PUBLIC MEETING AGENDA

October 28, 2004
9:00 a.m

04-9-1
Consideration of the San Joaquin Valley 1-Hour Ozone State Implementation Plan

04-9-2
Public Meeting to Review of Air Quality Legislation for 2004

04-9-3
Update to the Board on the Emission Control Technologies for Spark-Ignition Inboard Pleasure Craft

04-9-4
Update to the Board on Implementation of the ATCM to Limit School Bus Idling and Idling at Schools

04-9-5
Interim Update to the Board on the Heavy-Duty Diesel Engine Voluntary Software Upgrade (Chip Reflash) Program

Includes AcrobatTM ReaderTM

PC and Mac Compatible

ELECTRONIC BOARD BOOK

California Environmental Protection Agency

Air Resources Board

PUBLIC MEETING AGENDA

MEETING LOCATION (In-Person)

San Joaquin Valley Unified Air Pollution Control District
1990 East Gettysburg Avenue, Fresno, California

or VIA VIDEOCONFERENCE (2 Locations)

District Northern Region Office
4230 Kiernan Avenue, Suite 130
Modesto, California

District Southern Region Office
2700 M Street, Suite 275
Bakersfield, California

This facility is accessible by public transit. For transit information, call: (559) 621-1393, website faxtransit@fresno.gov (This facility is accessible to persons with disabilities.)

October 28, 2004
9:00a.m.

04-9-1 Consideration of the San Joaquin Valley I-Hour Ozone State Implementation Plan

The Board will consider the San Joaquin Valley l-Hour Ozone State Implementation Plan (SIP). This SIP provides for attainment of the federal l-hour ozone standard by 2010 as required for Extreme nonattainment areas under the Federal Clean Air Act.

04-9-2 Public Meeting to Review of Air Quality Legislation for 2004

Staff will present a review of air quality legislation considered during the 2004 legislative session, including legislation that was enacted and will take effect January 1, 2005.

04-9-3 Update to the Board on the Emission Control Technologies for Spark-Ignition Inboard Pleasure Craft

Staff will present the Board with an assessment of the current emission control technologies for spark-ignition inboard and sterndrive marine engines. As directed in the Resolution for the 2001 rulemaking, staff contracted the Southwest Research Institute to conduct an "on-water" study to demonstrate the safeness and durability of emission control technologies in the marine environment, most notably, catalysts. This presentation will report the findings of the study, as well as other issues that have arisen since the 2001 rulemaking, such as EPA rulemaking activity and *carbon monoxide emissions from marine engines.*

TO SUBMIT WRITTEN COMMENTS ON AN AGENDA ITEM IN ADVANCE OF THE MEETING:

CONTACT THE CLERK OF THE BOARD, 1001 I Street, 23rd Floor, Sacramento, CA 95814 **(918)** 322-5594
FAX: (918) 322-3928
ARB Homepage: www.arb.ca.gov

To request special accommodation or language needs, please contact the following:

- TTY/TDD/Speech-to-Speech users may dial 7-l-l for the California Relay Service.
- Assistance for Disability-related accommodations, please go to http://www.arb.ca.gov/html/ada/ada.htm or contact the Air Resources Board ADA Coordinator, at (916) 323-4916.
- Assistance in a language other than English, please go to http://inside.arb.ca.gov/as/eeo/languageaccess.htm or contact the Air Resources Board Bilingual Coordinator, at (916) 324-5049.

SMOKING IS NOT PERMITTED AT MEETINGS OF **THE CALIFORNIA AIR RESOURCES BOARD**

04-9-4 Update to the Board on implementation of the ATCM to Limit School Bus Idling and Idling at Schools

This will be an informational update to the Board on implementation, enforcement, and outreach activities on the ATCM to Limit School Bus Idling and Idling at *Schools approved by the* **Board** *on December 12, 2002.*

04-s-5 **Interim Update to the Board on the Heavy-Duty Diesel Engine Voluntary Software Upgrade (Chip Reflash) Program**

The Board approved the Voluntary Program in March 2004 with the understanding that the adopted regulation would be filed in December 2004 if 35 percent of the reflashable fleet in California did not get the software upgrade installed *by October 28, 2004. Preliminary results have been reported and staff would like to share those with the board in preparation for the December board meeting.*

OPEN SESSION TO PROVIDE AN OPPORTUNITY FOR MEMBERS OF THE PUBLIC TO ADDRESS THE BOARD ON SUBJECT MATTERS WITHIN THE JURISDICTION OF THE BOARD.

Although no formal Board action may be taken, the Board is allowing an opportunity to interested members of the public to address the Board on items of interest that are within the Board's jurisdiction, but that do not specifically appear on the agenda. Each person will be allowed a maximum of five minutes to ensure that everyone has a chance to speak.

THE AGENDA ITEMS LISTED ABOVE MAY BE CONSIDERED IN A DIFFERENT ORDER AT THE BOARD MEETING.

California Environmental Protection Agency

Air Resources Board

PUBLIC MEETING AGENDA

INDEX

MEETING LOCATION (In-Person)

San Joaquin Valley Unified Air Pollution Control District
1990 East Gettysburg Avenue, Fresno, California

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This facility is accessible by public transit. For transit information, call: (559) 621-1393, website faxtransit@fresno.gov (This facility is accessible to persons with disabilities.)

October 28.2004
9:00 a.m.

TO SUBMIT WRITTEN COMMENTS ON AN AGENDA ITEM IN ADVANCE OF THE MEETING:

CONTACT THE CLERK OF THE BOARD, 1001 I Street, 23" Floor, Sacramento, CA 95814 **(916) 322-5594**
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- Assistance in a language other than English, please go to http://inside.arb.ca.gov/as/eeo/languageaccess.htm or contact the Air Resources Board Bilingual Coordinator, at (916) 324-5049.

SMOKING IS NOT PERMITTED AT MEETINGS OF THE CALIFORNIA AIR RESOURCES BOARD

State of California
AIR RESOURCES BOARD

NOTICE OF PUBLIC MEETING TO CONSIDER APPROVAL OF A REVISION TO THE OZONE STATE IMPLEMENTATION PLAN FOR THE SAN JOAQUIN VALLEY

The California Air Resources Board (Board or ARB) will conduct a public meeting at the time and place noted below to consider a revision to the State Implementation Plan (SIP) for ozone for the San Joaquin Valley. The San Joaquin Valley Unified Air Pollution Control District (District) Governing Board is scheduled to conduct a public hearing and consider local adoption of this plan on October 8, 2004. The ARB meeting described in this notice will be held only if the District Governing Board adopts the SIP prior to October 28, 2004. ARB will consider the final plan as adopted by the District Governing Board, including any changes made to the proposal in response to public comments. If approved by the Board, ARB will submit the plan to the U.S. Environmental Protection Agency as a revision to the California SIP.

DATE: October 28, 2004

TIME: 9:00 a.m.

PLACE: **In-Person**
San Joaquin Valley Unified
Air Pollution Control District
1990 East Gettysburg Avenue
Fresno. California

Via Videoconference

District Northern Region Office	District Southern Region Office
4230 Kiernan Avenue, Suite 130	2700 M Street, Suite 275
Modesto, California	Bakersfield, California

The Board will also consider other items at this meeting. Please consult the agenda for the meeting, which will be available at least 10 days before October 28.2004, to determine the order in which the items will be considered by the Board.

If you have a disability-related accommodation need, please go to http://www.arb.ca.gov/html/ada/ada.htm for assistance or contact the ADA Coordinator at (916) 323-4916. If you are a person who needs assistance in a language other than English, please contact the Bilingual Coordinator at (916) 324-5049. TTY/TDD/Speech-to-Speech users may dial 7-l-l for the California Relay Service.

The federal Clean Air Act sets forth plan provisions, plan submission schedules, and attainment deadlines for areas that violate the l-hour National Ambient Air Quality Standard for Ozone. The San Joaquin Valley is currently classified as an extreme ozone nonattainment area, with a November 15, 2010 attainment deadline. As a result,

the State must submit a SIP revision by November 16, 2004 that includes demonstrations of attainment and interim emission reduction progress, together with the control strategy to reach those targets.

The District staff released a proposed SIP to satisfy the extreme area planning requirements on September 10, 2004. The proposed SIP includes: air quality data; an emission inventory for 1990 – 2010; air quality modeling to determine the attainment emission target; a control strategy reflecting the benefits of adopted local, State, and federal regulations, together with local and State commitments for additional emission reductions from new measures; a demonstration of attainment by 2010; a rate-of-progress demonstration through 2010; new motor.vehicle emission budgets for transportation conformity; and contingency emission reductions.

The plan shows that the Valley needs to reduce emissions of volatile organic compounds (VOC) and nitrogen oxides (NOx) by a combined 342 tons per day (tpd) between the 2000 starting point and the 2010 attainment date. Of these total reductions, 238 tons (70 percent) come from measures already adopted as of 2002, 46 tons (13 percent) come from commitments for new State and local measures already approved by U.S. EPA as part of the 2003 Particulate Matter SIP, 48 tons (14 percent) come from new commitments for State and local measures, and the final 10 tons (3 percent) come from a new District commitment for long-term measures. In this plan, the District introduces commitments for 12 new control measures to achieve 23 tpd – the most significant measure would reduce VOC emissions from large concentrated animal feeding operations by over 15 tpd. Based on the 2003 State and Federal Strategy for the California SIP approved by the Board last year, the State is increasing its commitment for new measures from the 10 tpd NOx in the PM10 SIP up to a total of 20 tpd NOx and 15 tpd VOC in the San Joaquin Valley by 2010.

ARB staffs evaluation of the plan is detailed in a report that will be available on ARB's website at http://www.arb.ca.gov/planning/sip/sip.htm on September 28, 2004. In addition, written copies may be obtained from the Board's Public Information Office, 1001 I Street, 1st Floor, Environmental Services Center, Sacramento, California 95814, **(916) 322-2990.**

ARB staff will make an oral presentation and present recommendations to the Board at the meeting. Interested members of the public may also present comments orally or in writing at the meeting, and in writing or by e-mail before the meeting. To be considered by the Board, written comments submissions not physically submitted at the meeting must be received **no later than 12:00 noon, October 27, 2004,** and addressed to the following:

Postal mail is to be sent to:

Clerk of the Board
Air Resources Board
1001 "I" Street, 23rd Floor
Sacramento, California 95814

Electronic mail is to be sent to sjvsip04@listserv.arb.ca.gov and received at the ARB **no later than 12:00 noon, October 27, 2004.**

Facsimile submissions are to be transmitted to the Clerk of the Board at (916) 322-3928 and received at the ARB **no later than 12:00 noon, October 27, 2004.**

The Board requests, but does not require 30 copies of any written submission. Also, the ARB requests that written and e-mail statements be filed at least 10 days prior to the meeting so that ARB staff and Board members have time to fully consider each comment. Further inquiries regarding this matter should be directed to Mr. Ravi Ramalingam at (916) 322-2085.

CALIFORNIA AIR RESOURCES BOARD

Catherine Wiierspoon
Executive Officer

Date: September 28, 2004

State of California
AIR RESOURCES BOARD

STAFF REPORT

PROPOSED 2004 STATE IMPLEMENTATION PLAN FOR OZONE IN THE SAN JOAQUIN VALLEY

Release Date: September 28.2004
Meeting Date: October 28, 2004

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
AIR RESOURCES BOARD

State of California
California Environmental Protection Agency
AIR RESOURCES BOARD

STAFF REPORT

PUBLIC MEETING TO CONSIDER APPROVAL OF THE PROPOSED 2004 STATE IMPLEMENTATION PLAN FOR OZONE IN THE SAN JOAQUIN VALLEY

Air Resources Board Meeting
Begins October 28, 2004
9:00 a.m.
San Joaquin Valley Unified Air Pollution Control District
1990 E. Gettysburg Avenue
Fresno, California

Meeting notice available at http://www.arb.ca.gov/regact/sjvsipnotice.htm

Prior to the meeting, the public may submit written comments through regular mail, e-mail or fax. To be considered by the Board, written comments not physically submitted at the meeting must be received **no later than 12:00 noon, October 27, 2004** and sent to:

Clerk of the Board
Air Resources Board
1001 I Street, 23rd Floor
Sacramento, California 95814

or by e-mail to sjvsip04@listserve.arb.ca.gov

or by facsimile transmission to the Clerk of the Board at (916) 322-3928

This report has been reviewed by the staff of the Air Resources Board and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Air Resources Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

This report is available for downloading from the Air Resources Board's Internet site at http://www.arb.ca.gov/planning/sip/sip.htm. In addition, written copies may be obtained from the Board's Public Information Office, 1001 I Street, 1st Floor, Environmental Services Center, Sacramento, California 95814, (916) 322-2990.

If you are a person with a disabilii and desire to obtain this document in an alternative format, please contact the Americans with Disabilities Act Coordinator at (916) 3234916, or TDD (916) 324-9531, or (800) 7008326 for TDD calls from outside the Sacramento area.

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Air Quality Data
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ACKNOWLEDGEMENTS

ARB staff thanks the San Joaquin Valley District staff for the high level of coordination between the agencies in developing the technical elements of this plan. We would like to recognize Mr. Dave Jones, Mr. Dave Mitchell, Mr. Scott Nester, Dr. Don Hunsaker, Mr. George Heinen, Mr. Evan Shipp, Ms. Jennifer Barba, Ms. Cynthia Echavania, Mr. David Nunes, Ms. Elena Nuño, Mr. Steve Shaw, Mr. Jim Sweet, and Mr. Tom Jordan, who each dedicated many hours to this interagency cooperation.

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EXECUTIVE SUMMARY

The San Joaquin Valley Unified Air Pollution Control District (District) released the 2004 State Implementation Plan (SIP) for Ozone in the San Joaquin Valley on September 10, 2004 and will consider local adoption at a hearing scheduled for October 8, 2004. Contingent on prior adoption by the District, the Air Resources Board (ARB or Board) will consider approval of the 2004 Ozone SIP at a public meeting on October 28.2004. Ifthe Board adopts the plan, it will be submitted to the U.S. Environmental Protection Agency (U.S. EPA) for federal approval.

This new plan identifies the clean air strategies needed to bring the Valley into attainment with the federal l-hour ozone standard by 2010. It builds on already adopted controls and the strategies in the Valley's 2003 SIP for inhalable particulate matter (PM10), then adds new Ozone SIP commitments that provide the last increment of reductions to meet the l-hour standard.

Air Quality, Emissions, and Growth. The San Joaquin Valley experiences some of the worst ozone and particulate air pollution in the U.S., with both high levels and frequent episodes. Since 1980, pollution controls have cut ozone-forming emissions by nearly 60 percent, even with growth in population, vehicle travel, and the economy. The emission controls have improved the long-term air quality trends, decreasing the number of days over the federal l-hour ozone standard and the geographic scope of the problem. Based on U.S. EPA's more protective 8-hour ozone standard, Valley residents still breathe unhealthy levels of ozone about a third of the year.

Attainment Deadline. This plan focuses on achieving the federal l-hour ozone standard by the 2010 deadline established by the federal Clean Air Act for nonattainment areaswith a classification of extreme. The 2010 date is the second extension of the San Joaquin Valleys deadline, with each change triggering a new round of air quality planning and control strategy development. The Valley was originally classified as a serious federal ozone nonattainment area with a 1999 deadline, then as a severe area with a 2005 deadline. The District formally requested and was granted a voluntary reclassification (or "bump up") from severe to extreme, requiring tighter emission controls and attainment by 2010. Although U.S. EPA intends to revoke the l-hour standard in 2005 (and replace it wlth the 8-hour standard), this plan is necessary to satisfy a legal requirement in U.S. EPA's transition policy for areas like the Valley that don't have an approved l-hour ozone attainment plan.

SIP Elements. The Proposed SIP includes: air quality data; an emission inventory for 1990 – 2010; air quality modeling to determine the attainment emissions target; a control strategy reflecting the benefits of adopted local, State, and federal regulations, together with local and State commitments for additional emission reductions from new measures; a demonstration of attainment by 2010; a rate-of-progress demonstration through 2010; new motor vehicle emission budgets for transportation conformity; and contingency emission reductions.

14.

Improved *Scientific* Tools. The tools and data used in the 2004 Ozone SIP represent the state-of–the-science and a significant step forward in our collective ability to understand the level of emission controls needed to the meet the ozone standards in the Valley. This information and capability is a direct result of the work done under the Central California Ozone Study, a public-private $18 million program of meteorological and air qualii monitoring, emission inventory development, data analysis, and air quality simulation modeling.

Control ***Strategy***. The plan shows that the Valley needs to reduce ozone-forming emissions of volatile organic compounds (VOC) and nitrogen oxides (NOx) by a combined 342 tons per day (tpd) between the 2000 starting point and the 2010 attainment date. Table ES-l shows that 70 percent, or 238 tpd, of the needed 342 tpd reductions come from control measures already adopted and on track for implementation. The next 13 percent of the reductions are from new measures identified in the adopted 2003 Valley PM10 SIP. This plan introduces additional commitments to achieve the last 17 percent of the reductions needed.

Table ES-I
Summary of Attainment Strategy for 2004 Ozone SIP
(San Joaquin Valley, Summer Planning, in tons per day)

	VOC + NOx	Percent of Total Reductions
2000 Baseline Emissions	1000	
Total Reductions Needed for Attainment	-342	
2010 Attainment Emissions Target	658	
Emission Reductions		
Measures Adopted as of September 2002	-238	70%
New Measures in 2003 Valley PM10 SIP	-46	13%
New Defined Measures in Ozone SIP	-48	14%
New Long-Term Measures in Ozone SIP	-10	3%
T tal Reductions Achieved bv Ozone SIP	-342	

In this plan, the District introduces Ozone SIP commitments for 12 new defined measures to achieve 23 tpd of reductions -- the most significant new measure would reduce VOC emissions from large concentrated animal feeding operations by over 15 tpd. This plan takes full credit for the VOC and NOx reductions in the 2003 State and Federal Strategy for the California SIP approved by the Board last year. The PM10 SIP included 10 tpd of NOx reductions from new State measures. To provide the additional reductions needed for ozone attainment, this plan increases the State's commitment to a total of 20 tpd NOx and 15 tpd VOC reductions in the San Joaquin Valley by 2010.

Table ES-2 provides a detailed breakdown of the attainment strategy by local, State, and federal Jurisdiction.

Table ES-2
Summary of Attainment Strategy by Jurisdiction
(San Joaquin Valley, Summer Planning, in tons per day)

	VOC	NOx	Percent of VOC+NOx by Jurisdiction
2002 Baseline Emissions			
State	209.7	249.4	46%
Local	203.9	161.4	36%
Federal	29.9	146.0	18%
Total	443.5	556.8	
2000-2010 Reductions from Measures Adopted (as of September 2002)			
State	-79.3	-97.2	74%
Local'	+8.5	-18.9	4%
Federal	-7.6	-43.9	22%
Total	-78.4	-160.0	
2010 Baseline Emissions with Adopted Measures			
State	130.4	152.2	37%
Local	212.4	142.5	47%
Federal	22.3	102.1	16%
Total	365.1	396.8	
2010 Reductions from Defined New Measures			
State	-15.0	-20.0	37%
Local	-30.7	-28.3	63%
Federal	0	0	0%
Total	-45.7	-48.3	
2010 Reductions from Long-Term Measures			
Local	-5.0	-5.0	100%
2010 Total Reductions from Ail Measures			
State	-94.3	-117.2	62%
Local	-27.2	-52.2	23%
Federal	-7.6	-43.9	15%
Total	-129. I	-213.3	
2010 Attainment Emissions Target	314.4	343.5	

[1] **Baseline District measures reduce NOx by nearly 19 tpd between 2000 and 2010,** but allow a net increase of just over 8 tpd in VOC emissions due to projected growth (mainly from livestock operations) over the same timeframe. The District's full rulemaking agenda over the next several years will ensure net reductions in both pollutants in the future.

