORVR vehicles)



Emission factors based on service station throughput were used in the analysis. These emission factors were taken from the emission inventory methodology proposed by the Monitoring and Laboratory Division staff for Petroleum Production and Marketing – Gasoline Dispensing Facilities Underground Tanks category. These emission factors are preliminary and currently undergoing peer review and have not yet been finalized by ARB. We expect that any changes to the emission factors will have a minimal effect on the total estimated emissions and will not alter the conclusions reached in this analysis. The emission factors used in the analysis are shown in Table 2.

Table 2
Emission Factors for Vehicle Fueling Operations
(pounds of hydrocarbon per thousand gallons dispensed)

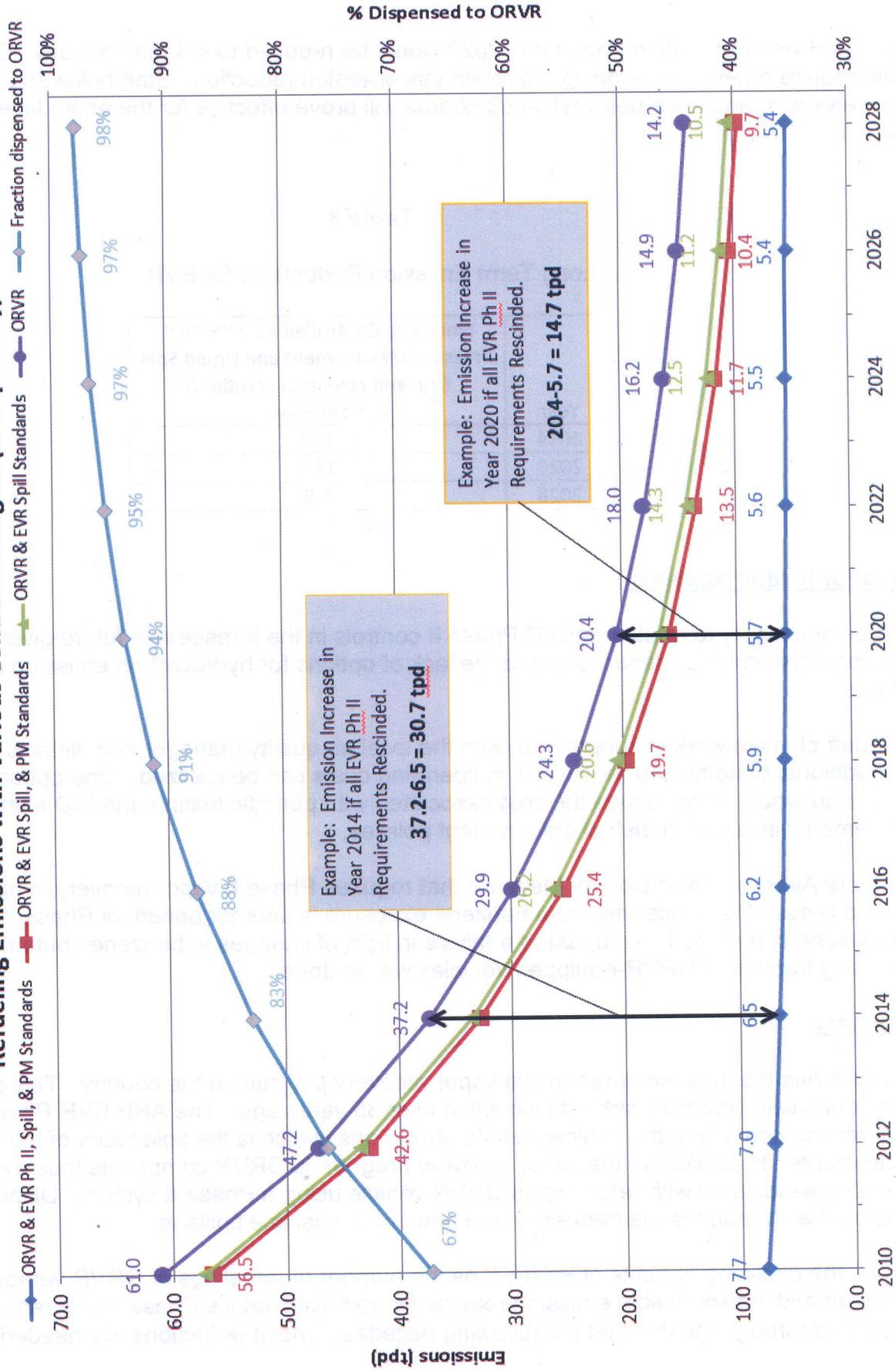
Vapor Displaced From Vehicle Fuel Tank				Drip, Spill & Liquid Retention		Pressure Driven Emissions From Underground Storage Tank	
With Phase II		Without Phase II		EVR	Non-EVR	EVR	Non-EVR
ORVR	Non-ORVR	ORVR	Non-ORVR				
0.01	0.38	0.07	7.5	0.24	0.42	0.0045	0.044

