California Environmental Protection Agency

Air Resources Board

PUBLIC MEETING AGENDA

February 25, 2010

LOCATION:
Air Resources Board
Byron Sher Auditorium, Second Floor
1001 I Street
Sacramento, California 95814

This facility is accessible by public transit. For transit information, call (916) 321-BUSS, website: http://www.sacrt.com
(This facility is accessible to persons with disabilities.)

TO SUBMIT WRITTEN COMMENTS ON AN AGENDA ITEM IN ADVANCE OF THE MEETING GO TO: http://www.arb.ca.gov/lispub/comm/bclist.php

February 25, 2010
9:00 a.m.

CONSENT CALENDAR:

All items on the consent calendar will be voted on by the Board immediately after the start of the public meeting. Any item may be removed from the consent calendar by a Board member or by someone in the audience who would like to speak on that item. The following items are on the consent calendar:

Consent Item#

10-2-1: Public Meeting to Consider 11 Research Proposals

1. *"Behavioral Strategies to Bridge the Gap Between Potential and Actual Savings in Commercial Buildings," University of California, Davis, $134,981, Proposal No. 2685-266.*

2. *"Quantifying the Effect of Local Government Actions on VMT," University of California, Davis, $125,000, Proposal No. 2692-266.*

3. *"Measuring the Climate Impact of Residential Buildings: GreenPoint Rated Climate Calculator Version 2," University of California, Berkeley, $100,000, Proposal No. 2693-266.*

4. *"Are There Any Counteracting Effects that Reduce the Global Warming Benefits Attributed to Diesel and Other Black Carbon Controls," University of California, San Diego, $114,751, Proposal No. 2690-266.*

5. *"Improving Regional VOC Emission Estimates Using An Airborne PTRMS EDDY Flux Measurement System," University of California, Berkeley, $400,000, Proposal No. 2698-266.*

6. *"Mobile Platform III: Characterizing Spatially Inhomogeneous Non-Criteria Pollutants in the Los Angeles Air Basin," University of California, Los Angeles, $290,000, Proposal No. 2697-266.*

7. *"On-road Measurement of Emissions from Heavy-Duty Diesel Trucks: Impacts of Fleet Turnover and ARB's Truck and Bus Rule," University of California, Berkeley, $300,000, Proposal No. 2696-266.*

8. *"Peripheral Blood Gene Expressions in Subjects with Coronary Artery Disease and Exposure to Particulate Air Pollutant Components and Size Fractions," University of California, Irvine, $274,931, Proposal No. 2699-266.*

9. *"Modeling Optimal Transition Pathways to a Low Carbon Economy in California: Impacts of Advanced Vehicles and Fuels on the Energy System," University of California, Davis, $278,356, Proposal No. 2700-266.*

10. *"Inverse Modeling to Verify California's Greenhouse Gas Emissions Inventory," California State University, Hayward, $150,000, Proposal No. 2695-266.*

11. *"In-duct Air Cleaning Devices: Ozone Emissions and Test Methodology," University of Missouri, $325,000, Proposal No. 2701-266.*

10-2-10: Public Hearing to Consider Approval of the Coachella Valley PM10 Redesignation Request and Maintenance Plan

Staff will present to the Board for approval the Coachella Valley PM10 Redesignation Request and Maintenance Plan. The Coachella Valley has attained the 24-hour PM10 National Ambient Air Quality Standard by the required 2006 attainment date.

Attached are the Proposed Resolutions. Please go to http://www.arb.ca.gov/board/ma/2010/ma22510.htm for resolution attachments.

DISCUSSION ITEMS:

Note: The following agenda items may be heard in a different order at the Board meeting.

Agenda Item #

10-2-7: Report to the Board on the Office of the Ombudsman

Staff will present an overview of the Office of the Ombudsman to the Board.

10-2-8: Report to the Board on Federal Climate Activities

Staff will present an overview and update on current initiatives by federal agencies and proposals in Congress to develop and implement programs to reduce greenhouse gas emissions.

10-2-2: Notice of Public Hearing to Consider Adoption of a Proposed Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear

Staff will present to the Board a proposed regulation for the reduction of sulfur hexafluoride emissions from gas insulated switchgear.