Federal ***8-Hour*** *Ozone Standard.* U.S. EPA has begun to implement a more stringent 8-hour ozone standard that will replace the current l-hour standard. In addition to providing the last increment of reductions for the l-hour standard, the 2004 Ozone SIP lays the groundwork for the 8-hour plan and attainment strategy due June 15, 2007.

District Clarification to Proposed Plan. District staff indicates it will make technical corrections to the plan at or prior to the October 8, 2004 local hearing. These changes include:

- Clarification of the District's commitment to achieve the aggregate local emission reductions from the defined new measures or from alternative measures in the same timeframe.
- Clarification of the District's intent to adopt the long-term measures.
- Clarification that the District will use the SIP update mechanism for changes to the rule development schedule.
- An update to the rate-of-progress calculations demonstrating the required emission reduction progress based on adopted measures.
- Corrections to the emission inventory and other minor revisions.

Staff Recommendation. The Proposed SIP, with the technical corrections characterized above, satisfies applicable requirements and will reduce ozone levels throughout the San Joaquin Valley to benefit public health. We recommend that the Air Resources Board adopt the 2004 San Joaquin Valley Ozone SIP and direct the Executive Officer to submit the plan to U.S. EPA as a revision to the California SIP.

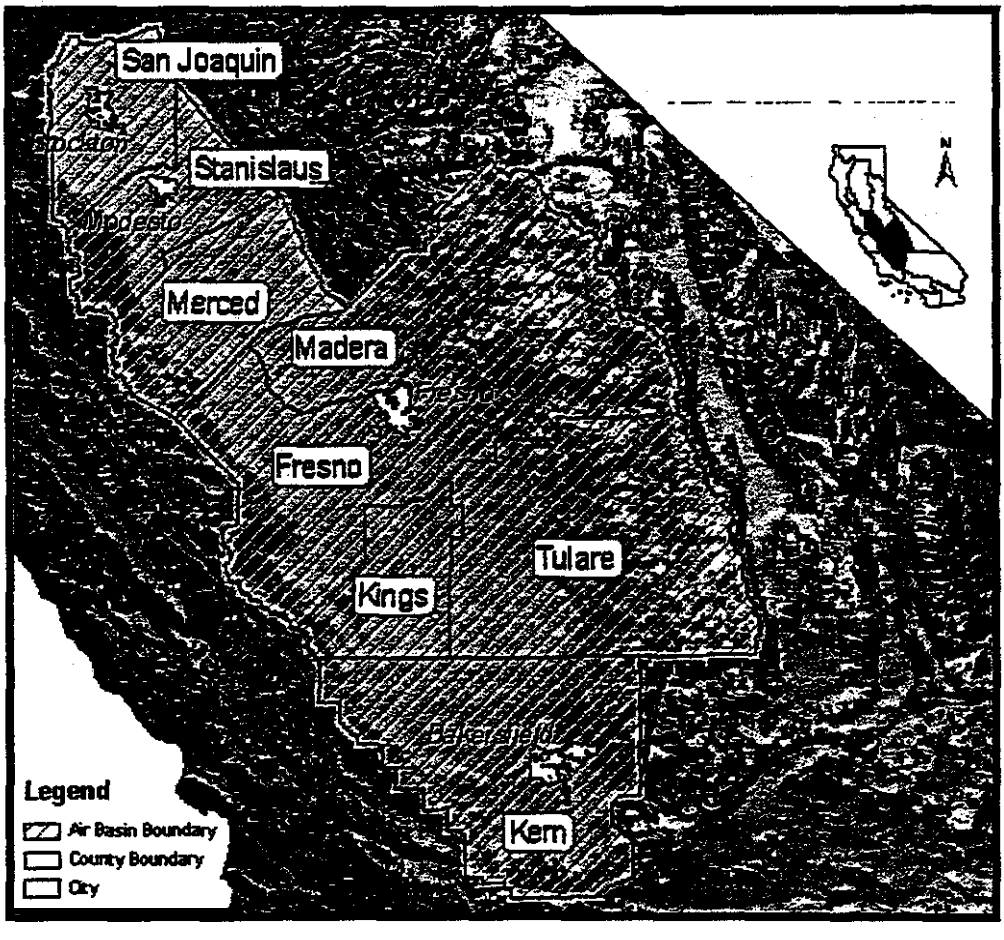
I. BACKGROUND

This chapter provides an overview of topography, meteorology, and ozone air quality in the San Joaquin Valley. It also briefly describes some of the air quality research used to develop the Valleys 2004 Ozone SIP.

A. Profile of the San Joaquin Valley

The San Joaquin Valley Air Basin covers San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Western Kern Counties. The San Joaquin Valley comprises nearly 25,000 square miles and covers approximately 16 percent of the geographic area of California. It is a continuous valley approximately 250 miles long and averaging 80 miles wide. Mountains bound the area on the west (Coastal Mountain range), the east (Sierra Nevada range), and the south (Tehachapi Mountains). The San Joaquin Valley has over 3.4 million residents today, with 4 million expected by 2010. The major urban centers are Bakersfield, Fresno, Modesto, and Stockton. The San Joaquin Valley Unified Air Pollution Control District is the focal air quality agency responsible for the air basin. Figure I-l shows the San Joaquin Valley Air Basin.

Figure I-l
San Joaquin Valley

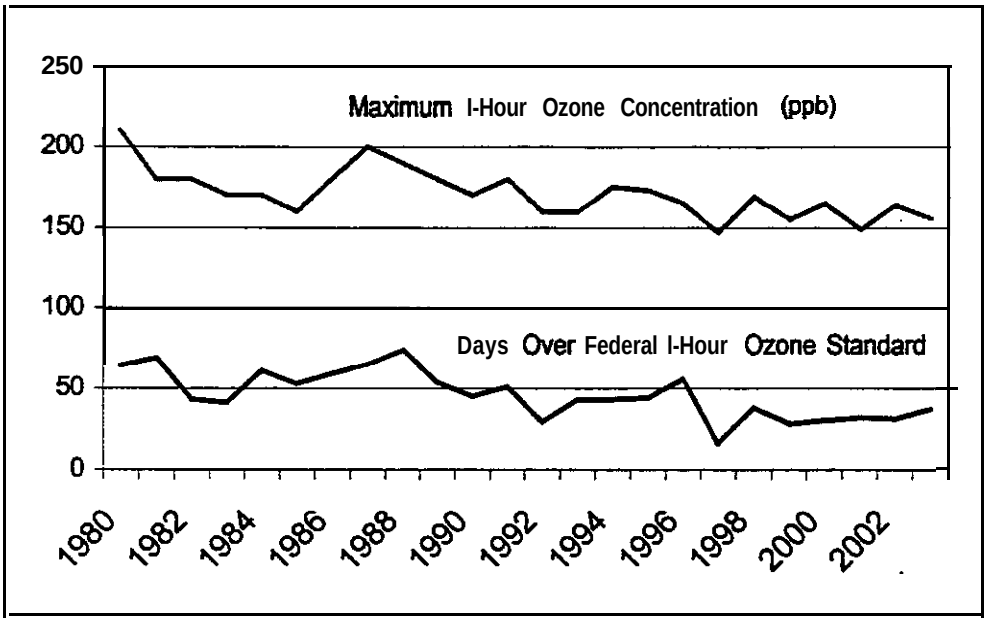


B. Hist rical Air Quality

Due to a combination of meteorology and air pollutant emissions, the San Joaquin Valley experiences many days where ozone levels are greater than the federal l-hour ozone standard. The areas experiencing the greatest number of violations of that standard are southeast and downwind of Fresno and Bakersfield. Ozone peaks generally occur during July through October, with daily maximum concentrations between noon and 6:00 p.m.

The long-term trend in San Joaquin Valley ozone air quality, as measured by the maximum l-hour ozone concentration in parts per billion (ppb) and the number of days over the federal l-hour ozone standard, is shown in Figure l-2. As the figure shows, ozone air quality is improving in the Valley over the long-term. Despite fluctuations due to differences in weather each year, the Valley has experienced a gradual decline in both the highest recorded concentrations of ozone, and the number of days on which the federal l-hour standard is exceeded.

Figure l-2
Maximum 1 -Hour Ozone Concentration and
Days Over Federal l-Hour Ozone Standard in the San Joaquin Valley

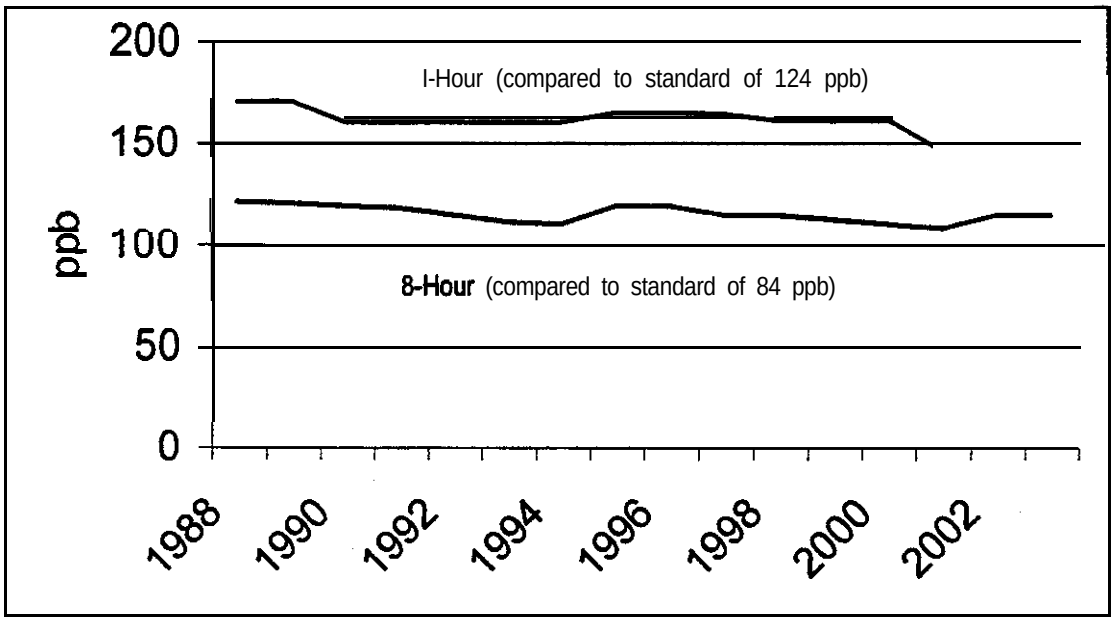


'Atthough the emission reduction progress has been steady, the annual variation in ozone air quality is strongly influenced by differences in weather conditions. Years having more days with severe weather conditions that are conducive to ozone formation (such as 1988.1996 and 1998) have more days that exceed the standards and higher peak concentrations. These severe weather wndiins include hot temperatures, strong inversion layers, and calm conditions. Summers with milder weather conditions (1997, 2004) have better air quality. Preliminary data indicates fewer than 10 federal l-hour exceedances for the Valley to date in Summer 2004.

The northern region of the Valley – San Joaquin, Stanislaus and Merced Counties-has the cleanest air. The Valley's peak concentrations have occurred (and continue to occur) at sites in either Fresno or Kern Counties. On average, Fresno and Kern Counties each have historically recorded at least twice as many days above the national 1 -hour standard as any of the remaining counties in the Valley.

Figure I-3 shows the Valleys federal l-hour design value (the required statistical indicator used to compare to the federal standard). It has improved only slightly over the last 15 years. The San Joaquin Valley also exceeds U.S. EPA's new 8-hour ozone standard. The Valley trends for 8-hour and l-hour ozone are similar.

Figure I-3"
i-Hour and O-Hour Design Value Trends
San Joaquin Valley
1988-2003



Other indicators of how severe and widespread the ozone problem is in the Valley show appreciable progress over time.

- The number of days over the federal l-hour standard is dropping for nearly all sites.
- In Kern County, the number of the very worst days (days with ozone over 0.15 ppm) has dropped by about 75 percent, and the number of days with federal l-hour exceedances by more than 50 percent, over the last 15 years.
- The geographic extent of ozone levels above the federal l-hour standard is also shrinking over time, meaning that fewer communities are exposed to these unhealthful levels. The Valleys northern region has not registered any exceedances since Summer 2002. Air quality modeling for l-hour and 8-hour ozone shows both reduced ozone levels and fewer areas exposed to high ozone over time.

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C. Central California Ozone Study

The San Joaquin Valley's last attainment demonstration for the federal l-hour ozone standard as part of the 1994 Ozone SIP was based on modeling from an ozone episode that occurred during the 1990 San Joaquin Valley Air Quality Study.

A decade later, air quality experts conducted the next generation study, called the Central California Ozone Study (CCOS). CCOS is a public-private $18 million, multi-year program of meteorological and air quality monitoring, emission inventory development, data analysis, and air quality simulation modeling. CCOS was designed to advance the state-of-the-science and provide modeling capability for all of California north of the Tehachapi Mountains. The CCOS study domain is large, extending from out over the Pacific Ocean to Nevada and from south of the Tehachapies to north of the Oregon border.

Data collected in CCOS, especially for the July-August 2000 intensive ozone episode, provides the basis for the air quality modeling and attainment demonstration in the Valley's 2004 Ozone SIP.

II. AIR QUALITY PLANNING

This chapter describes recent and future San Joaquin Valley plans and reviews the relevant planning provisions in the federal Clean Air Act (Act).

A. Ozone Planning Background

The federal Clean Air Act classifies nonattainment areas and sets out specific planning and control requirements based on the severity of each area's air qualii. Each of the nonattainment classifications-marginal, moderate, serious, severe, or extreme—is linked to a fixed deadline to attain the federal air quality standard. In 1990; the San Joaquin Valley was designated as nonattainment with a serious classification, which carried an automatic attainment date of 1999.

The San Joaquin Valley did not attain the l-hour ozone standard in 1999. U.S. EPA found that the area failed to attain by the deadline and reclassified the Valley as a severe ozone nonattainment area on November 8, 2001. (At the same time, U.S. EPA established eastern Kern County, which had been part of the San Joaquin Valley nonattainment area, as its own nonattainment area.) Wiih the reclassification, U.S. EPA set a deadline of May 15, 2002 for the District to submit a severe area plan.

In response to the reclassification, the District adopted a 2002 and 2005 Rate of Progress (ROP) Plan in May 2002. The District later amended this plan in December of the same year to reflect the latest motor vehicle emission estimates projected by EMFAC2002. These plans satisfied all planning requirements for a severe nonattainment area, except for a demonstration of attainment by the 2005 deadline.

Preliminary analysis at that time indicated that to attain the federal standard, the Valley needed to reduce ozone precursor emissions by approximately 30 percent (roughly 300 tons per day) from expected 2005,emission levels. Recognizing the inability to identify sufficient emission reductions from control measures to bring the Valley into attainment by 2005, the District Board voted on December 18, 2003 to request voluntary reclassification to extreme with an associated 2010 attainment deadline. ARB forwarded this request'to U.S. EPA. On April 16, 2004, U.S. EPA published a final notice in the Federal Register reclassifying the Valley to extreme effective May 17, 2004 and established the following requirements:

Due November 15.2004

- Demonstrate attainment* of the l-hour ozone standard attainment by 2010;
- Demonstrate reasonable progress* in reducing emissions for years 2008 and 2010;
- Use clean fuels (like natural gas) for boilers as required under section 182(e)(3); and
- Identify contingency measures for progress and attainment.

* These plans also need to establish motor vehicle emission budgets for transportation conformity in 2008 and 2010.

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Due Mav 76.2005

- Decrease the emission level that defines a major stationary source from 25 down to 10 tons per year;
- Apply reasonably available control technology (RACT) rules to facilities subject to the new lower major source cutoff; and
- Establish a more stringent New Source Review (NSR) requirement to offset emissions from new or modified major stationary sources – increase the current offset ratio of 1.3 tons of reductions for every ton of increased emissions up to a ratio of 1.5 to 1.

B. 2003 PM10 Plan

To fulfill its obligations as a serious PM10 nonattainment area, the San Joaquin Valley adopted a new PM1 0 Plan on June 19, 2003. This plan includes 245 tons per day of reductions in direct PM10 and PM10 precursor emissions (notably NOx) between 1999 and 2010 from a combination of the existing control programs and new commitments, and demonstrates attainment by 2010. U.S. EPA published its final approval of the Valleys 2003 PM10 Plan in the Federal Register on May 26, 2004.

The 2003 PM10 Plan included new State commitments for measures and emission reductions based on a subset of the *Proposed 2003* State and *Federal Strategy for the California State Implementation Plan,* as revised by ARB Resolution 03-14.

In adopting the 2003 PM10 Plan, the District committed to reassess the attainment demonstration and update the Plan by March 31.2006, based on final results from the California Regional Particulate Matter Air Quality Study. This. review will include an evaluation of the modeling and the latest technical information to determine whether the level of emission reductions in the 2003 PM1 0 Plan is sufficient to attain the PM1 0 standards. If this mid-course review shows a need for control strategy changes, the Plan revision will include the appropriate measures.

C. 8-Hour Ozone Planning Requirements

On April 15, 2004, U.S. EPA finalized both designations and the first phase of its rule defining requirements for the 8-hour ozone standard. The San Joaquin Valley, as anticipated, is nonattainment for the federal 8-hour standard. Classified serious, the Valley has until 2013 to attain the 8-hour standard.

The Valley will need significant further emission reductions to achieve this more health-protective federal standard. The strategies contained in this l-hour ozone plan will serve as a down payment on the reductions needed to attain the 8-hour standard.

D. PM2.5 Planning Requirements

U.S. EPA plans to finaliie designations for PM2.5 (particulate matter of diameter 2.5 microns and less) in December 2004. Based on its air quality data, we expect the Valley to be designated nonattainment for both the 24-hour and the annual PM2.5 standards. The Valleys PM2.5 attainment demonstration plan is due to U.S. EPA in early 2008.

The Valley will need significant additional NOx (a precursor to PM2.5) reductions for PM2.5 attainment. Therefore, the strategies for l-hour ozone, 8-hour ozone, and PM10 are complementary.

E. California Clean Air Act Plans

The California Clean Air Act (CCAA) requires districts that violate the State l-hour ozone standard to demonstrate every three years that they are making steady progress towards attainment through a five percent annual reduction in ozone precursors, or implementation of all feasible measures. Thus far, all districts, including the San Joaquin Valley, have relied on the all feasible measures option to show progress. Districts like the San Joaquin Valley that send "overwhelming" pollutant transport to other regions are also required to mitigate their transport contribution.