Using these emission factors, the emissions under various control strategies were calculated and are shown in Figure 3 and Table 3. Statewide dispensed gasoline volume was assumed to be constant at 15 billion gallons per year even though the combined effects of improved fuel economy and increasing vehicle miles traveled will affect the volume of gasoline dispensed in future years. The fraction of this gasoline volume dispensed to the ORVR vehicles types was determined based on estimates of vehicle miles traveled by model year vehicle and assumes the adoption of the LEV III ORVR requirements. The results are shown for a date range from 2010 to 2028. Figure 3 does not show the emission reductions associated with the proposed hose permeation standards.

In 2014, six months after U.S.EPA's determination of widespread use, an estimated 83 percent of the gasoline in California will be dispensed to vehicles equipped with ORVR controls. If the Stage II equivalent EVR Phase II requirements were eliminated in 2014 as allowed by the U.S. EPA proposal, the statewide hydrocarbon emissions would increase almost 31 tons per day, as shown in Figure 3. Because of the increasing penetration of ORVR equipped vehicles, this emission increase will decline with each successive year. With the new LEV III ORVR requirements, ARB expects the ORVR penetration will plateau in 2028. In 2028 and beyond approximately 98 percent of the gasoline would be dispensed into non-ORVR vehicles. Despite this high level of ORVR penetration, we estimate that about nine tons per day emission increase would occur if all EVR Phase II requirements were eliminated in year 2028 and beyond. However, Figure 2 shows that if the drip, spill, liquid retention and hose permeation and pressure management standards were maintained the emissions increase

Figure 3

Refueling Emissions with Various Control Strategies (tons per day)



associated with eliminating Phase II in 2028 would be reduced to 4.3 tons per day. Dropping Phase II would require a new nozzle design to retain this emission reduction. Staff believes the drip, spill, liquid retention, and hose permeation standards will prove effective for the entire time period of this analysis.

Table 3

Long Term Emission Reductions for EVR

Year	Emissions Controlled by EVR Ph II, Pressure Management and Liquid Spill Drip and retention Standards (tons/day)
2014	30.7
2020	14.7
2028	8.8

Areas for further analysis

It will be necessary to retain the EVR Phase II controls in the foreseeable future given the continuing need for more emission reductions and the lack of options for hydrocarbon emission control at other sources.

ARB staff plans to work in cooperation with the local air quality management districts to identify ways that additional benefits and reductions in operating costs can be realized. One option to be considered would be to reduce the cost associated with periodic testing and ISD alarm response requirements included in district enforcement policies.

The State Airborne Toxic Control Measure that requires Phase II vapor recovery in ozone attainment areas to reduce the cancer risk from benzene exposure is another benefit of Phase II vapor recovery that must be considered. An updated analysis in light of changes in benzene content of fuel and the increasing fraction of ORVR-equipped vehicles will be done.