10-2-3: Notice of Public Hearing to Consider Proposed Amendments to New Passenger Motor Vehicle Greenhouse Gas Emission Standards for Model Years 2012-2016 to Permit Compliance Based on Federal Greenhouse Gas Emission Standards

Staff will present amendments to California's regulations to control greenhouse gas emissions from new light-duty vehicles, to allow manufacturers to demonstrate compliance in the 2012 though 2016 model years based on compliance with the national greenhouse gas regulations.

10-2-4: Public Meeting to Provide an Overview of the Role of Offsets in the Greenhouse Gas Cap-and-Trade Program

Staff will present to the Board an overview of the role of offsets in the greenhouse gas cap-and-trade program as described in the preliminary draft regulation for a California greenhouse gas cap-and-trade program, which was released on November 24, 2009.

10-2-9: Notice of Public Meeting to Consider a Process for Adoption of Greenhouse Gas Accounting Protocols for Compliance Purposes, Including Withdrawal of Board Adoption of Voluntary Protocols

The Board will consider a resolution describing a process for consideration of greenhouse gas emission reduction protocols for compliance purposes to support the development of a cap-and- trade regulation. The process includes environmental review for protocols to be used for compliance purposes and withdrawal of Board adoption of voluntary protocols.

10-2-5: Report to the Board on Additional Staff Recommendations to Provide Further Locomotive and Railyard Emissions and Risk Reductions

In response to the Board's direction at the September 25, 2009 Board meeting, staff will present an update in efforts to provide further reductions in emissions and from high risk railyards.

10-2-6: Public Meeting to Present the 2009 Haagen-Smit Clean Air Award

The 2009 Haagen-Smit Clean Air Award recipients will be announced and highlighted. The Air Resources Board annually presents the award to esteemed persons in the air quality community – scientists, legislators, professors, activists, business leaders, and others who have made significant contributions toward improving air quality and public health.

CLOSED SESSION – LITIGATION

The Board will hold a closed session, as authorized by Government Code section 11126(e), to confer with, and receive advice from, its legal counsel regarding the following pending or potential litigation:

Central Valley Chrysler-Jeep, Inc. et al. v. Goldstene, U.S. Court of Appeals, Ninth Circuit, on appeal from U.S. District Court (E.D. Cal. Fresno), Case No. 08 17378.

Fresno Dodge, Inc. et al. v. California Air Resources Board et al., Superior Court of California (Fresno County), Case No. 04CE CG03498.

General Motors Corp. et al. v. California Air Resources Board et al., Superior Court of California (Fresno County), Case No. 05CE CG02787.

Green Mountain Chrysler-Plymouth-Dodge-Jeep, et al. v. Crombie, 508 F.Supp.2d 295, U.S. District Court Vermont (2007), appeal to U.S. Court of Appeals, Second Circuit, Case Nos. 07-4342-cv(L) and 07-4360-cv(CON).

Pacific Merchant Shipping Association v. Goldstene, U.S. District Court (E.D. Cal Fresno), Case No. 2:09-CV-01151-MCE-EFB.

American Trucking Association, et al. v. U.S. Environmental Protection Agency, et al., U.S. Court of Appeals, District of Columbia Circuit, Case No. 09-1090.

POET, LLC, et al. v. Goldstene, et al., Superior Court of California (Fresno County), Case No. 09CECG04850.

Rocky Mountain Farmers Union, et al. v. Goldstene, U.S. District Court (E.D. Cal. Fresno), Case No. 1:09-cv-02234-LJO-DLB.

National Petroleum & Refiners Association, et al. v. Goldstene, et al., U.S. District Court (E.D. Cal. Fresno) Case No. 1:10-cv-00163-AWI-GSA.

OPPORTUNITY FOR MEMBERS OF THE BOARD TO COMMENT ON MATTERS OF INTEREST

Board members may identify matters they would like to have noticed for consideration at future meetings and comment on topics of interest; no formal action on these topics will be taken without further notice.

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 do not specifically appear on the agenda. Each person will be allowed a maximum of three 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.