The District's 2004 Ozone SIP includes elements to address both federal and State ozone planning requirements. This evaluation covers only the federal element; we will assess the CCAA element in a separate, subsequent analysis of all districts' triennial plans.

III. PLAN EVALUATION

This chapter reviews the contents of the Proposed San Joaquin Valley I-Hour Ozone SIP and provides ARB staffs evaluation of each significant element.

A. Emission Inventory

California's emission inventory is an estimate of the amounts and types of pollutants emitted from thousands of industrial and commercial facilities, millions of mobile sources, and hundreds of millions of applications of other products such as paint and consumer products. The development and maintenance of the inventory is a multi-agency effort involving ARB, 35 local air pollution control and air quality management districts (districts), metropolitan planning organizations (MPOs), councils of governments (COGs), and the California Department of Transportation (Caltrans). ARB staff compiles the final, statewide emission inventory and maintains this information in a complex electronic database. An inventory reflects the best information available about the emission rate and activity (including projected growth) for each category of sources.

The San Joaquin Valley I-Hour Ozone SIP utilizes the latest estimates of VOC and NOx for stationary, area-wide, and on-road and off-road mobile sources. These are consistent with emission estimates reflected in the Valleys 2003 PM10 SIP.

The emission analyses in the SIP focus on the years 2000 (the starting point for the air quality modeling analysis) and 2010 (the attainment date). For purposes of assessing emission reduction progress according to the milestones identified in the Act, the SIP also includes inventories for 1990 and 2008. VOC and NOx emissions are projected to decline by 24 percent between 2000 and 2010, on the strength of controls adopted as of 2002. This reflects a net 3 percent dedine in emissions from stationary and area-wide sources, a 44 percent decline in emissions from on-road motor vehicles, and a 32 percent decline in emissions from off-road vehicles and equipment. Table III-1 shows the breakdown of VOC and NOx emissions by broad source category in 2000 and 2010, with the benefit of adopted controls. Throughout this report, emissions and reductions are shown in tons per day (tpd), during the summer ozone season planning inventory, for the San Joaquin Valley Air Basin, unless otherwise noted.

We note that the ozone season planning inventory currently includes estimates for VOC, carbon monoxide, and PM1 0 emissions from range land and forest management prescribed fires. ARB and District staff are working to identify the seasonal NOx emissions for these activities. Since that work was not complete at the time the planning inventory was developed, this inventory does not include estimates of the NOx emissions from prescribed burning. Until the seasonal NOx estimates from prescribed burning are finalized and reflected in a subsequent SIP, evaluation of prescribed burning emissions against the SIP planning inventory should focus on VOC, carbon monoxide, and PM1 0. This approach does not impact the attainment demonstration because the day-specific emission inventory used for air quality modeling in this plan does include information on fire activity and the associated emissions.

Table III-1
Baseline Emissi n Trends with Measures Adopted as of September 2002
(San Joaquin Valley, Summer Planning, in tons per day)

	VOC			NOx			VOC + NOx		
Source Category	**2000**	**2010**	**% Change**	**2000**	**2010**	**% Change**	**2000**	**2010**	**% Change**
Stationary & Area-wide	258.9	265.7	+3%[1]	161.5	142.5	-12%	420.4	408.2	-3%
On-Road Motor Vehicles	115.3	57.0[2]	-51%	223.8	134.2[2]	-40%	339.1	191.2	-44%
Off-Road Vehicles and Equipment	69.2	42.4[3]	-39%	171.5	120.1[3]	-30%	240.7	162.5[3]	-32%
TOTAL	**443.5**	**365.1**	**-18%**	**556.8**	**396.8**	**-29%**	**1,000.3**	**761.9**	**-24%**

[1] This projected increase comes primarily from expected growth in livestock emissions before the benefits of the proposed control measure are applied.

[2] Reflects ARB staffs external adjustment for geographic expansion of the Smog Check II program (requested by the District in 2001 and implemented by BAR in 2002), which reduces VOC by 2.5 tpd and NOx by4.9 tpd in 2010. The District Plan refers to these reductions as new State commitments in 2010 associated with the 2003 PM10 Plan.

[3] Includes 1 .O tpd of VOC and 0.1 tpd NOx added to the baseline emission inventory to eliminate double counting for emission reductions from ARB's 2003 lawn and garden regulations, which are reflected in the State's new measures commitment.

B. Emission Reduction Credits

According to U.S. EPA and AR8 policy, emission reduction credits (ERC) banked before a plan's emission inventory baseyear must be explicitly treated as emissions in the air. In other words, the plan must account for ERC use. The District does this by including projected ERC use in the emission inventory growth factor. This plan's projections for ERC use and total growth in stationary source emissions between 2000 and 2010 are shown in Table III-2.

Table III-2
Projected ERC Use and Stationary Emissions Growth 2000-2010
(San Joaquin Valley, Annual Average, in tons per day)

Pollutant	ERC Use (tpd)	Total Growth (tpd)
NOx	12.1	15.8
voc	8.1	9.7

Projected ERC use is less than total growth for each pollutant. That is the minimum criteria, for the District's approach to work. However, projected ERC use is large and accounts for nearly all growth. Consequently, there is very little margin for nonpermitted stationary sources to grow. As we have commented in the past, the District will need to monitor both ERC use and growth in nonpermitted sources to ensure the sum of the two does not exceed total growth.

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C. Air Quality Modeling

The Act requires the use of air quality modeling to relate ozone levels to emissions in a region and simulate future air quality based on changes in emissions. Modeling uses day-specific emission inventories, with measurements of meteorology and air quality, to establish this relationship. The performance of the model is determined by comparing the modeled or predicted ozone value to the monitored or observed ozone level. As applied in this SIP, the end result of the modeling is to project the quantity of VOC and NOx emissions that the Valley can accommodate while attaining the standard (known as the attainment emissions target or carrying capacity).

The modeling process involves a number of decisions along the way. These choices include an ozone episode representative of days that exceed the standard and appropriate scientific tools (like the air qualii model, the meteorological model, and the atmospheric chemistry mechanism for ozone formation) that can best predict ozone levels. ARB and District staff made these decisions together, aided by input from agency, industry, and scientific peer reviewers.

The tools and data used in the modeling analysis for the 2004 Ozone SIP represent the state-of-the-science and a significant step forward in our collective ability to understand the level of emission controls needed to meet the ozone standards. The modeling results meet the performance criteria established by both U.S. EPA and ARB.

1. Ozone Episode

During Summer 2000, intensive measurements were made during two ozone episodes, which occurred from July 30-August 2, and from September 17-21. In addition, a "training episode" was captured on June 14-15. During the June episode, intensive meteorological measurements were made, although the extensive CCOS air quality monitoring system was not engaged.

The July/August 2000 episode was the only episode with exceedances in all three regions of the San Joaquin Valley. This episode was characterized by localized high ozone concentrations in the San Joaquin Valley, Bay Area, and Sacramento Region. Westerly breezes in the Sacramento River delta occurred on most afternoons along with mid-morning northwest flows in Sacramento.

2. Air Quality Model

ARB staff and modelers with the University of California at Riverside, together with District staff, conducted extensive model performance evaluations with two meteorological models, two air quality models, and two chemical mechanisms within the air quality models. Each of the air quality models -- the Comprehensive Air Quality Model with Extensions (CAMx), and U.S. EPA's Models 3 - Community Multiscale Air Quality (CMAQ) modeling -- met U.S. EPA model performance guidelines to varying

degrees on different episode days. Of the two air quality models, CAMx was best able to simulate the unpaired peak concentrations during the July/August 2000 episode.

The period July 30 -August 2, 2000 was simulated using the CAMx air quality model, alternatively with Carbon Bond IV and SAPRC99f chemical mechanisms. The meteorological models MM5 and the CALMET/MM5 hybrid were also used to provide inputs to CAMx. Overall model performance of CAMx using the CALMET/MM5 hybrid and SAPRC99f was superior to that resulting from MM5 alone.

The attainment demonstration in this SIP uses the CAMx model, with the CALMET/MM5 hybrid meteorological model, and the SAPRC99f chemical mechanism.

3. Modeling Performance

Four of the Valleys ozone monitors recorded l-hour exceedances during the July/August 2000 episode. Recorded values during the episode are shown in Table Ill-3 below, with exceedances in bold.

Table Ill-3
Peak Ozone Values at Exceeding Monitors
July/August 2000 Episode

Monitor	I-Hour Ozone Maximum Value, ppb			
	July 30	July 31	August 1	August 2
Modesto	84	94	99	**131**
Turlock	80	105	104	**131**
Parker	129	103	**105**	**97**
Edison	**128**	115	113	**151**

In selecting a day and location within the episode for the attainment demonstration, ARB and District staff focused on the central and southern regions of the Valley, as the Districts site with the highest design value (the design site) has historically fluctuated between monitors in Fresno and Kern Counties.

ARB and District staff chose July 30 to determine the reductions needed for attainment because that day had model performance that met acceptance criteria, had minimal fire impacts, had the best match with design values, and provided the most conservative estimates of further reductions needed for attainment. Table Ill-4 shows the relationship between monitored and modeled values at the two Valley sites with the highest measured ozone on July 30, the modeled 2010 ozone level using baseline inventories that reflect adopted controls, and the maximum ozone level expected in each surrounding county. The model may predict a peak ozone value at a location where there is no monitoring site for comparison.

Table III-4
Monitored and Modeled Peaks
July/August 2000 Episode

Location	Ozone Peak Values on Episode Days, ppb					
	July 30			August 2		
	2000 Monitor Value	2000 Modeled Value	2010 Modeled Value	2000 Monitor Value	2000 Modeled Value	2010 Modeled Value
Parlier, Fresno County						
Parlier Monitor	129	131	114	97	122	100
Fresno County Modeled Peak	-	144	128	-	137	119
Edison, Kern County						
Edison Monitor	128	128	115	151	136	119
Kern County Modeled Peak	-	149	136	-	140	121

4. Attainment Emission Target

The Valley's predicted 2010 peak ozone level based on already adopted controls is 136 ppb. To determine the level of emissions needed to bring this ozone value down to the standard of 124 ppb, the SIP relies on graphical diagrams (called isopleths). ARB staff produced these diagrams based on hundreds of model runs to assess the impact of small incremental changes to VOC emissions, NOx emissions, and VOC plus NOx emissions. The resulting chart shows how each of these incremental changes in VOC and/or NOx emissions is predicted to change ozone levels.

Starting with the 2010 baseline emissions, and using an equal percent reduction in VOC and NOx emissions, District staff determined that a 14.5 percent reduction in each pollutant would reduce the predicted peak ozone level to the federal standard. This corresponds to a 2010 attainment emissions target of 314.4 tpd VOC and 343.5 tpd NOx. Table III-5 summarizes the modeling results.

Based on the modeling, other combinations of VOC and NOx emission reductions could also reduce ozone levels to the federal standard. ARB staff believes that the equal percent reduction option chosen by the District is a scientifically valid and effective approach.

The control strategy identifies the measures that will be used to reach these emission targets and demonstrate attainment of the federal I-hour ozone standard.

Table III-5
Modeling Summary for 2004 San Joaquin Valley Ozone SIP

Episode	3-Year Design Value[1] (ppb)	Peak Concentration Observed in Episode (ppb)	Peak Concentration Simulated by Model in 2000[2] (ppb)	Peak Concentration Simulated by Model from 2010 Baseline Emissions[1] (ppb)	Attainment Emissions Target (tpd)	
					VOC	NOx
July 30-August 2 2000	161	151	149	136	314.4	343.5

[1] The design value reflects the fourth highest observed ozone level in an area over the three year period up to and including the year of the primary episode day. A design value of 124 ppb or less equals attainment.
[2] The peak observed and predicted concentrations do not necessarily occur at the same location.

5. Peer Review

Peer review of the modeling inputs, technical tools, and results occurred on several levels. There were inventory work groups with representatives from multiple air agencies, transportation agencies, and consultants. The experts on the CCOS Technical Committee reviewed and provided feedback on all aspects of the modeling. Overall, the Technical Committee concurred that the technical approach for the air quality modeling used by ARB and District staff was reasonable. The modeling analysis was circulated in both draft and proposed form for public review and comment.

D. Control Strategy

The Proposed 2004 Ozone SIP includes a control strategy to attain the federal l-hour ozone standard based on reductions from existing regulations as well as additional reductions from enforceable commitments to adopt new control measures and clean engine incentive programs. The District has lead responsibility for adopting and implementing most stationary and area source controls; the transportation planning agencies for vehicle activity-related strategies; ARB for most mobile sources, fuels, and consumer products; the Bureau of Automotive Repair for vehicle inspection and maintenance (Smog Check); the California Department of Pesticide Regulation for pesticides; and U.S. EPA for national transportation sources and certain off-road farm and construction equipment.

Table III-6 summarizes the control strategy to reach the attainment emissions target. This section then describes the local, State, and federal measures contributing to attainment. The combined control strategy provides enforceable measures or commitments that meet the applicable requirements for approval. The District, local transportation agencies, and ARB have previously demonstrated in the materials

supporting the 2002/2005 Ozone Rate-of-Progress Plan and the 2003 PM10 SIP that all reasonably available control measures are being implemented or are committed for implementation. The commitments in this plan for additional controls further strengthen the SIP.

Table III-6
Summary of Control Strategy for 2004 Ozone SIP
(San Joaquin Valley, Summer Planning, in tons per day)

	VOC	NOx
EMISSIONS		
2000 baseline emissions	*443.5*	*656.8*
2010 baseline emissions[1]	*365.1*	*396.8*
2010 attainment emissions target	*314.4*	*343.5*
REDUCTIONS BETWEEN 2000-2010		
Total Emission Reductions Needed for Attainment	**129.1**	*213.3*
Measures adopted as of September 2002'		
Local	+8.5[2]	-18.9
State	-79.3	-97.2
Federal	-7.6	-43.9
Total	*-78.4*	*-160.0*
Percent of needed reductions from adopted measures	*61%*	*75%*
Commitments for new defined measures		
District		
--- Adopted since September 2002	*-2.4*	*-12.2*
--- Remaining PM10 SIP commitments	*-7.0*	*-14.2*
--- New Ozone SIP commitments	-21.3	-1.9
District Total	*-30.7*	*-28.3*
State		
--- PM10 SIP commitments		-10.0
--- New Ozone SIP commitments	-15.0	-10.0
Sate *Total*	*-15.0*	*-20.0*
Total	*-45.7*	*48.3*
Percent *of needed reductions from new defined measures*	*35%*	*23%*
Commitment for long-term measures		
District	*-5.0*	*-5.0*
Percent of needed reductions from long-term measures	*4%*	*2%*

[1] Reflects ARI 3 staffs external adjustment for geographic expansion of the Smog Check II pmgram (requested by the District in 2001 and impleme nted by BAR in 2002). which reduces VOC by 2.5 tpd and NOx by 4.9 tpd in 2010. The District Plan refers to these reductions as new State commitments in 2010 associated with the 2003 PM10 Plan.

[2] Indicates a net increase in emissions because the effect of growth (primarily in livestock operations) during this period is greater than the benefits of adopted controls.

1. Local Measures

The 2004 Ozone SIP includes District control measures and incentive programs that contribute to meeting progress and attainment targets. All of the emission reductions from local control programs in the plan come from the District's adopted rules, the Districts commitments for new measures, or the District's incentive program for cleaner engines. The sources under District control account for 36 percent of the Valley's inventory of ozone-forming emissions (VOC plus NOx) in 2000, rising to 47 percent by 2010 before the benefits of new controls are applied. The Valley 2004 Ozone SIP relies on the Districts existing control program and commitments for new measures to provide nearly 80 tpd of VOC plus NOx reductions (net of growth), towards the total 340 tpd required for attainment between 2000 and 2010. This local contribution amounts to 23 percent of the emission reduction target. Our evaluation focuses on the Districts control strategy.

The plan also contains local transportation-related strategies from Valley COGs and MPOs that are not relied upon to demonstrate progress or attainment. These transportation strategies help document the local approach to planning a transportation system that seeks to lessen the impacts of travel growth on air quality, but the strategies do not have quantified emission reductions associated with them. In the SIP, the District and transportation planning agencies did not specifically identify any of these strategies as transportation control measures or ask that they be considered as such for purposes of transportation conformity.

a. Adopted District Measures in Baseline

The District has adopted prohibitory rules for a wide range of the stationary and areawide sources under its jurisdiction. This plan includes the benefits of local, State, and federal controls adopted through September 2002 as part of the 2010 baseline emission inventory. Rules adopted after that date or with future adoption dates are considered new measures. The September 2002 cutoff for defining what is in the baseline versus what is considered a new measure allows the plan to be consistent with the 2003 Valley PM10 SIP and ARB's 2003 Statewide Strategy. Baseline District measures reduce NOx by about 19 tpd between 2000 and 2010, but allow a net 8 tpd increase in VOC emissions due to projected growth over the same timeframe. The District's full rulemaking agenda over the next several years will ensure net reductions in both pollutants in the future.

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b. New Defined District Measures

The category of new defined District measures includes those adopted subsequent to the September 2002, remaining 2003 PM10 SIP commitments, and new Ozone SIP commitments the District is proposing as part of this plan.

The District has now adopted some of the PM10 SIP measures and an additional one for lime kilns. The District is also taking credit for NOx emission reductions from its dean engine incentive programs, based on the local portion of the total funding. Table III-7 summarizes the Districts actions on these measures and the resulting benefits.

Table III-7
List of District Measures Adopted After September 2002
(San Joaquin Valley, Summer Planning, in tons per day)

Rule	Source Category	Adoption Date	Implementation Date	2010 Reductions[1]	
				VOC	NOx
4408	Glycol Dehydration Systems	12/19/02	12/31/03	1.8	--
4313	Lime Kilns	3/27/03	9/27/03	--	0.1
4610	Glass Coating Operations	4/17/03	12/1/02	0.2	--
4306	Boilers, Steam Generators, and Process Heaters	9/18/03	6/1/07	--	7.1
4604	Can and Coil Coatings	1/15/04	2/1/06	0.4	--
	Clean Engine Incentive Programs[2]	-	-	--	5.0
Totals				2.4	12.2

[1] Emission reductions creditable against PM10 SIP commitments are different for some measures because of the shii from annual average or winter season inventory used for PM1 0 to the summer ozone season planning inventory shown here.
[2] Portion funded by local monies.

As shown in Table III-8, the District's strategy relies on nine measures that are remaining commitments from the PM10 SIP and that reduce VOC or NOx emissions. The District also proposes to add commitments in this Ozone SIP for 12 new measures (encompassing 21 rules).

Together, the District is committing to reduce emissions by an aggregate 28.3 tpd VOC and 16.1 tpd NOx in 2010, through adoption of all new defined measures between 2004 and 2007, and with implementation beginning between 2005 and 2010. If the District Board later finds one of the defined measures to be infeasible at a noticed public hearing, the Districts SIP commitment requires the District Board to adopt alternative measures sufficient to achieve equivalent aggregate emission reductions in the same timeframe.