Summary

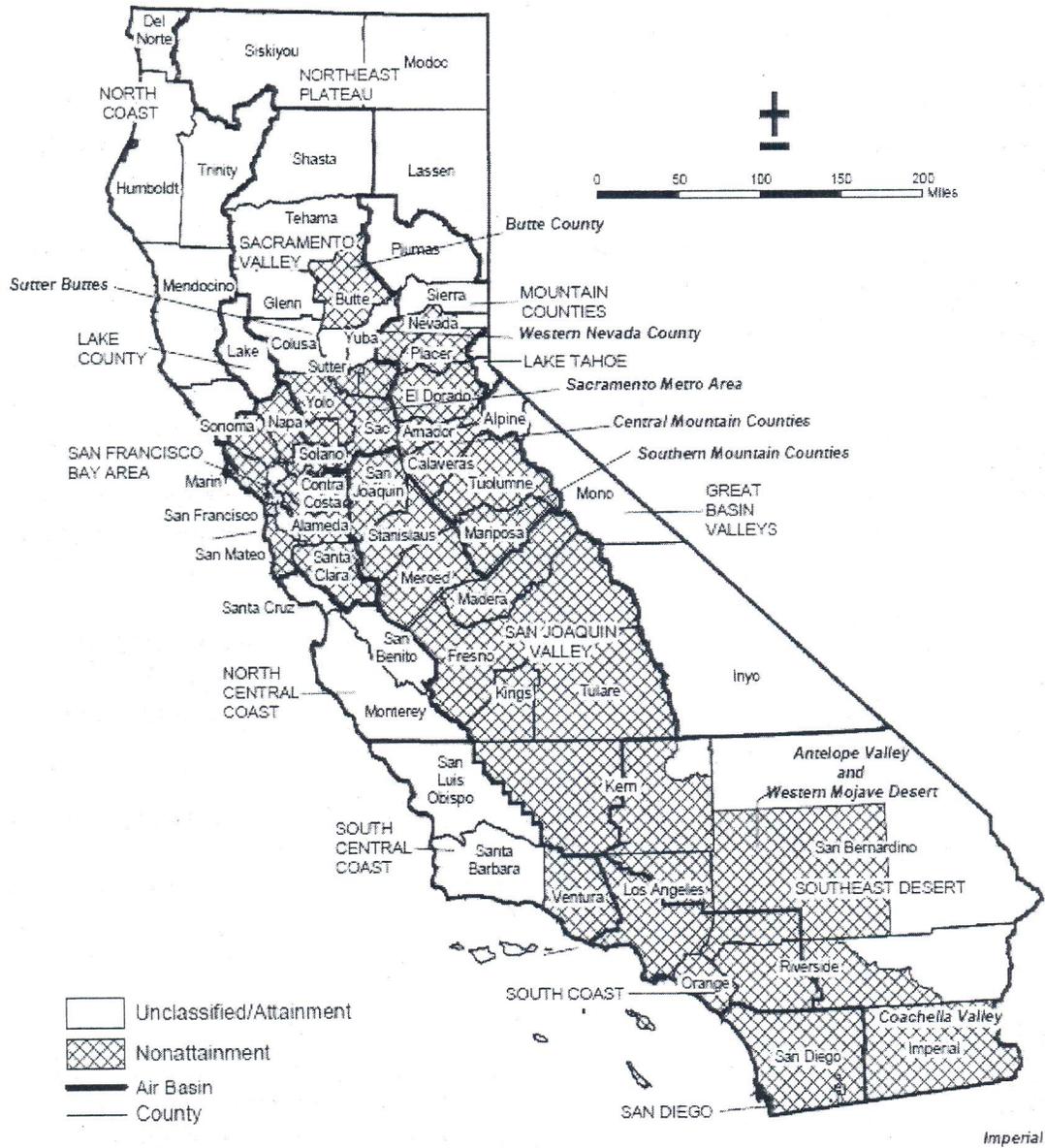
California has the most comprehensive vapor recovery program in the country. This program has been continually improved since its inception over 35 years ago. The ARB EVR Phase II program goes beyond controlling the vehicle transfer emissions, which is the sole focus of the federal Stage II requirements. In California, the vapor recovery program is ORVR compatible thus avoiding emissions associated with refueling an ORVR vehicle using a Phase II system. Dispensing equipment also reduces the frequency and amount of gasoline spillage.

Despite the declining benefits of Phase II as the number of refuelings of ORVR vehicles increases, significant and indispensable emission reductions from California's Phase II program will continue to be realized through the this and the following decades. These reductions are needed to meet

mandated federal ambient air quality standards, and staff is not aware of reductions from other sources that could be used to backfill the lost emission reductions if Phase II were eliminated as the EPA proposal would allow. Any newly identified sources of organic emissions will be needed to help move us closer to attainment of the federal ambient standard.

Attachments

Area Designations for National Ambient Air Quality Standards 8-HOUR OZONE



Source Date:
December 2009
Air Quality Data Branch, PTSD

2010 Area Designations for State Ambient Air Quality Standards OZONE



Source Date:
December 2009
Air Quality Data Branch, PTSD