TO SUBMIT WRITTEN COMMENTS ON AN AGENDA ITEM IN ADVANCE OF THE MEETING GO TO:
http://www.arb.ca.gov/lispub/comm/bclist.php

IF YOU HAVE ANY QUESTIONS, PLEASE CONTACT THE CLERK OF THE BOARD:
OFFICE: (916) 322-5594
1001 I Street, Floor 23, Sacramento, California 95814
ARB Homepage: www.arb.ca.gov

To request a special accommodation or language needs for any of the following:

- An interpreter to be available at the hearing.
- Have documents available in an alternate format (i.e. Braille, Large print) or another language.
- A disability-related reasonable accommodation.

Please contact the Clerk of the Board at (916) 322-5594 or by facsimile at (916) 322-3928 as soon as possible, but no later than 10 business days before the scheduled Board hearing. TTY/TDD/Speech to Speech users may dial 711 for the California Relay Service.

Para solicitar alguna comodidad especial o necesidad de otro idioma para alguna de las siguientes:

- Un intérprete que esté disponible en la audiencia
- Tener documentos disponibles en un formato alterno (por decir, sistema Braille, o en impresión grande) u otro idioma.
- Una acomodación razonable relacionados con una incapacidad.

Por favor llame a la oficina del Secretario del Consejo de Recursos Atmosféricos al (916) 322-5594 o envíe un fax al (916) 322-3928 no menos de diez (10) días laborales antes del día programado para la audiencia. Para el Servicio Telefónico de California para Personas con Problemas Auditivos, ó de teléfonos TDD pueden marcar al 711.

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

California Environmental Protection Agency

Air Resources Board

PUBLIC MEETING AGENDA

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February 25, 2010 at 9:00 a.m.

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PROPOSED

State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 10-4

February 25, 2010

Agenda Item No.: 10-2-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2695-266, entitled "Inverse Modeling to Verify California's Greenhouse Gas Emissions Inventory" has been submitted by California State University, Hayward;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee (RSC) has reviewed and recommends for funding:

> Proposal Number 2695-266 entitled "Inverse Modeling to Verify California's Greenhouse Gas Emissions Inventory" submitted by California State University, Hayward, for a total amount not to exceed $150,000.

NOW, THEREFORE, BE IT RESOLVED that ARB, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of RSC and approves the following:

> Proposal Number 2695-266 entitled "Inverse Modeling to Verify California's Greenhouse Gas Emissions Inventory" submitted by California State University, Hayward, for a total amount not to exceed $150,000.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $150,000.

ATTACHMENT A

Inverse Modeling to Verify California's Greenhouse Gas Emissions Inventory

Background

In California, methane (CH_4) emissions in 2006 were estimated to be approximately 27 million metric tons of carbon dioxide equivalents ($MMTCO_2$), accounting for approximately 5 percent of total greenhouse gas (GHG) emissions in California. Assembly Bill 32 (AB 32) requires that GHG emissions in California be reduced to 1990 levels by 2020. Careful accounting of current CH_4 emissions and future reductions is therefore essential. Air Resources Board's (ARB) CH_4 emission inventory was developed using the Intergovernmental Panel on Climate Change recommended methodologies involving a "bottom-up" approach that calculates emissions based on emission factors multiplied by activity data.

Atmospheric inverse modeling can provide an alternative approach to assess California's CH_4 emissions estimated from the "bottom-up" approach. ARB intends to operate six high-precision carbon monoxide (CO)/CO_2/CH_4 monitors in the Central Valley of California in 2010. During the CalNex field study scheduled in May-June 2010, ARB will further deploy two mobile platforms to measure CH_4 levels in California. In addition, Lawrence Berkeley National Laboratory (LBNL) and University of California, San Diego (UCSD) each have been operating two monitoring stations measuring CH_4 in California. The combined use of these measurements will provide an unparalleled dataset for performing inverse modeling to assess California's "bottom-up" CH_4 emissions inventory.

Objective

The objectives of this project are: 1) to use an inverse modeling tool to quantify CH_4 emissions in California for four months of 2010 using data to be collected at CH_4 monitoring stations operated by ARB, LBNL, and UCSD; 2) to transfer the codes of the inverse modeling tool to ARB and train ARB staff to use this tool for continued inverse modeling analysis.