Table III-8
New Defined District Measures for Attainment
(San Joaquin Valley, Summer Planning, 2010, in tons par day)

SIP #	Source Category	Adoption Date	Full Implementation Date	VOC		NOx	
				Baseline Emissions	Reductions	Baseline Emissions	Reductions
	Remaining PM10 SIP Commitments						
A	Oil and Gas Fugitives	3Q/04	1Q/05	10.2	-4.7	--	--
B	Refinery and Chemical Fugitives	3Q/04	1Q/05	0.5	-0.2	--	--
D	Indirect Source Mitigation	2Q/05	4Q/05 [1]	--	--	N/A	-4.0
E	Small Boilers, Process Heaters, Steam Generators 2--5 MMBtu/hr	4Q/04	4Q/08	--	--	9.0	-1.0
F	Wineries – Fermentation&Storage	4Q/04	4Q/07	2.1	-0.7	--	--
H	Stationary IC Engines	2Q/05	1Q/06 [1]	--	--	20.1	-8.0
I	Commercial Dryers	2Q/05	4Q/09	--	--	9.0	-1.0
N	Water Heaters, 0.075--2.0 Mbtu/hr	3Q/06	2025-2035	--	--	1.4	-0.2
O	Steam-Enhanced Oil Well Vents	3Q/06	4Q/08	12.8	-1.4	--	--
Subtotal					-7.0		-14.2
	New Ozone SIP Commitments						
C	Fleet Rule – School Buses	4Q/04	2010-2015	--	--	2.6	-0.1
G	Solid Fuel Boilers, Steam Generators & Process Heaters	4Q/04	1Q/06	--	--	4.4	<-0.05
J	Composting/Biosolids Operations	2Q/05	2010	0.7	-0.1	--	--
K	Automotive Coating	3Q/05	2Q/07	1.6	-0.1	--	--
L	Concentrated Animal Feeding Operations	2Q/06	1Q/07 [1]	63.1	-15.8	--	--
M	- Organic Solvent Degreasing - Organic Solvent Cleaning – Motor Vehicle and Mobile Equipment Coating – Surface Coating of Metal Parts and Products - Can and Coil Operations -Aerospace Assemblies and Component Coating -Wood Products Coating – Graphic Arts – Adhesives – Polyester Resin Operations	2Q/06	4Q/08	5.1	-1.3	--	--
P	Soil Decontamination	4Q/06	2008	<0.05	<-0.05	--	--
Q	Open Burning	1Q/07	2010	5.8	-2.9	2.3	-1.1
R	Polymeric Foam Manufacturing	2Q/07	4Q/09	0.3	-0.1	--	--
S	Stationary Gas Turbines (<10MW, distributed generation)	2Q/07	2010			2.5	-0.6
T	Gasoline Storage & Transfer	3Q/07	2010	3.4	-0.9	--	--
U	Aviation Fuel Transfer, Phase I	3Q/07	2010	0.2	<-0.05	--	--
Subtotal					-21.3		-1.9
TOTAL					-28.3		-16.1

[1] Implementation begins

3 4 .

A summary of each proposed measure is presented below.

A. *Oil and* Gas ***Fugitives.*** This measure is committed to in the Valley's 2003 PM10 Plan.' It applies to sources involved in the production of crude oil, natural gas, and natural gas liquids. These sources house pipes, valves, flanges, hatches, pumps, compressors, and many other components with the potential to leak fluids or gases, releasing fugitive VOC emissions. Controls could include lowering the permissible gaseous leak threshold of 10,000 ppmv, eliminating some existing exemptions, increasing the frequency of inspection, shortening the repair period for leaking components, and replacing frequently leaking components.

B. Refinery and Chemical *Fugitives.* This measure applies to petroleum refineries and gas-liquids processing facilities, and is a commitment in the Valley's PM10 Plan. These facilities house large numbers of components with the potential to leak fluids or gases, causing fugitive VOC emissions. The measure would set lower leak thresholds, require operators to conduct more frequent inspections of components,. implement a rigorous leak detection and repair program, and require Best Available Control Technology (BACT) equipment to replace frequently leaking devices.

C. ***Fleet*** *Rule – School* Buses. This measure would reduce NOx and PM1 0 emissions from bus fleets used for elementary and secondary schools. Reductions would occur by replacing buses with newer, deaner vehicles, by retrofitting existing buses with cleaner burning engines or emission controls, or by modiing buses to use deaner-burning fuels. District staff indicates that the intent of this measure is to ensure that bus purchases result in a cleaner fleet, aided by incentives to help school districts finance the cost.

D. *Indirect* Source ***Mitigation*** Fee. This proposal, committed to in the Valleys 2003 PM10 Plan, would create a program to mitigate emissions from new development projects that generate vehicle trips and area source emissions from other on-site activities not subject to District permitting. These types of projects are referred to as indirect sources. New development projects could be required to pay a mitigation fee to mitigate a portion of their indirect emissions, or they could provide on-site mitigation. Mitigation funds would be used to purchase cost-effective emission reductions. The District is proposing to adopt this program in three phases. The first phase would apply to residential development projects; the second phase to commercial and institutional development projects; and the third phase to industrial development projects.

E. Small Boilers, *Steam Generators and Process Heaters, from 2-5* ***MMBtu/hr.*** This is a new measure, committed to in the Valleys PM10 Plan, and applicable to small boilers, steam generators, and process heaters, from 2-5 MMBtu/hr. Affected facilities include hotels, hospitals, office buildings, schools, prisons and military facilities. Combustion modifications appropriate for these units include low excess air, low NOx burners, water/steam injection, and flue gas recirculation. Post-combustion treatment of the exhaust stream may include selective catalytic reduction or selective non-catalytic reduction.

F. wineries. This is a new measure, committed to in the Valley's 2003 PM10 Plan, and applicable to winery processes that produce significant VOC emissions via wine fermentation and aging. The District determined that the emissions exceed the de **minimus** threshold and are subject to Reasonably Available Control Technology (RACT) requirements. The District does not currently regulate wine fermentation and aging. **VOC reduction** could be achieved with vapor collection and control systems, carbon adsorption, water scrubbers, catalytic incineration, condensation, and additional temperature control. The District has refined the inventory for this category over the last year. The measure anticipates the same control efficiency as in the PM10 Plan, with the lower baseline inventory translating to lower expected reductions.

G. So/id Fuel ***Boilers, Steam*** Generators ***and Process Heaters.'*** This measure, committed to in the Valley's 2003 PM10 Plan, would amend an existing rule. This rule applies to facilities combusting biomass, municipal solid waste, tires, or petroleum coke., The rule would be amended to apply to facllliies with the potential to emit lower levels of **NOx.** The District may also set more stringent emission limits.

H. Stationary IC Engines. This measure, committed to in the Valleys 2003 PM10 Plan, would upgrade an existing rule that establishes **opacity** standards. Agriculture irrigation engines are currently exempt **from** the opacity standards; the District plans to remove the exemption.

1. ***Commercial Dryers.*** This is a new measure, committed to in the Valleys PM10 Plan that **will** affect dryers used to remove water from process material by heating. The District determined that these dryers exceed the de **minimus** threshold and are subject to Best Available Control Measures **(BACM)** requirements for **PM10.** These units are currently subject to District permitting requirements, but there is no specific rule. Emission controls appropriate for dryers include Public Utilities Commission-quality natural gas, low excess air, low **NOx** burners, and flue gas recirculation.

J. Composting/Biosolid Operations. This new measure would reduce VOC emissions from the wmposting of biosolids, including sewage sludge, agricultural waste, and other green waste (such as from residential landscaping). Controls **could** include vapor collection and control systems, forced aeration, and **windrow** of materials.

K. ***Automotive Coating.*** This new measure would reduce VOC emissions from any new or existing operations that apply coatings to automobile parts or accessories. This measure would be amended to align with California Air Pollution Control **Officers'** Association (CAPCOA) recommendations.

L. Concentrated Animal Feeding Operations. The District is proposing to reduce VOC emissions **from** dairies, cattle feedlots, poultry ranches, and other agricultural operations involving animal husbandry. VOC emissions may be reduced by controlling emissions **from feedlots** and from supporting operations such as waste treatment lagoons. The measure is intended to comply with California Health and Safety Code Section 40724.6.

M. Organic Solvents Omnibus Measure. Ten District solvent rules would be amended to satisfy 'all feasible measure" requirements under the California Clean Air Act. The commitment to amend these rules is being included in this SIP because the resulting emission reductions are needed to attain the federal l-hour ozone standard. Since these rules were last amended, other districts have started requiring lower-VOC solvents at a level of 25 grams of VOC per liter. This new standard would be incorporated into the rules.

N. Water Heaters 75,000 *Btu/hr to* 2 *MMBtu/hr.* This is a new measure, committed to in the Valley's PM10 Plan, and applicable to industrial, commercial, and institutional water heaters. These sources are currently not regulated by the District. NOx prohibitory rules may be coupled with a financial incentive program to accelerate the replacement or retrofit of higher-polluting units. While the PM10 Plan committed to an adoption date for this measure in 4Q/04, the Ozone SIP commits to adoption in 3Q/06. The District projects that full implementation of this rule will extend out 20 to 30 years based on the current pace of replacement for existing water heaters.

0. Steam-Enhanced Crude Oil Production Well Vents. This is an upgrade to an existing rule, and is a commitment in the Valley's PM10 Plan. This measure would reduce VOC emissions from steam-enhanced crude oil production wells, and any associated vapor collection and control systems. Emission reductions can be achieved by lowering the rule exemption thresholds.

P. S il Decontamination. This measure is an upgrade to an existing rule designed to reduce VOC emissions created during activities in the remediation of contaminated soils.

Q. Open Burning. The District's open burning rule will be amended pursuant to California Health and Safety Code Section 416555(a), which phases out open burning between 2005 and 2010, and exemptions allowed for disease control. The exact reductions achievable by this rule will depend on the extent to which open burning practices can be replaced by cost-effective technologically feasible alternatives.

R. Polymeric Foam Manufacturing. This rule amendment would reduce VOC emissions from manufacturing polymeric foam and foam products by specifying material VOC content limits and emission control devices. This rule would be expanded to include VOC emission reduction or control from product curing areas and general product storage, similar to those employed by several of the existing sources. Possible controls for this category include switching to an alternative, non-VOC blowing agent or employing capture and control systems for the VOC emissions.

S. Stationary Gas Turbines. This measure would amend the Districts stationary gas turbine rule, which was last amended in 2002. Since then, ARB published emission standards for turbines used in electrical power generation. Turbines rated greater than 10 MW are subject to District requirements similar to the ARB limits. The control

measure would examine the feasibility of ARB NOx and carbon monoxide limits for stationary gas turbines, rated 40.0 MW.

T. Gasoline Storage and Transfer. This measure would reduce fugitive VOC emissions occurring at gasoline terminals and bulk plants. More stringent rules standards would be set, together with possible control enhancements such as increased inspection and maintenance frequencies, tank seal repair or replacement, and retrofitting old systems with newer technologies.

U. Aviation Fuel Transfer, Phase I. The new measure would reduce fugitive VOC emissions created during Phase 1 refueling operations, including filling aviation fuel bulk storage tanks using primary fuel delivery trucks, and filling an airports fuel delivery trucks from the bulk storage tanks. The measure does not propose to cover the process of filling the aircraft's onboard fuel tanks. Fugitive emissions from storage and delivery can be controlled with pressure-vacuum relief valves on storage tanks, submerged fill tubes to reduce splashing, and vapor recovery or destruction systems similar to those used for Phase I motor vehicle fueling operations.

c. Compliance With Other Extreme Area Requirements

As an extreme nonattamment area, the District must adopt RACT control measures applicable to sources with emissions greater than 10 tons per year of an ozone precursor, rather than the current 25 tons per year cutoff applicable to severe areas. The District must also upgrade its rules for the Title V federal operating permits program and New Source Review to comply with extreme area requirements. All three elements are due for submittal to U.S. EPA by May 16, 2005. The plan includes the Districts commitment to meet this deadline.

The District evaluated sources with VOC or NOx emissions ranging from IO-25 tons per year, and identified three RACT measures: Dryers and Dehydrators; Flares; and Jet Engines and Test Cells. The District is proposing to address the Dryer and Dehydrator category as a near-term measure. Similarly, sources with emissions from IO-25 tons per year will become subject to the Districts existing Flares rule once the District amends its definition of major sources in the Districts New Source Review (NSR) rule to reflect its extreme classification. With respect to Jet Engines and Test Cells, the District was unable to identify viable control measures. The District is listing this as a further study measure and will investigate potential controls. Meanwhile, these sources will be brought into the Title V program when the District modifies its NSR rule.

The District states that rules and practices already satisfy the extreme area requirement that clean fuels (like natural gas) be used in boilers (per Act section 182(e)(3)).

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2. State Measures

The emission sources under State regulatory jurisdiction (e.g., vehicles, fuels, some off-road 'equipment, and consumer products) are a significant contributor to the Valley's pollution problems. These sources under State control account for 46 percent of the Valleys inventory of ozone-forming emissions (VOC plus NOx) in 2000, becoming a smaller share (37 percent) of the total by 2010 in response to cleaner vehicles and fuels. The Valley 2004 Ozone SIP relies on the State's existing control program and prior commitments for new State measures to provide over 210 tpd of the total 342 tpd emission reductions required for attainment between 2000 and 2010. This State contribution amounts to 62 percent of the emission reduction target.

a. Adopted State Measures in Baseline

ARB regulations on the books as of 2002 are providing 176 tpd of emission reductions – these include the Low-Emission Vehicle Program and California Reformulated Gasoline, together with a series of progressively tighter emission standards for new engines used in big diesel trucks and heavyequipment, forklii and pumps, lawn and garden equipment, pleasurecraft, and over 100 categories of consumer products. To complement these regulatory programs, the State has contributed over $60 million since 1998 to fund a variety of District clean engine incentive programs throughout the Valley.

The Bureau of Automotive Repair's (BAR) Smog Check program is also providing essential reductions in the Valley. The District took an important step in 2001 to request that BAR expand the most rigorous form of the program to apply beyond the major urban areas. BAR implemented Smog Check II in six additional Valley cities in 2002. This increased the portion of the Valley's fleet subject to Smog Check II to 95 percent. The benefits of this change are reflected as an external adjustment to the baseline inventory in this report since the expansion was in place by 2002.

b. New Defined State Measures

The Board has previously approved commitments to develop new State measures that will generate further emission reductions in the Valley. State commitments for 10 tons of NOx reductions from these measures were already submitted to and approved by U.S. EPA as part of the Valley's 2003 PM10 SIP. ARB will add 15 tpd VOC and another 10 tpd NOx to generate a total combined State commitment of 35 tpd VOC plus NOx for this Ozone SIP.

To help achieve the federal health-based air quality standards, ARB adopted the *2003 State and Federal Strategy for the California State Implementation Plan* (Statewide Strategy) on October 23.2003. ARB submitted the Statewide Strategy to the U.S. EPA for approval as a revision to the California SIP on January 4, 2004.

The Statewide Strategy identifies the Board's near-term regulatory agenda to reduce ozone and particulate matter by developing and adopting new measures from 2002 through 2009, with implementation prior to the 2010 Ozone season. It includes:

- Commitments for the Board to consider 19 specific statewide measures.
- BAR's planned improvements to the Smog Check program. The recent repeal of the rolling 30-year exemption for older vehicles will further increase the air quality benefits of the program.
- Continuation of the Department of Pesticide Regulation's approved SIP obligation' to reduce volatile emissions from pesticides. For the San Joaquin Valley, this means a pesticide VOC emissions target of 12 percent less than 1990 levels.

The Statewide Strategy also describes a process to identify longer-term solutions to achieve additional reductions from sources under State, federal, and local control.

The defined control measures in the Statewide Strategy cover on-road vehicles, off-road equipment, ports and harborcraft, fuels and refueling, and consumer products. Lower emission standards for new engines and consumer products are complemented by measures to clean up the existing fleet of mobile sources. Other measures would reduce vapor emissions from gasoline storage and refueling. These defined measures are listed in Table III-9. The Statewide Strategy, which includes detailed descriptions of each measure, is available at http://www.arb.ca.gov/planning/sip/stfed03/stfed03.htm.

Public Process. The 2003 Statewide Strategy relied on an extensive public process. Using feedback from workshops in 2001, staff compiled a list of potential control measures for sources under State, federal, and local control. In 2003, staff participated in eleven public workshops with the local air districts in the South Coast and San Joaquin Valley, as well as an ARB technical workshop in both those regions plus Sacramento, to discuss the draft Statewide Strategy. ARB staff considered the public concerns and suggestions voiced at these workshops and additional stakeholder meetings, as well as over 300 comment letters. Staff incorporated revisions into the proposed Strategy and recommended further changes in response to public comment. In October 2003, the Board held a public hearing and approved the 2003 State and Federal Strategy for the California SIP.

Current ***Implementation Status.*** ARB is actively working to implement the Statewide Strategy. Several of the measures in the Strategy are comprehensive approaches for the source category, encompassing multiple rulemakings or other actions that will contribute to the total reductions expected. As of September 1, 2004, ARB has taken action on the following measures, which provide benefits towards the State's commitment for emission reductions beyond the 2010 baseline.

[1] 40 CFR Part 52, Federal Register, January 8, 1997, pages 1150-I 187.

- The low sulfur diesel fuel regulation adopted in July 2003 fulfills SIP measure FUEL-2.
- The small off-road engine emission standards adopted in September 2003 fulfill SIP measures SMALL OFF-RD-1 and SMALL OFF-RD-2.
- The particulate matter control measure for diesel-powered solid waste collection vehicles adopted September 2003 fulfills part of SIP measure ON-RD HW DUTY-3.
- The voluntary emission control software upgrade program for diesel trucks approved in March 2004 fulfills part of SIP measure ON-RD HVY DUTY-3. This voluntary measure includes a regulatory backstop to ensure that the anticipated emission reductions occur by 2010.
- The engine manufacturer diagnostics requirements for new diesel trucks adopted in May 2004 fulfill part of SIP measure ON-RD HVY DUTY-3.
- The consumer products regulation adopted in June 2004 fulfill SIP measure CONS1.
- The restriction on idling time for commercial diesel trucks and vehicles adopted in July 2004 fulfills part of SIP measure ON-RD HVY DUTY-3.
- By 2004, ARB had begun implementing an expanded community-based inspection program for diesel trucks and buses, fulfilling SIP measure ON-RD HVY DUTY-I.
- In addition to these defined SIP measures, ARB adopted three controls for diesel stationary engines, portable engines, and transportation refrigeration units in February 2004 that will contribute to meeting the State's obligations.

In addition, BAR has implemented two of the three Smog Check improvements (directing more vehicles to Test-Only stations and requiring dynamometer testing for heavier gasoline vehicles up to 9,999 pounds gross vehicle weight rating). These improvements fulfill part of SIP measure LT/MED-DUTY-2.

State Funding for Incentive Programs. The Statewide Strategy discusses the need to obtain continued funding for the Carl Moyer incentive program to supplement regulatory actions requiring clean up of the existing fleet of diesel vehicles and equipment. Governor Schwarzenegger's approval of the current State budget established a permanent source of funding for the Moyer program at $61 million per year statewide, with the Valley due to receive several million annually. The projects funded with these State monies will provide emission reductions creditable towards the State's obligation.