Methods

To assess the "bottom-up" emission inventory of CH_4/CO in California, this project will apply the Weather Research & Forecasting – Stochastic Time-Inverted Lagrangian Transport (WRF-STILT) model with a Bayesian estimation tool to CH_4/CO measurements collected in 2010 from up to 12 stations in California. The principal investigator will compile quality-controlled CH_4/CO measurement data collected at the Sacramento River's Delta's Walnut Grove tower and the San Francisco's Sutro Tower for the study period. ARB staff will supply quality-controlled CH_4/CO measurement data at all other sites including the UCSD stations for the same period. The *a priori* "bottom-up" CH_4 emission inventory will be provided by ARB. The *posterior* emission estimate for CH_4 from the WRF-STILT/Bayesian estimation tool will be used to evaluate the

"bottom-up" CH_4 emission inventory for different sectors such as livestock and landfills in California.

Expected Results
This project is expected to provide an independent test of the current CH_4 emission estimate in California as well as useful insight for improving CH_4 emission inventory in California. A final report and a journal paper summarizing the proposed work will be prepared. The inverse modeling package including the WRF-STILT and Bayesian estimation codes will be transferred to ARB. In addition, a one-week training tutorial will be conducted for ARB staff to use the inverse modeling tool for future applications.

Significance to the Board
Accurate GHG emission inventory is crucial to the design and implementation of mitigation measures to fulfill the goal of AB 32. This project will help ARB evaluate and improve the "bottom-up" CH_4 emission inventory in California, which is the basis for developing effective CH_4 emission mitigation plans.

Contractor:
California State University, Hayward

Contract Period:
18 months

Principal Investigator (PI):
Dr. Marc L. Fischer

Contract Amount:
$150,000

Basis for Indirect Cost Rate:
The State and the California State University System have agreed to a 25% indirect cost rate.

Past Experience with this Principal Investigator:
Dr. Marc Fischer has been actively involved in the measurement and modeling of GHG emissions in California through funding from the Department of Energy and the California Energy Commission.

Prior Research Division Funding to California State University, Hayward:

Year	2008	2007	2006
Funding	$0	$0	$0

BUDGET SUMMARY

Contractor: California State University, Hayward

Inverse Modeling to Verify California's Greenhouse Gas Emissions Inventory

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 25,084	
2.	Subcontractors	$ 110,000[1]	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 0	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 1,916	
7.	Mail and Phone	$ 0	
8.	Supplies	$ 0	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 0	
	Total Direct Costs		$137,000
INDIRECT COSTS			
1.	Overhead	$ 13,000	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$13,000
TOTAL PROJECT COSTS			**$150,000**

[1] The subcontract is necessary to support a research associate at LBNL, who is very experienced in atmospheric inverse modeling, to perform a substantial amount of work included in this project. In addition, the subcontract with LBNL can take advantage of excellent computational facilities at LBNL.

SUBCONTRACTORS' BUDGET SUMMARY

Subcontractor: Lawrence Berkeley National Laboratory

Description of subcontractor's responsibility: The subcontractor at LBNL will carry out the WRF-STILT and inverse model calculations and participate in preparing the final report and training ARB staff.

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	55,108	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	0	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	0	
7.	Mail and Phone	$	0	
8.	Supplies	$	0	
9.	Analyses	$	0	
10.	Miscellaneous	$	0	
	Total Direct Costs			$55,108
INDIRECT COSTS				
1.	Overhead	$	39,851	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	15,041	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$54,892
TOTAL PROJECT COSTS				**$110,000**

PROPOSED

State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 10-5

February 25, 2010

Agenda Item No.: 10-2-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2697-266, entitled "Mobile Platform III: Characterizing Spatially Inhomogeneous Non-Criteria Pollutants in the Los Angeles Air Basin," has been submitted by the University of California, Los Angeles;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee (RSC) has reviewed and recommends for funding:

> Proposal Number 2697-266 entitled "Mobile Platform III: Characterizing Spatially Inhomogeneous Non-Criteria Pollutants in the Los Angeles Air Basin," submitted for a total amount not to exceed $290,000.

NOW, THEREFORE, BE IT RESOLVED that ARB, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of RSC and approves the following:

> Proposal Number 2697-266 entitled "Mobile Platform III: Characterizing Spatially Inhomogeneous Non-Criteria Pollutants in the Los Angeles Air Basin," submitted for a total amount not to exceed $290,000.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $290,000.

ATTACHMENT A

Mobile Platform III: Characterizing Spatially Inhomogeneous Non-Criteria Pollutants in the Los Angeles Air Basin

Background

Highly localized vehicle emission impacts due to sharp concentration gradients near roadways have been of growing concern in recent years and have important exposure and health implications for those spending time in close proximity to major roadways. In a preceding study by the current investigators (Hu et al., 2009), a wide impact area of elevated pollutant concentrations on the downwind (up to ~2000 m) and upwind (up to ~600 m) sides of a freeway was measured during the pre-sunrise (PSR) hours. This impact area was much larger than earlier measurements during daytime particularly on the downwind side, where pollutant concentrations dropped slowly, remaining at about 40 percent of their freeway edge values 1200 m downwind. The measurements were made during meteorological conditions typical of the PSR period, characterized by weak winds and a radiation inversion. The results suggested broad areas of elevated pollutants around major roadways may be common in the early morning hours; however, this hypothesis needs to be tested. There are also concerns regarding the proximity of roadways with high traffic densities to primarily minority and low-income neighborhoods. Although Southern California has met Federal Air Quality Standards for carbon monoxide and nitrogen oxide on a regional basis, concentrations of these pollutants are more elevated along heavily traveled roadways. In addition, a recent California Department of Health Services study found that non-white children were three to four times more likely to live in areas with high traffic density compared to white children.

Objective

The objective of this study is to generalize previous PSR results to several locations in Southern California, and to characterize air pollution and exposure in low-income and/or minority neighborhoods that are adversely impacted by sources (e.g. freeways, busy arterial roads).

Methods

Researchers at University of California, Los Angeles (UCLA) propose to use the mobile platform, developed by Air Resources Board (ARB), to measure ultrafine particles (UFP), particulate matter (PM) 2.5 mass, black carbon, oxides of nitrogen (NO, NO_2, NO_X), carbon dioxide (CO_2), carbon monoxide (CO), and particle-bound polyaromatic hydrocarbons (PAHs) in different locations in the South Coast Basin. These locations include the area near the Ports of Los Angeles and Long Beach, downtown Los Angeles/Boyle Heights, and another location on the east side of the basin. The bulk of the sampling consists of 6-9 measurement days per sampling route in both winter and summer seasons. Sampling will occur on three different routes in various locations in the South Coast Basin during the PSR period, in the morning after sunrise, and in the afternoon. Routes driven during the PSR period will mainly focus on the near-roadway environment. Morning (post-sunrise) and afternoon routes in the Boyle

Heights/Downtown Los Angeles, and Ports areas will also include measurements near housing communities located in low-income/minority neighborhoods.

Expected Results
The results of this study will contribute to our understanding of near-road exposures during the PSR period as well as our understanding of air quality in/at low-income communities/housing complexes. In addition, this study will begin to evaluate the effect of various emission control strategies (implemented by ARB and the Ports of Los Angeles and Long Beach), on exposures in freeway-adjacent residential neighborhoods.

Significance to the Board
Elevated levels of pollutants near busy roadways have important exposure implications, particularly in the early morning hours before sunrise, when people are most likely to be home. During this time period, elevated pollution levels have been observed up to a mile and a half downwind of a busy freeway and over a quarter mile upwind of the freeway. The findings of this study will determine the overall importance of the PSR exposures and attempt to elucidate vehicle-related exposures in low-income and/or minority neighborhoods.

Contractor:
University of California, Los Angeles

Contract Period:
30 months

Principal Investigators (PI):
Suzanne E. Paulson, Ph.D.
(Co-PI) Arthur M. Winer, Ph.D.

Contract Amount:
$290,000

Basis for Indirect Cost Rate:
The State and the University of California system have agreed to a ten percent indirect cost rate.