A coalition of industry, environmental, and government stakeholders has also been working legislatively to secure additional incentive funding to further accelerate cleanup of air pollution sources. On September 23, the Governor signed a bill that authorizes another $80 million per year of combined State and local monies for a broad range of incentive programs to reduce mobile source pollution. The new local monies are expected to come in response to the authorization for local air districts to raise the motor vehicle registration fee that consumers pay to support air quality programs by $2 per vehicle per year.

State Emissi n Reduction Commitment. In Resolution No. 03-22, adopting the Statewide Strategy, the Board delegated

> "...authority to the Executive Officer to calculate and commit to new emission reductions from implementation of the Final Statewide Strategy that she determines to be appropriate for specific areas violating the NAAQS in California, as attainment SIPs are developed or revised in those areas."

ARB commits to adopt and implement measures to achieve, at a minimum, 15 tpd VOC and 20 tpd NOx emission reductions in the San Joaquin Valley Air Basin by the 2010 ozone season as part of the attainment demonstration for the federal l-hour ozone standard. Measures to achieve these reductions will be adopted by 2009. ARB may meet this commitment by adopting one or more of the control measures in Table III-9, by adopting one or more alternative control measures, or by implementing incentive program(s), so long as the aggregate emission reduction commitment is achieved. ARB's prior commitment to achieve 10 tpd of new NOx reductions as part of the Valley PM10 SIP is a subset of the 20 tpd NOx discussed here.

Table III-9
Defined State Measures from the 2003 Statewide Strategy

Strategy (Agency)	Name
LT/MED-DUTY-1 (ARB)	Replace or Upgrade Emission Control Systems on Existing Passenger Vehicles
LT/MED-DUTY-2 (BAR)	Improve Smog Check to Reduce Emissions from Existing Passenger 8 Cargo Vehicles
ON-RD HVY DUTY-1 (ARB)	Augment Truck and Bus Highway Inspections with Community-Based inspections
ON-RD HVY DUTY-2 (ARB)	Capture and Control Vapors from Gasoline Cargo Tankers
ON-RD HVY DUTY-3 (ARB)	Pursue Approaches to Clean Up the Existing and New Truck/Bus Fleet
OFF-RD CI-I (ARB)	Pursue Approaches to Clean Up the Existing Heavy-Duty Off-Road Equipment Fleet (Compression Ignition Engines)
OFF-RD CI-2 (ARB)	Implement Registration and Inspection Program for Existing Off-Road Equipment to Detect Excess Emissions (Compression Ignition Engines)
OFF-RD LSI-1 (ARB)	Set Lower Emission Standards for New Off-Road Gas Engines (Spark Ignited Engines 25 hp and Greater)
OFF-RD LSI-2 (ARB)	Clean Up Existing Off-Road Gas Equipment Through Retrofit Controls and New Emission Standards (Spark-Ignition Engines 25 hp and Greater)
SMALL OFF-RD-1 (ARB)	Set Lower Emission Standards for New Handheld Small Engines and Equipment (Spark Ignited Engines Under 25 hp such as Weed Trimmers, Leaf Blowers, and Chainsaws)
SMALL OFF-RD-2 (ARB)	Set Lower Emission Standards for New Non-Handheld Small Engines and Equipment (Spark ignited Engines Under 25 hp such as Lawnmowers)
MARINE-1 (ARB)	Pursue Approaches to Clean Up the Existing Harbor Craft Fleet –Cleaner Engines and Fuels
MARINE-2 (ARB)	Pursue Approaches to Reduce Land-Based Port Emissiis -Alternative Fueis. Cleaner Engines. Retrofit Controls, Electrification, Education Programs, Operational Controls
FUEL-I (ARB)	Set Additives Standards for Diesel Fuel to Control Engine Deposits
FUEL-2 (ARB)	Set Low-Sulfur Standards for Diesel Fuel for Trucks/Buses, Off-Road Equipment, and Stationary Engines
CONS-I (ARB)	Set New Consumer Products Liiits for 2006
CONS-2 (ARB)	Set New Consumer Products Limits for 2008-2010
FVR-1 (ARB)	Increase Recovery of Fuel Vapors from Aboveground Storage Tanks
FVR-2 (ARB)	Recover Fuel Vapors from Gasoline Dispensing at Marinas
FVR-3 (ARB)	Reduce Fuel Permeation Through Gasoline Dispenser Hoses
PEST-I (DPR)	Implement Existing Pesticide Strategy

3 . Federal Measures

The emission sources under the legal or practical control of the federal government include heavy-duty diesel trucks.registered outside California. some new farm and construction equipment, locomotives, and aircraft. These federal sources account for 18 percent of the Valley's inventory of ozone-forming emissions (VOC plus NOx) in 2000. Nationwide regulations promulgated by U.S. EPA achieve over 50 tpd of emission reductions in the Valley between 2000 and 2010, contributing 15 percent of the total reductions needed for attainment in this SIP. There are no additional federal measures included in this plan.

Although U.S. EPA is developing additional rules to reduce emissions from federal sources, the timeline for achieving reductions is beyond the 2010 attainment deadline of this SIP. U.S. EPA recently adopted more stringent emission standards and low-sulfur diesel fuel requirements for new off-road diesel equipment, based on the transfer of emission control technology for on-road engines. The benefits will be critical in the post-2010 timeframe, both to offset growth in goods movement and to make progress toward the federal 8-hour ozone and PM2.5 standards. U.S. EPA also released an advance notice of proposed rulemaking to phase in more stringent emission standards for locomotives and ships nationwide, with implementation beginning post-2010. ARB has provided extensive comments on this proposal, urging the federal government to set the most effective emission standards possible and to accelerate implementation. Such federal action will be essential as the Valley transitions to the &hour ozone standard.

In the 2010 timeframe, we need the federal government to focus on funding an incentive program to clean up diesel engines that parallels California' Moyer program. The benefits realized from federal incentives would help deal with the remaining 10 tpd of reductions needed from long-temi measures in this plan.

ARB will continue to push, US. EPA to achieve its fair share of the emission reductions needed to meet health-based air quaiii standards in the Valley and across California.

4. Long-Term Measures

The federal Clean Air Act recognizes that extreme ozone nonattainment areas, such as the San Joaquin Valley, must rely on evolving technologies to meet attainment goals.

After accounting for the anticipated benefits of both adopted and new defined State and local measures, the 2004 Ozone SIP demonstrates a need for another 5 tpd VOC reductions and 5 tpd NOx reductions from long-ten measures. This represents three percent of the total reductions needed for attainment between 2000 and 2010. The District is committing to identify and adopt long-term measures to achieve the last 10 tpd VOC plus NOx reductions. In 2007, the District will reevaluate the l-hour ozone attainment control strategy using available new information on ozone formation. At that time, the District will add new measures as warranted by the updated assessment.

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In this plan, the District has already begun the process of identifying additional strategies via the described "further study measures" and "future study measures."

a. Further Study Measures

Further study measures are potential measures from emission categories without adequately developed emission inventories or for which emission control strategies must be further researched and developed. Some of these may be developed into control measures in 2006 or later, yielding emission reductions in the pm-2010 timeframe. Others may be discarded after District evaluation.

The further study measures address the following source categories:

- Portable equipment registration program;
- Asphalt plant dryers/heaters;
- Sumps, pits and wastewater processing equipment;
- Heavy oil stream fugitives;
- Adhesives;
- Graphic arts;
- Cutback asphalt application;
- Under-fired restaurant charbroilers;
- Residential water heaters;
- Furnaces; and
- Brandy production.

ARB staff has comments on three of the further study measures, as described below. Staff has relied on recent rule stringency assessments by the California Air Pollution Control Officers Association (CAPCOA) and four districts in central California. The four Districts -- the Bay Area Air Quality Management District, Sacramento Metropolitan Air Quality Management District, San Joaquin Valley District, and Yolo-Solano Air Quality Management District -- have worked together with ARB to compare the technical requirements of their rules against each other and the best in the State. The goal of this exercise is to identify source categories with potential additional reductions.

Adhesives: This measure was identified on both the four District comparison list and CAPCOA's All Feasible Measures list. ARB staff suggests the District prioritize review of this category when evaluating the further study measures.

Graphic Arts: The four District comparison did not find sufficient differences between the Districts' rules to warrant amendments. However this category was identified in CAPCOA's All Feasible Measures list. ARB staff suggests the District prioritize review of this category when evaluating the further study measures.

P rtable Engines. In February 2004, ARB adopted an airborne toxic control measure for portable engines that applies statewide. Districts may choose to adopt their own version, which must be at least as stringent as the State rule. The timeframe for implementation of the ARB toxics measure is compatible with a further study measure for the District. The State measure affects all diesel-fueled portable engines that are larger than 50 horsepower. Included are engines registered under ARB's Portable Equipment Registration Program, engines permitted by the districts, and engines historically exempt from district permits. The measure requires all portable engines to be certified to U.S. EPA /ARB off-road engine standards by 2010. After 2010, it requires all fleets of portable engines to meet diesel PM emission averages that become more stringent in 2013, 2017, and 2020. The measure will also achieve reductions in NOx through expedited engine replacement

b. Future Study Measures

Stakeholders at District workshops on the 2004 Ozone SIP have suggested control measure concepts for mobile sources. The District will investigate the feasibility of these additional programs that reduce emissions from mobile sources. The stakeholder suggestions target:

- Detection of gross emitting passenger and heavy-duty vehicles via remote sensing;
- Enforcement of truck speed limits;
- Funding for ARB to increase its heavy-duty vehicle roadside inspections;
- Designation of a no through-truck traffic route along Highway 99;
- Restrictions on truck idling; and
- Revising, the vehicle registration fee structure to charge according to emissions rather than value of the vehicle.

In addition, the District also lists as future study measures programs for emissions from non-mobile sources, such as vegetation used for landscaping.

The State is already working on two of these concepts. ARB and BAR are conducting a pilot study to evaluate the effectiveness of remote sensing equipment in identifying gross emitting vehicles. Also, the Bureau is restarting its vehicle retirement program. Eligible consumers whose vehicles fail the Smog Check test can opt to retire their vehicle and receive $500, based on available funds.

In July 2004, ARB adopted an airborne toxic control measure to limit diesel-fueled commercial motor vehicle idling. The new measure will restrict idling of diesel-fueled commercial motor vehicles with a gross vehicle weight rating greater than 10,000 pounds to no more than five minutes at any location. The Board will consider a companion measure next year that addresses idling in sleeper cabs.

5. Contingency Measures

Contingency measures are intended to provide additional reductions in case the control measures identified for attainment and progress do not deliver the expected reductions. Contingency measures are therefore required both for the 2008 progress milestone, the 2010 progress milestone, and the 2010 attainment demonstration.

To meet rate of progress requirements for 2008 and 2010; the District relies on adopted measures, increasing the certainty that the emission reductions will be achieved as expected. Contingency reductions for this plan are provided by the District's commitments for new measures and the growing emission reductions from turnover of the vehicle fleet to cleaner models under ARB's regulations.

The District is subject to a requirement for contingency measures unique to extreme areas. Three years before the proposed implementation date, the District will submit enforceable commitments to develop and adopt contingency measures if the advanced technology measures do not achieve planned reductions. For purposes of U.S. EPA's review under section 11 O(k) of the Clean Air Act, these measures should be treated in the same way as fully adopted rules because they are fully developed in the manner contemplated by the Act at this point in time. The timing of this requirement dovetails with submittal of the 8-hour ozone SIP in June 2007, and the expected transition to the federal 8-hour standard.

E. Attainment Demonstration

Table III-10 summaries the Valley's attainment demonstration for the federal l-hour ozone standard. The 2010 attainment emission targets are 314.4 tpd VOC and 343.5 tpd NOx. The attainment demonstration relies on a combination of reductions from already adopted local, State, and federal controls, both local and State commitments for new reductions, and finally, reductions from future measures authorized by section 182(e)(5) of the Federal Clean Air Act.

Table III-10
Control Strategy for 2004 Ozone SIP
(San Joaquin Valley, Summer Planning, tons per day)

	VOC	NOx
Emissions		
2000 baseline emissions	443.5	556.8
Emissionreductions,2000-2010		
--- Measures adopted as of September 2002	-78.4	-160.0
---Commitmentsfornear-termdefinedmeasures	45.7	-48.3
--- Commitment for further reductions from long-term measures	-5.0	-5.0
Total	-129.1	-213.3
Modeled2010attainmentemissionstarget	314.4	343.5

F. Rate-of-Progress. Demonstration

In addition to developing an attainment demonstration as part of the San Joaquin Valleys reclassification to extreme, the District is also required to show sufficient emission reductions to achieve the required rate-of-progress (ROP). As a severe area, the District adopted and submitted an ROP Plan for 2002 and 2005. U.S. EPA found adequate for transportation conformity purposes the motor vehicle emission budgets in that plan on July 10, 2003. On September 4, 2003, U.S. EPA found the 2002 and 2005 ROP Plan to be complete.

The purpose of the ROP requirement is to ensure that nonattainment areas make steady progress toward their attainment goals. Areas must reduce 'their emissions of **VOC** by **three** percent per year, averaged over a three-year period Specifically, the Valley must demonstrate that its VOC emissions in 2008 are 51 percent below the levels in 1990, the baseline year for ROP plans. In addition, 2010 VOC emissions must be shown to be at or below 57 percent of the 1990 levels. NOx reductions may be substiiuted for VOC reductions on an equivalent basis, to the extent that NOx reductions are necessary for attainment.

U.S. EPA has expressed a policy preference for using reductions from adopted controls, instead of from commitments, in ROP demonstrations.[2,3] The District is revising the ROP demonstration for 2008 and 2010 in the Proposed 2004 Ozone SIP to show that the Valley meets the progress requirements on the strength of adopted measures alone. The District takes credit for reductions from all adopted VOC measures and also relies on substitution of NOx reductions from adopted measures. Table Ill-1 1 summarize the k y steps in the revised ROP demonstration.

[2] U.S. EPA, memorandum. Guidance on Issue Related to 15 Percent Rate-of-Progress Plans, August 23, 1993.
[3] U.S. EPA, memorandum. November 1994 Submittal Policy, September 1.1994.

Table 111-I 1

Rate of Progress Demonstration with Adopted Measures Only
(San Joaquin Valley, Summer Planning, in tons per day)

2008 Milestone		
Line No.	**ROP Demonstration Steps**	**Emissions**
1	Adjusted 1990 VOC inventory [1]	553.0
2	VOC reductions required from 1990-2008 (51% of line 1)	282.0
3	VOC reductions from adopted measures, 1990-2008	183.6
4	VOC reduction shortfall in 2008	98.4
5	VOC-equivalent NOx reduction needed [2]	125.1
6	NOx reductions, 1990-2008, from adopted measures available for substitution [3]	291.6
7	NOx reductions used for substitution	125.1
8	NOx emissions remaining after substitution>attainment target?	Yes
9	Rate of Progress Achieved in 2008?	Yes
2010 Milestone		
Line No.	**ROP Demonstration Steps**	**Emissions**
1	Adjusted 1990 VOC inventory [1]	548.5
2	VOC reductions required from 1990-2010 (57% of line 1)	312.6
3	VOC reductions from adopted measures, 1990-2010	185.6
4	VOC reduction shortfall in 2010	126.8
5	VOC-equivalent NOx reduction needed [2]	161.2
6	NOx reductions, 1990-2010, from adopted measures available for substitution [3]	192.9
7	NOx used for substitution	161.2
8	NOx emissions remaining after substitution>attainment target?	Yes
9	Rate of Progress Achieved in 2010?	Yes

[1] Baseline inventory of 633.1 tpd is reduced by 80.2 tpd for 2008 milestone, and by 84.7 tpd for 2010 milestone. to account for noncrediible reductions from the federal motor vehicle control program.

[2] Computed by multiplying the VOC shortfall by 1.27 to reflect the VOC/NOx ratio in the baseyear.

[3] After subtracting out NOx reductions used in previous milestone years for substitution.

G. Transp rtati n Conformity Budgets

This Plan establishes county level on-road motor vehicle emissions transportation conformity budgets for the years2008 and 2010. The emissions budgets reflect the latest planning assumptions and were developed using ARB's latest on-road mobile source emission factor model EMFAC2002 (approved by U.S. EPA on April 1, 2003). The Valley's 2002/2005 Ozone Rate of Progress Plan contained budgets for 2002 and 2005, which U.S. EPA found adequate, effective August 8, 2003.

The new emissions budget, based on summer planning daily emissions for VOC and NOx, are shown in Table III-12. The budgets are matched to activity data reported by the eight county Councils of Government using ARB's VMT matching methodology. These results are adjusted to account for any baseline emission reductions not included in the model. Finally, the new State and local commitments to reduce on-road vehicle and road construction emissions are subtracted from the adjusted baseline to arrive at the conformity budgets. These budgets would become applicable when U.S. EPA finds the budgets adequate. Conformity assessments for these budgets will use the emission factors in this SIP with updated activity.

Table III-12
Sub-Area On-Road Motor Vehicle Emission Budgets for Ozone'
(San Joaquin Valley, Summer Planning, in tons per day)

County	2008		2010	
	VOC	NOx	VOC	NOx
Fresno	15.8	33.7	13.0	27.7
Kern (SJVAB)	11.5	32.7	9.6	27.2
Kings	2.5	6.2	2.1	5.4
Madera	3.9	8.4	3.3	7.2
Merced	5.0	11.4	4.0	9.1
San Joaquin	9.3	22.4	7.7	17.9
Stanislaus	8.5	17.4	7.0	14.0
Tulare	8.5	18.8	6.9	15.3
Total[2]	*65.0*	*151.0*	*53.6*	*123.8*

[1] The District released these revised budget numbers on October 8, 2004.
[2] Total is for informational purposes only.

The emission budgets established in this plan fulfill the requirements of the Act and U.S. EPA regulations to ensure that transportation activities support progress and attainment of the federal l-hour ozone standard.

50.

IV. FUTURE FEDERAL OZONE PLANS

The District must develop a new ozone plan in less than three years to meet federal requirements for 8-hour ozone, and satisfy any outstanding requirements applicable to i-hour ozone planning.

A. 2007 1 -Hour Ozone Plan Update

The 2004 Ozone SIP does not fully define all measures needed for attainment of the federal l-hour ozone standard in 2010. The District proposes defining and adopting long-term measures in 2007. The District will reassess the emission reductions needed at that time, using the latest information on ozone formation, available control strategies, and precursor inventories. The District will develop and submit a l-hour SIP update including defined long-term measures in 2007.

B. 8-Hour Ozone Plans

ARB and the districts across Northern California have kicked off the process of developing 8-hour plans. The Valley must submit two types of 8-hour plans: an 8-hour rate of progress plan and an 8-hour attainment demonstration plan that is due June 2007. As a serious 8-hour ozone nonattainment area, the Valleys 8-hour attainment date is 2013.

Staff from ARB and the 8-hour ozone nonattainment districts in central California have already met several times to discuss development of 8-hour ozone SIPs. This major collaborative undertaking will rely on upcoming emission inventory upgrades, enhancements to CCOS modeling, and will benefit from a joint review of the relative stringency of local controls. Staff is coordinating on sharing resources, and is mapping out schedules for deliverables needed for SIP development.