Past Experience with this Principal Investigator:
Professor Paulson has nearly a decade of research experience in atmospheric science and has recently published two important manuscripts using data gathered from ARB's mobile platform to characterize exposures during PSR hours and near a small municipal airport. She has also successfully led previous ARB-funded studies.

Professor Winer has four decades of research experience in the field of air pollution. He has successfully completed numerous projects and contracts with ARB and has been involved with mobile platform measurements and analysis for at least five years.

Prior Research Division Funding to University of California, Los Angeles:

Year	2008	2007	2006
Funding	$386,076	$616,171	$348,990

BUDGET SUMMARY

Contractor: University of California, Los Angeles

Mobile Platform III: Characterizing Spatially Inhomogeneous Non-Criteria Pollutants in the Los Angeles Air Basin

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 245,948	
2.	Subcontractors	$ 0	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 5,000	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 1,200	
7.	Mail and Phone	$ 0	
8.	Supplies	$ 2,303	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 11,811[1]	
	Total Direct Costs		$266,262
INDIRECT COSTS			
1.	Overhead	$ 23,738	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$23,738
TOTAL PROJECT COSTS			**$290,000**

[1] Equipment maintenance for mobile platform.

PROPOSED

State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 10-6

February 25, 2010

Agenda Item No.: 10-2-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2692-266, entitled "Quantifying the Effect of Local Government Actions on Vehicle-Miles of Travel (VMT)," has been submitted by the University of California, Davis (UC Davis);

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee (RSC) has reviewed and recommends for funding:

> Proposal Number 2692-266 entitled "Quantifying the Effect of Local Government Actions on VMT," submitted by UC Davis, for a total amount not to exceed $125,000.

NOW, THEREFORE, BE IT RESOLVED that ARB, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of RSC and approves the following:

> Proposal Number 2692-266 entitled "Quantifying the Effect of Local Government Actions on VMT," submitted by UC Davis, for a total amount not to exceed $125,000.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $125,000.

ATTACHMENT A

Quantifying the Effect of Local Government Actions on VMT

Background
On-road vehicles generate the largest source of California's greenhouse gas (GHG) emissions. Assembly Bill (AB) 32 and Executive Order S-03-03 establish aggressive targets to reduce California's GHG emissions. Senate Bill (SB) 375 requires Air Resources Board (ARB) to develop regional targets to reduce GHG emissions and Vehicle Miles Traveled (VMT). It also requires California regions to prepare Sustainable Community Strategies to identify a set of actions at the regional level to reduce transportation GHG emissions down to target levels. Achieving the goals of AB 32 and SB 375 will require a strong partnership between regional and local governments. A number of studies have been conducted to explore the relationship between travel behavior and local government actions. However, most of these studies are only able to provide some directional interpretation of their results such as whether a local government action would have a positive or negative effect on reducing VMT.

Objective
The objective of this proposed study is to quantify local government policy decisions and their effect on VMT as a function of the local context. A tool will be developed for use by local governments that translate findings into a practical approach useful for improving policy choices to reduce local and regional VMT.

Methods
The investigators will estimate a statistical model that identifies the elasticity of commute trip VMT, shopping trip VMT, and total household VMT with respect to a variety of policy-relevant variables depending on the local land use transportation context and the socioeconomic characteristics of the commuter, shopper, and household, respectively. The estimates will include a focus on context sensitivity.

Expected Results
Results of this research are expected to quantify the effect of local government actions on reducing VMT. This information is expected to provide local and regional assistance to meet statewide targets to reduce GHG emissions and overall VMT.

Significance to the Board
ARB is the lead agency implementing AB 32 and SB 375. This study will provide local and regional assistance to meet statewide targets to reduce overall VMT and GHG emissions as mandated by SB 375 and AB 32.

Contractor:
University of California, Davis

Contract Period:
36 months

Principal Investigator (PI):
Deborah Salon, Ph.D.

Contract Amount:
$125,000

Basis for Indirect Cost Rate:
The State and the UC system have agreed to a ten percent indirect cost rate.