V. ENVIRONMENTAL IMPACTS

The California Environmental Quality Act (CEQA) requires that State and local agency. projects be assessed for potential significant environmental impacts. Air quality plans are "projects" that are potentially subject to CEQA requirements. In its Notice of Preparation/Initial Study for this plan, the District identified three areas with potential for significant impacts (air qualii, utilities/service systems, and water) and therefore warranting evaluation in a Draft Environmental Impact Report (EIR). In the Draft EIR, District staff determined that there were no significant impacts in these areas.

The Draft EIR evaluated all the proposed near-term control measures (Control Measures A through U), all of the further study measures (Further Study Measures A through K), and the future study measures. In addition, the Draft EIR evaluated three feasible alternatives to the 2010 Ozone SIP and found that the SIP approach was environmentally superior.

We reviewed the Draft EIR prepared by the District, and find that it accurately describes the potential environmental impacts of the plan. Staff concurs with the District's conclusions and finds that the District has met its obligations under CEQA.

The 2003 Statewide Strategy was already subject to a separate environmental review under CEQA prior to adoption by the Board. Our evaluation is presented in the *2003 State and Federal Strategy for the California* State *Implementation Plan.*

Environmental Justice. In December 2001, ARB adopted a set of policies and associated actions that provide the framework for incorporating environmental justice into ARB's programs consistent with the directives of State law. The policies and actions are based on State law, which describes "environmental justice" as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies." ARB's environmental justice policies help ensure that we take into account neighborhood impacts as we prioritize and develop controls and pollution-prevention strategies.

The environmental justice policies touch virtually every ARB program, including motor vehicles, air-quality planning, toxics, research, enforcement, and air monitoring. They apply to all communities in California but recognize that extra efforts may be needed in some communities due to historical land-use patterns, limited participation in public processes in the past, and a greater concentration of air pollution sources in these communities.

The 2003 Statewide Strategy included in the Valleys 2004 Ozone SIP reflects our environmental justice policies. While all of the new State measures would result in better air quality for residents throughout California, we are making measures that cut exposure and risk in communities with high air pollution burdens a high priority for development. ARB has focused on controlling particulate emissions from diesel

engines, the dominant source in California of known risk from air toxics. ARB has already adopted measures to reduce diesel emissions from trash trucks, stationary and portable engines, transportation refrigeration units, and truck idling. Board staff have begun conducting more truck inspections in communities with high truck traffic as well.

ARB staff is committed to working with districts, local governments, and affected communities to improve statewide compliance for all air pollution sources, whether under ARB or district jurisdiction. ARB staff has already begun to incorporate environmental justice perspectives into our program activities. ARB staff is working with districts to assure that all air pollution complaints are promptly investigated and that feedback is provided to the public on the actions taken in response to those complaints. ARB staff is also working with the local air districts to improve accessibility of information regarding enforcement activities, including notices of violations, monetary penalties, and other sefflement of violations. ARB is also reviewing its own enforcement activities and redirecting efforts where we can achieve a more direct community benefit

VI. LEGAL AUTHORITY

The Clean Air Act Amendments of 1990 (42 U.S.C. section 7401 et seq.) require states such as California to submit to U.S. EPA revisions to the SIP for ozone and PM10 for certain areas. The primary tool to be used in the effort to attain national ambient air quality standards is a plan to be developed by any state with one or more nonattainment areas which provides for implementation, maintenance and enforcement of the standards-the SIP (section 1 IO(a)(l)). Section 110(a)(2)(A) broadly authorizes and directs states to include in their SIPs:

> "...enforceable emission limitations and other control measures, means, or techniques (including economic incentives such as fees, marketable permits, and auctions of emissions rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to meet the applicable requirements of the Act."

Pursuant to these statutory provisions, ARB is charged with coordinating State, regional, and local efforts to attain and maintain both State and national ambient air quality standards. The direct statutory link between ARB and the mandates of the Clean Air Act is found in section 39602 of the Health and Safety Code. This provision states:

> 'The state board is designated the air pollution control agency for all purposes set forth in federal law.
>
> The state board is designated as the state agency responsible for the preparation of the state implementation plan required by the Clean Air Act (42 U.S.C., Sec. 7401, et seq.) and, to this end, shall coordinate the activities of all dii necessaryto comply with that act.
>
> Notwithstanding any other provision of this division, the state implementation plan shall only include those provisions'necessary to meet the requirements of the Clean Air Act."

VII. STAFF RECOMMENDATIONS

As described in this report, ARB staff has reviewed the Proposed 2004 Valley Ozone SIP and consulted extensively with District staff during this review. District staff indicates it will make technical corrections to the plan at or prior to the October 8, 2004 local hearing. These changes include:

- Clarification of the Districts commitment to achieve the aggregate local emission reductions from the defined new measures or from alternative measures in the same timeframe.
- Clarification of the Districts intent to adopt the, long-term measures.
- Clarification that the District will use the SIP update mechanism for changes to the rule development schedule.
- An update to the rate-of-progress calculations demonstrating the required emission reduction progress based on adopted measures.
- Corrections to the emission inventory and other minor revisions.

ARB staff finds that the Proposed 2004 Ozone SIP, with the technical corrections characterized above, meets applicable requirements. We believe that implementation of this plan would clearly reduce ozone levels throughout the San Joaquin Valley and benefit public health. Therefore, we recommend that the Board take the following actions:

(1) Adopt the 2004 San Joaquin Valley Ozone SIP as a revision to the California SIP, including the control strategy, emission inventories, progress demonstration, attainment demonstration, and motor vehicle emission budgets.

(2) Direct the Executive Officer to submit the plan to U.S. EPA as a revision to the California SIP.

CALIFORNIA AIR RESOURCES BOARD

NOTICE OF PUBLIC MEETING TO CONSIDER A STATUS REPORT ON CATALYST TESTING OF SPARK-IGNITION INBOARD/STERNDRIVE PLEASURECRAFT

The Air Resources Board (the Board or ARB) will conduct a public meeting at the time and place noted below to consider the status report on catalyst testing of spark-ignition inboard/sterndrive pleasurecraft. This item is informational only; no regulatory action will be taken.

DATE: October 28.2004

TIME: 9:00 a.m.

PLACE: **In-Person**
San Joaquin Valley Unified
Air Pollution Control District
1990 East Gettysburg Avenue
Fresno, California

Via Videoconference

District Northern Region Office
4230 Kieman Avenue, Suite 130
Modesto, California

District Southern Region Office
2700 M Street, Suite 275
Bakersfield, California

This item will be considered at a one-day meeting of the Board, which will commence at 9:00 a.m., October 28, 2004. The Board will also consider other items at this meeting. Please consult the agenda for the meeting, which will be available at least 10 days before October 28.2004, to determine the order in which the items will be considered by the Board.

If you have a disability-related accommodation need, please go to http://www.arb.ca.gov/html/ada/ada.htm for assistance or contact the ADA Coordinator at (916) 3234916. If you are a person who needs assistance in a language other than English, please contact the Bilingual Coordinator at (916) 324-5049. TTY/TDD/Speech-to-Speech users may dial 7-l-l for the California Relay Service.

Background

At the July 2001 Public Hearing, the Board approved exhaust emission standards for spark-ignition inboard/sterndrive pleasurecraft. The vessels comprising this category are inboards, such as ski boats, and stemdrives, such as cruisers. Prior to this

r&making, there were no state or federal exhaust emission standards for inboard and stemdrive engines. The regulations contain two sets of standards. Beginning with the. 2003 model year, an emission standard went into effect that serves to maintain or "cap" emissions at current levels. Over the 2007-2009 time frame, catalyst-based emission standards will be phased in.

As directed in Board Resolution 01-23 for this rulemaking, it was deemed necessary and proper that ARB undertake a joint developmental in-water testing program in conjunction with the United States Environmental Protection Agency (U.S. EPA), the United States Coast Guard, members of the National Marine Manufacturers Association, and manufacturers and suppliers of emission control equipment in order to demonstrate the safeness and durability of catalysts when used in a marine environment.

Summary of Report

Staff will present to the Board the results of the catalyst test program for inboard/sterndrive pleasurecraft. The report will focus on the demonstration project that was conducted for ARB by the Southwest Research Institute (SwRI) in San Antonio, Texas. The project involved four inboard/sterndrive boats that were fabricated with new, catalyst-equipped exhaust systems and with closed-loop fuel controls. Engine calibrations were optimized, baseline exhaust emissions were sampled and measured, and then the boats were operated for a period of 480 hours at Canyon Lake in Texas. During the 480-hour accumulation of on-water operation, exhaust samples were obtained and sampled to verify that the emission control systems were functioning properly. Following the 480-hour accumulation, the engines were then re-tested at the SwRI laboratory.

The successful results from the demonstration project should allay the concerns about the safeness and durability of catalysts in a marine environment. The results also m-confirm that California's catalyst-based standards are indeed feasible with emission control technology that is presently available.

Staff will also report on other issues related to inboard pleasurecraft, including U.S. EPA's proposed rulemaking for evaporative controls and recent concerns involving carbon monoxide emissions.

Availability of Documents and Agency Contact Person

ARB staff will present a written status report at the meeting. Copies of the report may be obtained from the Board's Public Information Office, 1001 "I" Street, 1st Floor, Environmental Services Center, Sacramento, California 95814, (916) 322-2990, October 18, 2004. The staff report may also be obtained from ARB's Internet site at http://www.arb.ca.gov/msprog/marine/marine.htm.

Interested members of the public may also present comments orally or in writing at the meeting, and in writing or by e-mail before the meeting. To be considered by the Board; written submissions not physically submitted at the meeting must be received **no later than 12:00 noon, October 27, 2004,** and addressed to the following:

Postal mail is to be sent to:

Clerk of the Board
Air Resources Board
1001 "I" Street, 23rd Floor
Sacramento, California 95814

Electronic mail is to be sent to cattest@listserv.arb.ca.gov and received at the ARB **no later than 12:00 noon, October 27, 2004.**

Facsimile submissions are to be transmitted to the Clerk of the Board at (916) 322-3928 and received at the ARB **no later than 12:00 noon, October 27, 2004.**

The Board requests, but does not require 30 copies of any written submission. Also, the ARB requests that wriien and e-mail statements be filed at least 10 days prior to the meeting so that ARB staff and Board members have time to fully consider each comment. Further inquiries regarding this matter should be directed to Ms. Jackie Lourenco, Manager, Off-Road Controls Section, at (626) 5756676, 9528 Telstar Avenue, El Monte, California 91731, or at jlourenc@arb.ca.gov.

CALIFORNIAAIR RESOURCES BOARD

Catherine Witherspoon
Executive Officer

Date: October 5, 2004

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 Web-site at www.arb.ca.gov.

State of California
AIR RESOURCES BOARD

STAFF REPORT

PUBLIC, MEETING TO CONSIDER A STATUS REPORT ON CATALYST TESTING OF SPARK-IGNITION INBOARD/STERNDRIVE PLEASURECRAFT

Date of Release: October 15, 2004
Scheduled for Consideration: October 28, 2004
Agenda Item No.: 04-9-3

FOREWORD

This report contains results from emission tests performed on four spark-ignition inboard/stemdrive marine engines, before and after 480 hours of 'on-water" operation with a catalyst-equipped exhaust system. As part of the 2001 rulemaking that established catalyst-based exhaust emission standards for inboard and stemdrive engines, the Board directed staff to undertake a joint developmental test program to demonstrate the safeness and durability of catalysts in the marine environment.

Other participants contributing to this project were:

- National Marine Manufacturers Association: providing boats and engines
- Manufacturers of Emission Controls Association: supplying catalysts and emission control support
- United States Coast Guard – Flotilla #74*: safely operating the boats on Canyon Lake

The Southwest Research Institute was contracted by the Air Resources Board to conduct the project, which commenced in August 2002 and was completed by September 2004.

* A special thank you to Ms. Dona Lore, for her generous efforts at Canyon Lake.

Table of Contents

I. Introduction

The purpose of this report is to present the findings of an "on water" catalyst test project for inboard and stemdrive boats. The project was conducted over the 2002-2004 time frame for the purpose of demonstrating the safeness and durability of catalysts and other related emission control components in the marine environment. The report will also inform the Board of recent events that are of importance to the inboard/stemdrive rulemaking.

II. Background

Regulatory activity aimed at controlling exhaust emissions from spark-ignition recreational marine engines is less than ten years old. The United States Environmental Protection Agency (U.S. EPA) first adopted exhaust emission standards for personal watercraft and outboard boat engines in 1996. However, revised emissions inventory modeling showed that the benefits of the federal rulemaking were not sufficient to meet California's air quality goals. Therefore, the Air Resources Board (the "Board" or "ARB") adopted exhaust emission regulations for spark-ignition recreational marine engines in 1998. The Board approved regulations 'that accelerated the 2006 federal standards to begin in 2001 in California. The regulations also set more stringent standards for these engines in 2004 and 2008. By 2008, personal watercraft and outboard engines in California will meet exhaust emission standards that are numerically 65 percent less than federal exhaust emission standards.

Although personal watercraft and outboard boats contributed more emissions, the inventory modeling showed that inboard and stemdrive boats also contributed significantly to ozone-forming emissions in California. Because of this, the Board adopted exhaust emission standards for these vessels in 2001. Beginning with the 2003 model year, manufacturers of inboard and sterndrive engines have been required to demonstrate compliance to standards that are equivalent to California's 2008 standards for personal watercraft and outboards. During the 2007-2009 time frame, catalyst-based emission standards will be phased-in.

A) Description of Inboards and Sterndrives

Inboard and stemdrive vessels are primarily used for recreation. The engines are most commonly derived from V-8 or V-6 automotive gasoline engines. In the simplest inboard design, the engine drives a long, straight propeller shaft. This is the oldest historical design and it remains popular today. Wih stemdrive boats, the engine is situated inboard in the extreme rear-end of the boat, with the S-shaped transmission external to the boat.

Another type of propulsion system is the inboard V-drive. It is referred to as a V-drive because the engine is placed at the extreme rear end of the boat but faces backward with the shaft-end toward the front, forming the shape of a "V." This placement allows more room in the boat. The exhaust in this configuration is also routed through the transom.

B) 2001 Rulemaking

Following a public hearing on July 26, 2001, the Board adopted provisions for emission standards, certification, environmental/consumer labeling, on-board diagnostics and other related requirements to the California regulation governing spark-ignition inboard and stemdrive engines. The emission standards begin with the 2003 model year and later inboard and stemdrive engines. A phase-in schedule for the catalyst-based emission standards was also adopted, beginning with the 2007 model year.

This regulatory action made 2003 and later inboard and stemdrive engines subject to the provisions found in Tie 13 of the California Code of Regulations (CCR), Sections 2440-2446. The in-use compliance testing and recall provisions found in CCR Sections 211 I-2140 and 2147 apply to 2009 and later inboard and stemdrive engines.

The non-catalyst based emission standard for 2003-2008 model year inboard and stemdrive engines is 16 grams per kilowatt-hour (g/kW-hr) for hydrocarbons plus oxides of nitrogen ($HC+NO_x$). This standard characterizes emissions from current production and achieves the intent of "capping" the exhaust emissions until the catalyst-based standards become effective. The catalyst-based standard is 5 g/kW-hr $HC+NO_x$. Engines complying wlth this standard will be phased-in over the 2007-2009 time frame at a rate of: 45%–75%–100%. These percentages are based on the manufacturers annual sales. The phase-in was incorporated to provide manufacturers flexibility to develop and introduce cleaner engines over a three-year period.

In order to keep the emission control system functioning properly and safely, 2007 and later inboard and stemdrive marine engines meeting the 5.0 g/kW-hr $HC+NO_x$ emission standard are to be equipped with an on-board diagnostics marine (OBD-M) system. The OBD-M system will be responsible for monitoring the catalyst, oxygen sensor, fuel system, and comprehensive components (sensor and solenoids). These requirements also provide manufacturers flexibility, with respect to component monitoring strategies and fault code/communication formatting, while still maintaining the desired effectiveness. In case of malfunction, a light or other indicator would be illuminated or activated. If required by the Executive Officer, misfire monitoring will be required on 2009 and later engines. The "misfire monitoring" requirement is subject to Executive Officer approval and shall be based on the need to protect the catalyst.

C) Board Hearing Resolution – Directing Project

To support the proposal for establishing the inboard/sterndrive emission standards, staff successfully demonstrated in a laboratory setting that catalysts and closed-loop fuel systems were feasible and cost-effective. However, industry had two main concerns: 1) excessive heat from a catalyst and 2) water damaging the emission control components. In response to industry's concerns, the Board agreed to undertake a more thorough study of the technology. Board Resolution 01-23 contains the following pertinent paragraphs:

> It is necessary and proper that ARB shall undertake a joint developmental in-water testing program in conjunction with U.S. EPA, U.S. Coast Guard, members of the National Marine Manufacturers Association and manufacturers and suppliers of emission control equipment, in order to demonstrate the safeness and durability of catalysts when used in a marine environment. This program shall include vessel operation in both fresh and salt water; and
>
> It is necessary and proper that ARB staff shall address the Board in 2003 and 2005 to report the findings of the in-water testing program, other related technological developments, and an assessment of the overall feasibility of the regulatory requirements – including the stringency of the emission standards – as well as providing industry the opportunity to present their own assessment of these issues to the Board, and in such reviews staff may consider additional information in order to assist the Board to determine whether it needs to re-evaluate the regulatory requirements.

Following approval of the inboard/sterndrive regulations, staff began the work effort to conduct the testing program. Because of various unexpected delays, the project took considerably longer to complete; thus, the report that was anticipated in 2003 was re-scheduled to 2004. Also, because of budget constraints, vessel operation was limited to fresh water operation.

III. On-Water Demonstration Project

A) Overview and Aim of Project

In August 2002, the Southwest Research Institute (SwRI) commenced work on a project entitled "Development of Low Emission SD/I Boats" ('SD/I" refers to the types of boats; namely stemdrive and inboard boats). As stated in Resolution 01-23, the intent of the project was to demonstrate the safeness and durabilii of catalysts.

Along with ARB's financial contribution, members of the National Marine Manufacturers Association provided boats and engines, members of the Manufacturers of Emission Controls Association provided the emission control devices, and the United States Coast Guard provided the personnel to operate the boats until the desired 480 hours' of 'onwater" use had been accumulated. As mentioned, SwRI was contracted to conduct the test program, which included fabricating new exhaust systems and sampling the exhaust emissions.

B) Description of Test Vessels

There were four test vessels in the project. The 5.7-liter (L) displacement engine was selected for three of the boats because it is the most popular engine with inboards and stemdrives. Because this test program was to study catalysts, not engines, using the same engine helped to streamline the efforts towards optimizing the engine calibrations. However, a 4.3L engine was also included because such engines are used in entry-level inboard/sterndrive boats. In an attempt to sample a variety of inboard and stemdrive pleasurecraft, the following vessel types and engines were selected. Table 1, below, describes the differences.

Table 1.