Past Experience with this Principal Investigator:
Dr. Deborah Salon will serve as the principal investigator conducting the work to compile, clean, and analyze data as well as coordinating the project with the research team which includes several recognized world leaders in the area of land use and transportation planning. Dr. Salon has conducted similar work in the past with non-California data, which makes her an ideal person to fulfill this role.

Prior Research Division Funding to UC Davis:

Year	2008	2007	2006
Funding	$ 1,209,135	$ 935,020	$ 1,684,890

BUDGET SUMMARY

Contractor: University of California, Davis

Quantifying the Effect of Local Government Actions on VMT

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 97,062	
2.	Subcontractors	$ 15,994	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 1,200	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 150	
7.	Mail and Phone	$ 150	
8.	Supplies	$ 234	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 300	
	Total Direct Costs		$115,090
INDIRECT COSTS			
1.	Overhead	$ 9,910	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$9,910
TOTAL PROJECT COSTS			**$125,000**

SUBCONTRACTORS' BUDGET SUMMARY

Subcontractor: University of California, Irvine

Description of subcontractor's responsibility: UC Irvine is heading up a land use planning track for the new UC-wide Multi-campus Research Program Initiative on Sustainable Transportation for California. UC Irvine will participate as an essential collaborator on both the analysis and the reports for this project.

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	14,040	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	500	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	0	
7.	Mail and Phone	$	0	
8.	Supplies	$	0	
9.	Analyses	$	0	
10.	Miscellaneous	$	0	
	Total Direct Costs			$14,540
INDIRECT COSTS				
1.	Overhead	$	1,454	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$1,454
TOTAL PROJECT COSTS				**$15,994**

PROPOSED

State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 10-7

February 25, 2010

Agenda Item No.: 10-2-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2685-266, entitled "Behavioral Strategies to Bridge the Gap Between Potential and Actual Savings in Commercial Buildings," has been submitted by the University of California, Davis (UC Davis);

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee (RSC) has reviewed and recommends for funding:

> Proposal Number 2685-266 entitled "Behavioral Strategies to Bridge the Gap Between Potential and Actual Savings in Commercial Buildings," submitted by UC Davis, for a total amount not to exceed $134,981.

NOW, THEREFORE, BE IT RESOLVED that ARB, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of RSC and approves the following:

> Proposal Number 2685-266 entitled "Behavioral Strategies to Bridge the Gap Between Potential and Actual Savings in Commercial Buildings," submitted by UC Davis, for a total amount not to exceed $134,981.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $134,981.

ATTACHMENT A

Behavioral Strategies to Bridge the Gap Between Potential and Actual Savings in Commercial Buildings

Background

As required by the California Global Warming Solutions Act of 2006, Air Resources Board (ARB or board) must identify and implement cost-effective strategies for reducing California's greenhouse gas (GHG) emissions. Addressing emissions associated with California's commercial sector which accounts for more electricity use than any other sector, and a substantial portion of the state's natural gas consumption, will be critical to meeting both near- and long-term emissions targets. However, efforts to reduce commercial building energy consumption are impeded by a lack of understanding of the human elements that play into energy consumption in buildings through occupant behavior, management practices, and building operations. The gaps between building operations in theory and building operations in practice place serious limits on the success of strategies that are exclusively technology-oriented. The mismatch also points to the under-tapped social and behavioral potential of building operators and occupants to work with the built environment to provide indoor spaces that require less energy and cause less GHG emissions while preserving or enhancing occupant comfort.

Objective

The proposed project is designed to identify behavioral, social, and organizational strategies that reduce energy use and GHG emissions from California commercial buildings; and to develop improved conceptual models of how energy and comfort are managed in commercial buildings. Research results will produce strategies that the State can implement to guide energy policy, behavior change initiatives, technology and building design, and energy research to accommodate the realities of how buildings are actually operated and how building occupants adapt, or can adapt, to their environment. The focus of this research is on existing buildings as they currently operate in the commercial sector, which has received relatively little attention compared to residential buildings and new building design. Research results will also be useful to inform new building design and retrofits. The essential value of this research is that it moves beyond theoretical understandings to deliver actionable strategies in a context that is networked with the professional, policy-making, and research communities who can promote, implement and refine them.