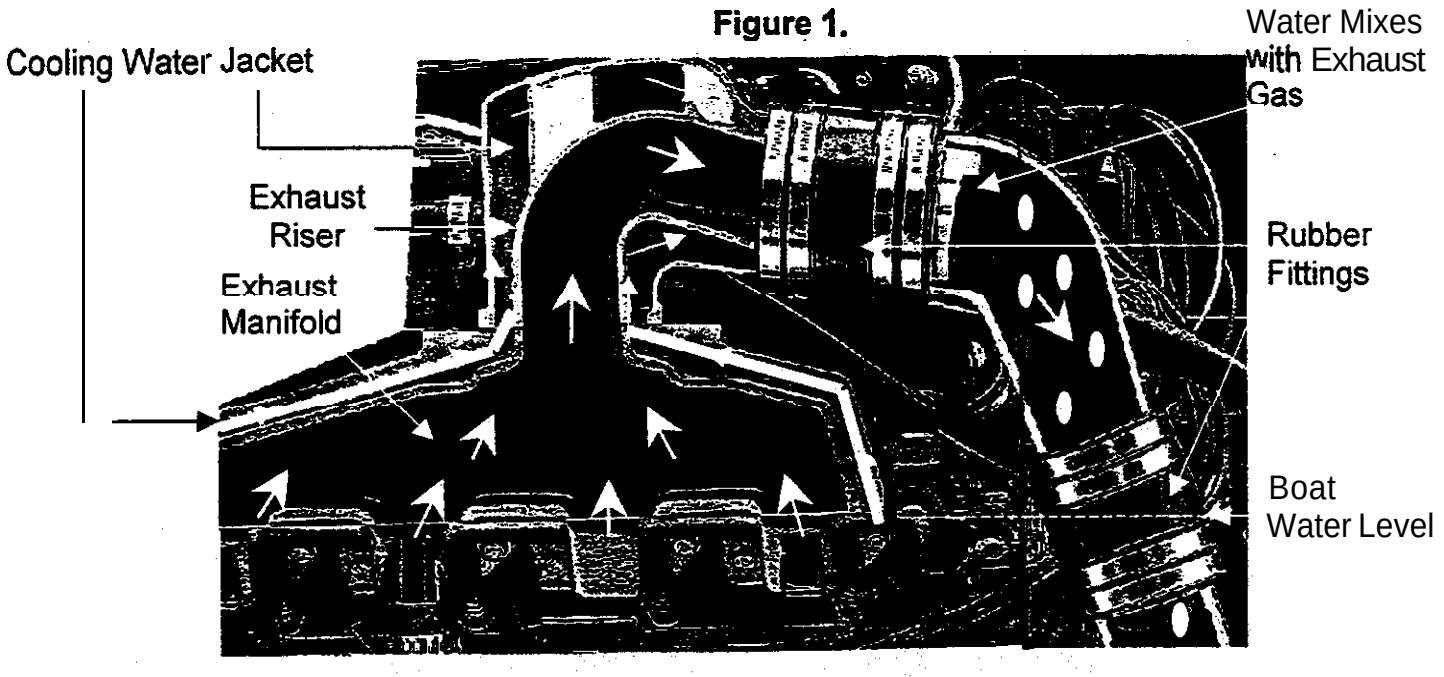
Boat Model	Typical Use	Vessel Type	Engine Type and Displacement
Malibu Wakesetter	Ski Boat	Inboard	V-8 / 5.7L
MasterCraft Maristar	Cruiser	V-drive	V-8 / 5.7L
Sea Ray 220	Cruiser	Sterndrive	V-8 / 5.7L
Sea Ray 190	Cruiser	Stemdrive	V-6 / 4.3L

[1] 480 hours of "on water" operation was chosen because in the inboard/sterndrive regulations, 480 hours is the "useful life" period for compliance testing.

C) Fabrication of Catalyst-Equipped Exhaust Systems

In current inboard and stemdrive designs, water is circulated through the exhaust manifold to provide cooling. Water is also mixed with the exhaust gases for the same reason. Figure 1, below, is a cutaway image of a typical inboard/stemdrive exhaust system. The "red" areas (with the large white arrows) show the exhaust flow; the "blue" areas (small arrows) and droplets respectively show the cooling water's passages and its mixing with the exhaust gases.

Figure 1.



The practice of mixing water with the exhaust gases has been the main technical issue with regards to applying three-way catalysts and feedback air-fuel controls to these engines. Specifically, the concern is "water reversion," whereby given the right circumstances, sea or lake water can travel upstream in the exhaust system. This was a concern because it was thought that water could potentially damage the emission control system. However, SwRI was able to show (based on results from a previous SwRI project) that water in the exhaust/engine was primarily due to condensation, not reversion. By controlling cooling water with a thermostat, condensation problems were largely resolved. For the "Development of Low Emission SD/I Boats" project, a thermostatically controlled cooling system with a water-jacketed exhaust system was used on each of the four engines. Also, because water is commonly mixed with the exhaust gases for cooling purposes, the catalysts and oxygen sensors were placed well upstream of the exhaust gas/water mixing point.

Because it allows for more room on deck, inboard and stemdrive engine compartments are often designed to fit closely around the engine. Such was the challenge in fabricating the new exhaust systems; i.e., making them fit within the confines of the existing engine compartment space. SwRI met the challenge and successfully engineered the catalyst-equipped exhaust systems to neatly fit. The following images are of the exhaust system fabricated by SwRI for a 5.7L engine.

Figure 2 shows the new exhaust system mounted on the engine as the developmental work was in progress in the test cell (i.e., the actual catalyst was not yet installed at this point and thus, only its 'location" is shown]. Comprised of four sections, the exhaust gases from the engine exit via the exhaust manifold, then are routed upward through a new C-shaped riser. The exhaust gases then enter, pass through the catalyst, and exit through a new water-jacketed exhaust pipe.

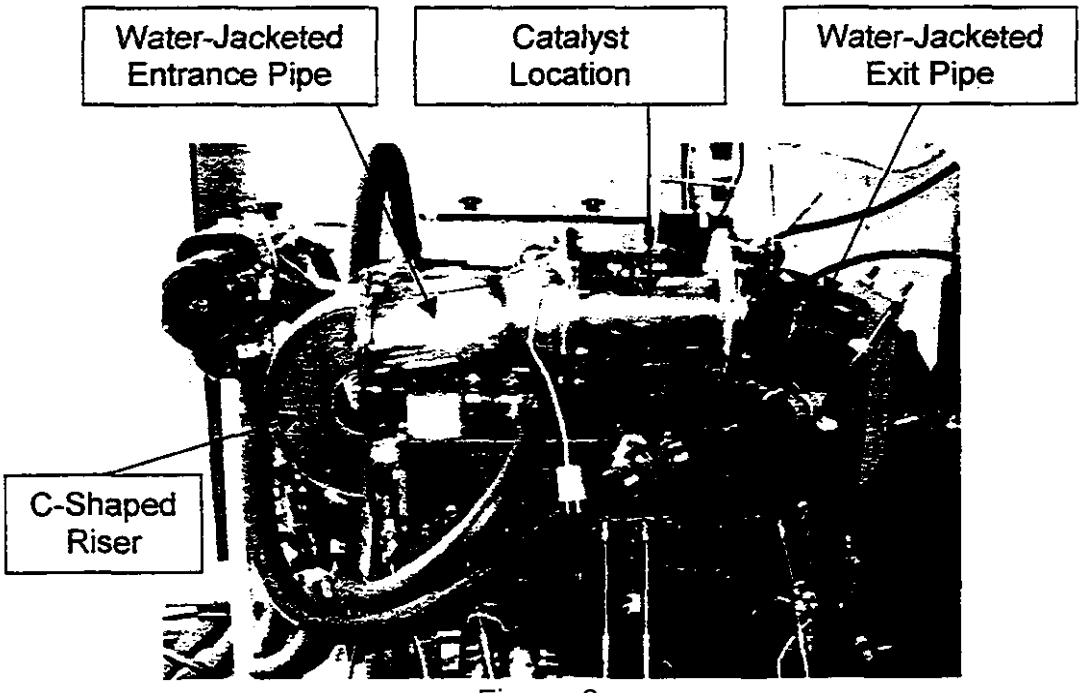


Figure 2.

Figure 3 shows the completed new exhaust system, with the catalyst installed.

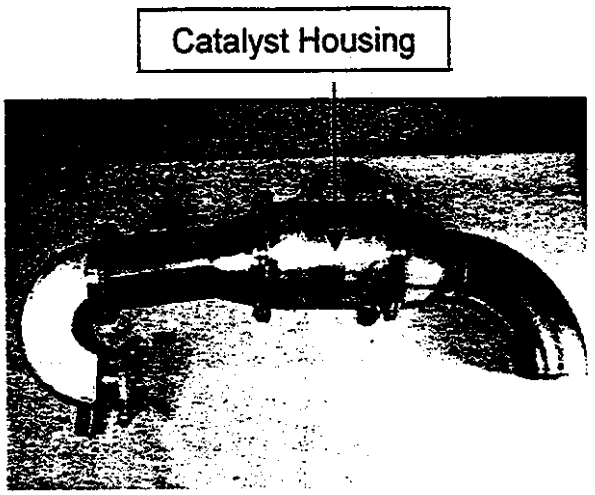


Figure 3.

D) Baseline Calibrations and Emission Testing

A 5.7L and 4.3L engine were used for initial developmental efforts. Specifically, these efforts included developing closed-loop calibrations (i.e., mapping the ignition timing, optimizing the engine controllers software settings, etc.) and analyzing the performance of various types of catalysts (both metallic and ceramic substrates). Once optimal settings and calibrations were determined; the work to modify the uncontrolled 'boat engines proceeded.

Zero-hour baseline emissions for each engine were measured while exercising the engine over an established five-mode steady-state certification test cycle for spark-ignition marine engines. Table 2, below, compares the emissions from the uncontrolled development engines with the baseline emissions of the controlled boat engines. On average, $HC+NO_x$ emissions on the 5.7L engines were reduced by 80 percent. On the 4.3L engine, the $HC+NO_x$ emissions were reduced by more than 85 percent.

Table 2.
Exhaust Emission Comparisons

Uncontrolled vs. Baseline Controlled	Brake-Specific Emissions (Grams per Kilowatt-Hour)			
Boat / Engine	HC	NO_x	$HC+NO_x$	CO
5.7L Uncontrolled Engine	5.44	6.68	12.12	193.0
5.7L Baseline Controlled-Malibu Wakesetter	1.72	0.95	2.68	99.6
5.7L Baseline Controlled-MasterCraft Maristar	1.79	0.57	2.37	84.8
5.7L Baseline Controlled-Sea Ray 220	1.82	0.51	2.33	74.2
4.3L Uncontrolled Engine	4.94	11.67	16.61	110.8
4.3L Baseline Controlled-Sea Ray 190	1.90	0.48	2.38	106.3

Below in Figures 8, 9, and 10 are images of the catalyst-equipped engines, installed in two of the boats' existing engine compartments.

Malibu Wakesetter

Engine Compartment Closed

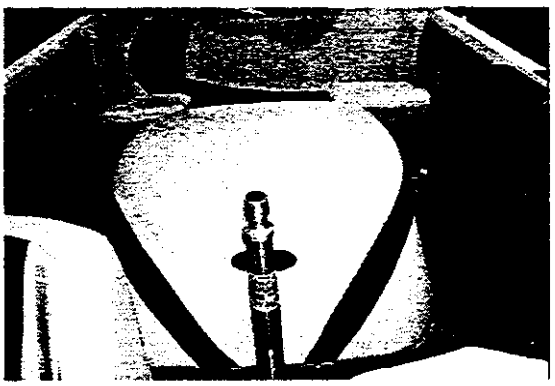


Figure 8.

Engine Compartment Open

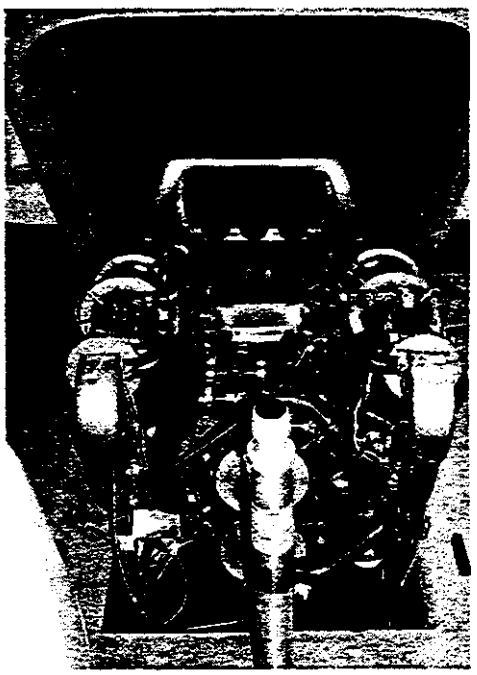


Figure 9.

MasterCraft Maristar

Engine Compartment Open

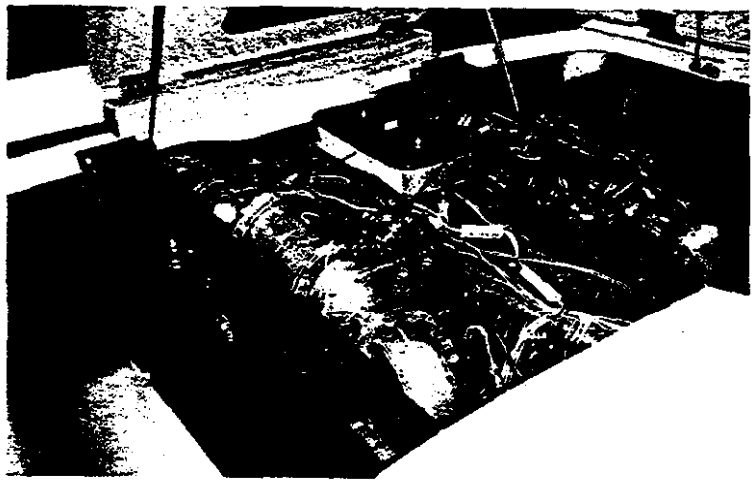


Figure 10.

E) 480-Hour On-Water Accumulation

Figures 11 and 12 below show images of these two catalyst-equipped boats operating on the water for the first time.

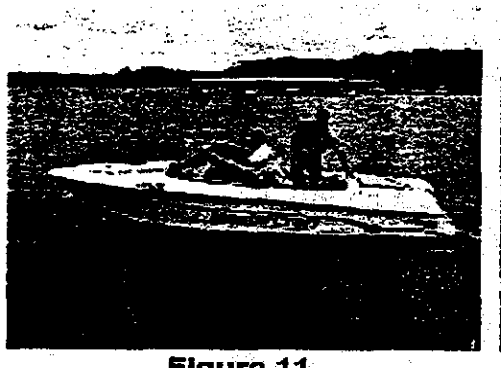


Figure 11.

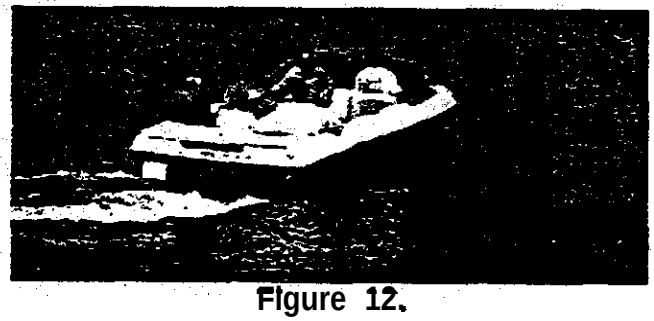


Figure 12.

The completed boats were transported to Canyon Lake, Texas, for the 'on-water" portion of the test program, which was the accumulation of 480 hours of use. Members of the local United States Coast Guard Flotilla contributed in this effort, beginning in December of 2003 and finishing in September of 2004.

Periodic "on-water" emission testing was conducted using a portable dilution system that drew a sample of raw exhaust, and diluted that sample with ambient air. Sample bags were filled with exhaust gases and transported to SwRI for analysis. This type of analysis- is not as rigorous as "in laboratory" testing, but' was essential to ensure the emission controls and devices were operating properly.

The on-water emission testing during the 480-hour accumulation period confirmed that the emission control system was operating properly and safely without incident. However, it should be noted that some mechanical problems did occur, which were not catalyst related. The Vdrive unit on the MasterCraft boat developed a leaky seal, causing the oil to run out. The propeller on the Malibu boat encountered a log and became bent beyond repair; thus, requiring replacement. The Sea Ray 190 also developed a "hot-start" problem. This was solved by replacing the ignition coil and the high tension lead to the distributor.

The engines in the Malibu and MasterCraft boats also became "hydro-locked during the test program because of leaking and cracked aftermarket exhaust manifolds. Hydro-locking is a condition in which one or more engine cylinders fill with water. Because the water cannot be compressed, the engine can no longer rotate internally. Figure 13, below, shows a close-up image of exterior cracks (lengthwise, in the marked areas) in the exhaust manifold from the MasterCraft boat. Similar cracks inside the manifolds leaked water into the cylinders, causing the problem.

Cracks in Exhaust Manifold

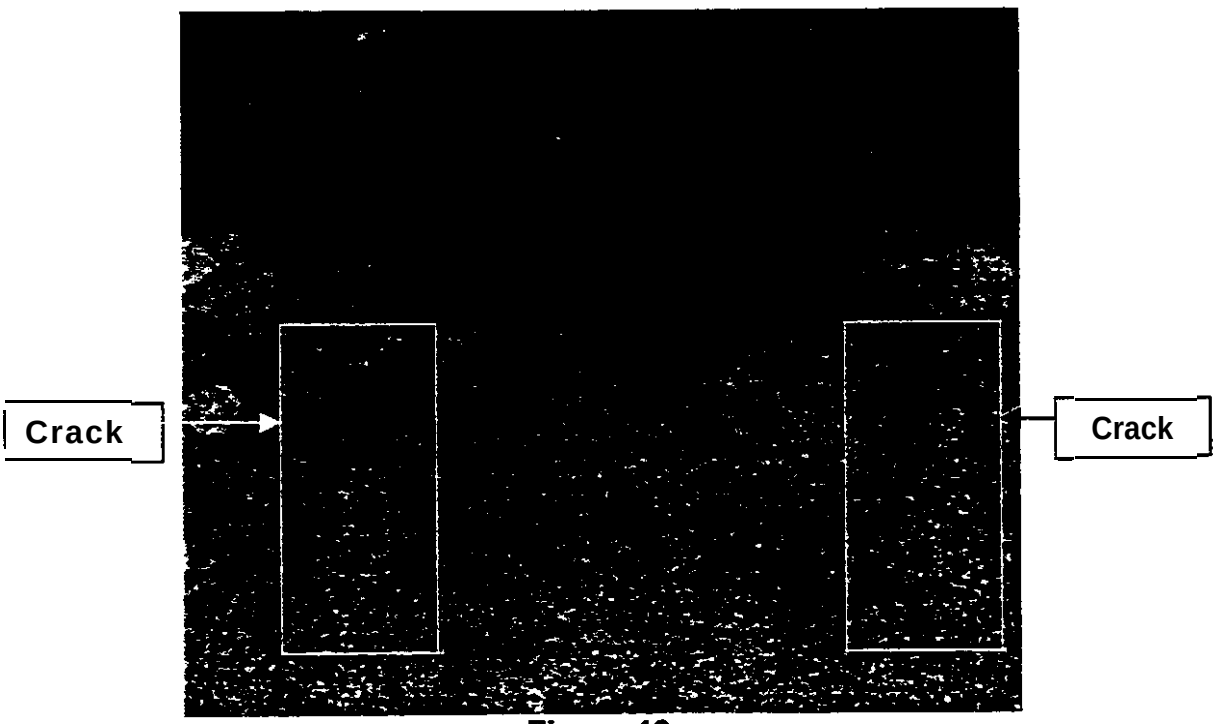


Figure 13.

Hydro-locking can exert excessive stress on connecting rods when the operator attempts to start an engine with water in one or more cylinders. Rather than risk engine problems later on, the engines' connecting rods in the cylinders where water was found were replaced. While the engine was apart, the catalysts were inspected and no signs of failure or damage were observed.

The accumulation of 480 hours of operation over a period of months (as was done in this project) is not typical; on average it takes years to reach (the test period (useful liie). Nevertheless, because two of the four engines developed cracked manifolds, suggesting overheating, staff has investigated possible explanations for this development.

- The engines were calibrated to operate at stoichiometry, which is leaner than uncontrolled calibrations, and could have resulted in periods of higher combustion and exhaust gas temperatures.
- Generally, the thennostat in the cooling system maintained an outlet temperature at 185° F. This was slightly higher than normal (to guard against condensation), but under the 200° F safety threshold set by the U.S. Coast Guard. Therefore, it is unlikely the thermostat setting contributed to the manifolds cracking.
- The exhaust manifolds that failed were used on the Malibu and MasterCraft engines only had partial water-jacketing, while the exhaust manifolds on both Sea Ray engines were completely water-jacketed. Neither of these fully jacketed manifolds developed cracking or hydro-locking conditions.

Partial water-jacketing creates larger temperature gradients throughout the manifold, which increases the likelihood of cracking. The use of fully water-jacketed exhaust manifolds for future catalyst-equipped engines will diminish the occurrence of cracking manifolds.

F) Final Emission Testing

Upon successful completion of 480 hours of "on-water" operation, the boats were returned to SwRI. The engines were removed from the boats and installed in a test cell for emission testing. Compared to O-hour baseline testing, some deterioration of the emission levels is expected after 480 hours of use. Staff was very pleased to learn however, that although demonstrating compliance to the 2007-2009 catalyst-based standards was not the aim of this project, all three 5.7L engines remained under the 5.0 g/kW-hr standard for $HC+NO_x$. Tables 3, 4, and 5, below, compare the O-hour and 480-hour emission results.

Table 3.

5.7L Malibu Wakesetter	Brake-Specific Emissions (Grams per Kilowatt-Hour)			
	HC	NO_x	HC+NO_x	C O
0-hour	1.72	0.95	2.68	99.6
480-hour	2.07	1.68	3.75	117
Percent Change	20%	76%	40%	17%

Table 4.

5.7L MasterCraft Maristar	Brake-Specific Emissions (Grams per Kilowatt-Hour)			
	HC	NO_x	HC+NO_x	C O
0-hour	1.82	0.54	2.36	86.5
480-hour	1.71	0.96	2.67	101.6
Percent Change	-6%	78%	13%	17%

Table 5.

5.71 Sea Rav 220	Brake-Specific Emissions (Grams per Kilowatt-Hour)			
	HC	NO_x	HC+NO_x	CO
0-hour	1.82	0.51	2.33	74.2
480-hour	1.53	0.93	2.46	92.5
Percent Change	-16%	82%	6%	25%

The 4.31 engine in the Sea Ray 190 exceeded the catalyst-based standard slightly. Although further investigation on the engine will be conducted to explain the reason(s) for the higher emission levels, SwRI has already determined that excessive fuel was being delivered to one engine bank; and one cylinder on that bank had low compression. The excessive fuel would explain the increase in HC emissions. The low compression in one of the cylinders would result in incomplete combustion, which would also increase HC emissions. However, more importantly, incomplete combustion also results in increased oxygen levels in the exhaust, which would significantly reduce the catalysts NO, reduction efficiency.

No cause for the excessive fuel and low compression has been reported by SwRI at this time. However, these "problems" do not appear to be related to the installation of the catalysts. It should also be noted that despite the conditions experienced by this engine, the $HC+NO_x$ emissions were still well below the uncontrolled level of 16.61 g/kW-hr; suggesting that the catalyst was still functioning efficiently.

Table 6.

Sea Ray 190 4.3l	Brake-Soecific Emissions (Grams per Kilowatt-Hour)			
	HC.	NO_x	$HC+NO_x$	CO
O-hour	1.90	0.48	2.38	106.3
480-hour	2.97	2.77	5.75	15.9
Percent Change	57%	479%	142%	9%

G) Assessment of Emission Controls

With the goal of demonstrating safeness and durability of catalysts, the project was successful. There were no instances of fire or excessive heat, and the results from both the on-water and in-laboratory exhaust sampling show that catalysts are robust in the marine environment.

Figures 14 and 15 below compare the inlets and outlets of the catalysts from the engine used in the Sea Ray 220 boat. These, as well as the other catalysts, were not fractured or damaged during the test program.

Left and Right Bank Inlets

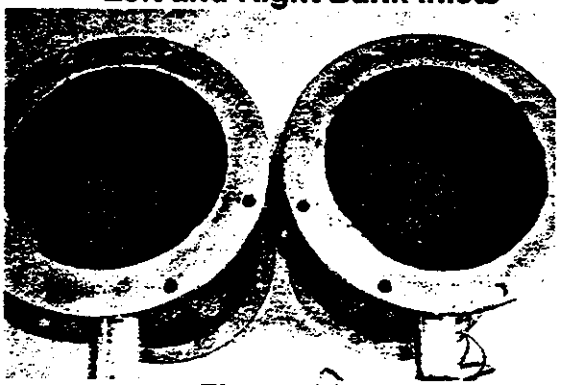


Figure 14.

Left and Right Bank Outlets

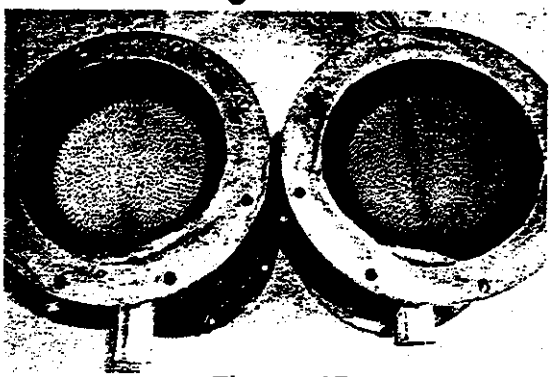


Figure 15.

Another notable success was the upstream oxygen sensors. These prototype sensors were designed with a shrouded tip, to make them less prone to water damage. Throughout the course of the on-water accumulation, these sensors did not require replacement. It should be noted that the oxygen sensor was upstream of the catalyst, not downstream. Manufacturers have raised issues with the durability of downstream sensors in the marine environment. Staff believes the thermostatic control of cooling water, which reduces condensation, should alleviate the problem.

IV. Other Related Issues

A) U.S. EPA Proposed Rulemaking

In August 2002, U.S. EPA announced a proposed rulemaking aimed at controlling evaporative emissions from spark-ignition marine engines (including inboards, stemdrives, personal watercraft, and outboards). According to their emission inventory modeling, spark-ignition marine engines were responsible for 108 tons per day (tpd) of evaporative emissions in 2000, nationwide. By 2020, these emissions are projected to increase to 114 tpd. Evaporative emissions are primarily hydrocarbon emissions. For comparison, over the same time frame hydrocarbon exhaust emissions from these marine engines are projected to drop from 708 to 284 tpd because of the regulations for exhaust emissions.

The U.S. EPA is considering reducing diurnal emissions, fuel tank permeation, and fuel hose permeation. The proposed standards represent more than a 25 percent reduction in diurnal emissions and a 95 percent reduction in permeation from both tanks and hoses. At the time this proposal was released, U.S. EPA did not propose exhaust emission standards for inboard and stemdrive engines. Instead, they wanted to collect more information and investigate further the application of catalysts; which would not only apply to inboards and stemdrives, but also personal watercraft and outboard engines.

Staff anticipates a final rulemaking from U.S. EPA by late 2004 or early 2005.

B) Carbon Monoxide Emissions

Neither the federal nor California regulations for spark-ignition marine engines contain emission standards for CO. Both control measures focused on reductions of ozone-forming emissions; i.e., HC and NO,. However, as an added benefit from the improved fuel calibrations and the conversion from two-stroke to four-stroke technology with personal watercraft and outboard engines, CO emissions are expected to decrease. These reductions are expected to decrease further with the introduction of inboard and stemdrive engines meeting the catalyst-based standards.

Recent studies have been undertaken to study CO exposure in the recreational marine environment. A prominent study, led by the National Institute for Occupational Safety and Health,* took place at Lake Havasu, where recreational boating is quite popular. CO monitoring equipment was placed in various locations, both on boats and on land near the shore. NIOSH recommends CO levels not exceed 35 parts per million (ppm), as measured over a time-weighted average during an eight-hour workday with a maximum exposure of 200 ppm. Over a holiday weekend, CO concentrations were measured in the 100-200 ppm range. These measurements were taken "on shore" where the Lake Havasu employees and police personnel work. They also measured CO levels. increasing at a rate of 20-30 ppm per hour when the wind began to die down.

There have also been prominent news stories about people becoming ill and dying due to CO exposure after engaging in an activity known as "teak surfing." In teak surfing, a person rides the "wake" that is caused by the propulsion of the boat through the water. This is done at slow speeds, with the person in the water following very closely behind the back of the boat. The back of the boat is also where the exhaust gases are routed; thus, putting the teak surfer at risk.

The U.S. Coast Guard and the boating industry have been holding workshops to discuss CO exposure. While recognizing that both propulsion engines and auxiliary engines (e.g., generators) need to emit low levels of CO, there is a strong need to educate the boating community about the hazards of those activities that place people in close proximity of the exhaust. At these meetings, U.S. EPA has announced they are working towards proposing CO emission standards for spark-ignition marine engines that will reduce emissions by approximately 50 percent. The reduction in CO observed from tie 5.7L engines tested in our program was approximately 50 percent. The catalysts did not lower CO emissions from the 4.3L test engine.

C) Industry's Concerns

Since the 2001 inboard/sterndrive rulemaking, the boating industry has raised three issues with staff. In 2003, the National Marine Manufacturers Association approached staff with a request to amend the phase-in of the catalyst-based standards. Instead of a three-year phase-in (45%–75%–100%) during model years 2007-2009, industry requested we consider 100 percent compliance in 2008. A statewide inventory analysis for 2010 and 2020 shows that a full implementation alternative in 2008 would not have a negative impact, although certain local air pollution control districts have counted on the reductions from catalyst-based standards taking effect in 2007.

Another request from industry is to amend the regulations to continue to allow corporate averaging beyond 2008. Currently, engines over 500 horsepower are unregulated through 2008. Industry would like to be able to certify non-catalyzed

[2] (NIOSH -a Federal agency that is part of the Centers for Disease Control and Prevention)

engines over 500 horsepower by averaging their emissions with the emissions from their controlled (i.e., catalyst-equipped) engines. Manufacturers believe that because the over 500 horsepower engines comprise a very small percentage of sales, their uncontrolled emissions will be more than offset by much lower emission levels from the catalyst-equipped engines; and that this flexibility will not compromise the air qualii benefits of the inboard/sterndrive regulations.

Lastly, industry has requested to phase-in the on-board diagnostic requirements. The first phase, to begin in 2008, would not include catalyst monitoring. Catalyst monitoring is typically done with two sensors: pre- and post-catalyst. Industry has concerns about post-catalyst sensors surviving in the marine environment. Following an industry-proposed Technology Review in 2010. the second phase, which would include catalyst monitoring, would be delayed until 2012.

Staff is suggesting meeting with industry to discuss these issues in further detail and, if warranted, returning with its findings for the Board's consideration next year.

V. Conclusion

The "on-water" demonstration project successfully demonstrated that catalysts are safe in the marine environment. There were no heat-related safety issues that arose during the 480 hours of operation (cumulatively, over 1,900 hours). The cooling system fabricated by SwRI kept the skin temperature of engine components below 200 degrees Fahrenheit, which is the threshold to which the U.S. Coast Guard requires and industry complies.

Durability was also demonstrated. The catalysts continued to function efficiently. Three of the four engines measured below California's 5.0 g/kW-hr $HC+NO_x$ standard after the 480 hours of operation. The engine that exceeded the standard by 15 percent was determined to have developed low compression in one of its cylinders; leading to less-than-optimal combustion and higher-than-normal HC emissions. Nevertheless, the $HC+NO_x$ emissions were still much lower than uncontrolled levels. Another important display of durability was the fact that the exhaust gas oxygen sensors did not require replacement throughout the project.

Because of the successful outcome of the test program, staff believes that the overall feasibility of the regulatory requirements has been reinforced. Staff therefore recommends continued support of the catalyst-based emission standards for inboard and stemdrive engines. During the next year, staff can discuss with industry their concerns and requests to amend the regulations and report back to the Board in 2005.

TITLE 13. CALIFORNIA AIR RESOURCES BOARD

NOTICE OF PUBLIC MEETING FOR THE INTERIM UPDATE ON THE HEAW-DUTY DIESEL ENGINE VOLUNTARY SOFTWARE UPGRADE (CHIP REFLASH) PROGRAM

The Air Resources Board (the Board or ARB) will meet publicly at the time and place noted below for an interim update of the heavyduty diesel engine voluntary software upgrade program. The adopted software upgrade regulation mandates installation of software to reduce emissions of oxides of nitrogen (NOx) from 1993-1999 model year heavy-duty vehicles. However, the Board directed staff to withhold filing the adopted regulation with the Office of Administrative. Law to allow the engine manufacturers, dealers, California Trucking Association, and vehicle owners to work together to get low NOx software installed on a voluntary basis. Interim results were reported to ARB on September 7, 2004. Staff will report on those interim results in preparation for the voluntary program evaluation at the December board hearing.

The software upgrades, referred to as low NOx software, were developed in the 1990s as a result of negotiations between the United States Environmental Protection Agency (U.S. EPA), the ARB, and seven engine manufacturers. Owners of eligible vehicles and dealers/distributors with the capability to install the software have responsibilities under the proposed regulation.

DATE: October 28.2004

TIME: 9:00 a.m.

PLACE: **In-Person**
San Joaquin Valley Unified
Air Pollution Control District
1990 East Gettysburg Avenue
Fresno, California

Via Videoconference

District Northern Region Office
4230 Kiernan Avenue, Suite 130
Modesto, California

District Southern Region Office
2700 M Street, Suite 275
Bakersfield, California

The Board will also consider other items at this meeting. Please consult the agenda for the meeting, which will be available at least 10 days before October 28, 2004, to determine the order in which the items will be considered by the Board.

If you have a disability-related accommodation need, please go to http://www.arb.ca.gov/html/ada/ada.htm for assistance or contact the ADA Coordinator at (916) 323-4916. If you are a person who needs assistance in a language other than English, please contact the Bilingual Coordinator at (916) 3245049. TTY/TDD/Speech-to-Speech users may dial 7-l-l for the California Relay Service.

Background

The ARE has adopted a regulation to reduce air pollution by requiring owners and operators of trucks, school buses, and motor homes with 1993-1998 model year heavy-duty diesel engines to upgrade the software in the electronic control module (ECM) of these engines. Software

upgrades were developed by the engine manufacturers and are available now for most 1993-1998 model year engines. When the Board adopted the regulation in March 2994, they directed staff to withhold filing the regulation and allow the engine manufacturers, the dealers, the California Trucking Association, and the vehide owners to work together to get low NOx software installed on eligible engines on a voluntary basis.

When, and if, the regulation is filed, owners and operators of eligible vehicles that operate in California must ensure that the engines in their vehides have the appropriate low NOx software installed. Since many 1999 model year vehides have engines produced in 1998. owners and operators of 1999 model year vehicles will need to check to determine if they are affected. Distributors and dealers must provide the appropriate low NOx software to the vehicle owner or operator upon request.

The heavy-duty diesel engine software upgrade (also referred to as low NOx software upgrade or chip reflash) is simply software installed in the engine that reprograms the vehicle's computer and reduces NOx emissions. The installation process typically takes between one-half to one hour.

The ARB staff has prepared a list that can be checked to determine if low NOx software is available for the engine. This list is available from our web site at: http://www.arb.ca.gov/msprog/hdsoftware/hdsoftware.htm

The heavy-duty diesel engine software upgrade has been provided to the vehicle owners at no charge upon request under the voluntary program. The ARB staff believes the applicable Consent Decrees and Settlement Agreements require manufacturers to supply the low NOx software at no cost whenever it is requested. Out-of-service costs to the vehicle owner can be reduced or eliminated if the low NOx software is installed at the same time as another service or repair.

Under the voluntary program, there is no requirement for the vehide owners to install low NOx software. If this regulation is filed, it will require the low NOx software upgrade to be installed on a schedule that depends on the model year of the engine in the affected vehide as follows:

1993-1994 model years	By April 30, 2005
1995-I 996 model years	By August 31.2005
1997-I 998 model years	By December 31.2005 (except for medium heavy-duty diesel engines (MHDDEs))
1997-1998 model year MHDDEs	By December 31, 2006

The ARB enforcement staff will verify required installations of the low NOx software through a modified Heavy-Duty Vehicle Inspection Program and moditied Heavy-Duty Vehicle Fleet Inspection Program.

AVAILABILITY OF DOCUMENTS AND AGENCY CONTACT PERSONS

Inquiries concerning this matter may be directed to the designated agency contact persons, Lisa Jennings, Air Pollution Specialist, at (916) 322-6913, or Earl Landberg, Air Pollution Specialist, at (916) 323-I 384. To discuss this notice with someone who speaks Spanish, please call Marivel De La Torre at (916) 3234362.

SUBMITTAL OF COMMENTS

The public may present comments relating to this matter orally or in writing at the meeting, and in writing or by e-mail before the meeting. To be considered by the Board, written submissions not physically submitted at the meeting must be received **no later than 12:00 noon, October 27, 2004,** and addressed to the following:

Postal mail is to be sent to:

Clerk of the Board
Air Resources Board
1001 I Street, 23" Floor
Sacramento, California 95814

Electronic mail is to be sent to: chip05@listserv.arb.ca.gov and received at the ARB **no later than 12:00 noon, October 27, 2004.**

Facsimile transmissions are to be transmitted to the Clerk of the Board at (916) 322-3928 and received at the ARB **no later than 12:00 noon October 27, 2004**.

The Board requests but does not require that 30 copies of any written statement be submitted and that **all** written statements be filed at least 10 days prior to the meeting so that ARB staff and Board Members have time to fully consider each comment. The ARB encourages members of the public to bring any suggestions or comments to the attention of staff in advance of the meeting

CALIFORNIA AIR RESOURCES BOARD

for
Catherine Witherspoon
Executive Officer

Date: October 11, 2004

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 Web -site at www.arb.ca.gov.*

No written material available at time of electronic board book creation.