Methods

The basic approach will be sociological and anthropological, carefully informed by technological and engineering considerations. The technical plan is devised to include multiple buildings and multiple approaches to the issues of interest, and to generalize from the particular attributes of these buildings. Primary tasks include a synthesis of quantitative performance of commercial buildings, based on publications and databases; interviews with building energy researchers to elaborate and critique

normative models of building operation; analysis of occupant survey data and development of a follow-on module to illuminate attitudes and adaptive behaviors related to energy conservation, efficiency, and management; interviews with building operators and energy management to shed light on motivating factors in and limitations to their choices; and development of building case studies to support development of strategies for reduced energy consumption.

Expected Results
Positioned alongside several recent and ongoing efforts that have begun to push the building energy field to more sophisticated and effective strategies for influencing energy consumption, this effort will deliver practical results to support ARB's efforts to reduce GHG emissions from the commercial building sector. The highly interdisciplinary project team, which is strongly credentialed in both research and professional roles, will deliver a unique and closely targeted analysis of how real-world emissions can be reduced as well as ensure, in collaboration with the project advisory board, that results are disseminated to building energy professionals and architects. The dataset to be acquired by this research will also be valuable for future research and outreach efforts that build on results from this work.

Significance to the Board
Space conditioning and ventilation represent 28 percent of the electricity use and 38 percent of the natural gas consumption in California's commercial sector. Technology-based efforts to reduce commercial building energy consumption have typically fallen short of their technical potential to influence energy consumption, since they fail to account for practices that influence energy consumption in buildings. Understanding these practices will help guide research and policy toward improved technology development, building design, and toward behaviorally-oriented conservation campaigns that fit, or can successively influence, actual social practices. Research results will also support development of new and potentially more powerful, more cost-effective, GHG emissions reduction strategies for commercial buildings with the co-benefits of protecting and even improving occupant health, productivity, and well-being. Improved emissions reduction strategies in the commercial building sector are essential to the Board if it is to meet its near-and long-term GHG emissions reduction goals.

Contractor:
University of California, Davis

Contract Period:
36 months

Principal Investigator (PI):
Alan Meier

Contract Amount:
$134,981

Basis for Indirect Cost Rate:
The State and the UC system have agreed to a ten percent indirect cost rate.

Past Experience with this Principal Investigator:
The project principal investigator, Dr. Alan Meier, is Associate Director and a Faculty Researcher with the Energy Efficiency Center at UC Davis; as well as a senior scientist at Lawrence Berkeley National Laboratory. His research has had direct and significant impact on energy policy. For example, his international plan to reduce standby in all devices to less than one watt has been endorsed by the G8 countries.

The highly interdisciplinary research team brought together for this research has recently conducted highly successful energy analyses at the intersection of technological, social, and behavioral factors. Proposal reviewers from multiple agencies concur that the researchers' previous reports offer new and useful information that supports demand-side energy management, policy, and planning.

Prior Research Division Funding to UCD:

Year	2008	2007	2006
Funding	$1,209,135	$935,020	$1,684,890

BUDGET SUMMARY

Contractor: University of California, Davis

Behavioral Strategies to Bridge the Gap Between Potential and Actual Savings in Commercial Buildings

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	20,080	
2.	Subcontractors	$	105,278[1]	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	0	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	0	
7.	Mail and Phone	$	0	
8.	Supplies	$	0	
9.	Analyses	$	0	
10.	Miscellaneous	$	1,580	
	Total Direct Costs			$126,938
INDIRECT COSTS				
1.	Overhead	$	8,043	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$8,043
TOTAL PROJECT COSTS				**$134,981**

[1] The team for the proposed research has been selected to bring in an outstanding and broad range of capabilities, perspectives, and resources; and combines academic researchers as well as practitioners in the field of building energy use. Moreover, the research team includes staff who work in three University of California centers, each of which has established strong links between academia and the building industry.

SUBCONTRACTORS' BUDGET SUMMARY

Subcontractor: Mithra Moezzi

Description of subcontractor's responsibility: Dr. Moezzi, a private consultant specializing in bridging engineering and social scientific approaches to research, with 17 years of experience in the building energy field, will serve as the Project Director. She will be responsible for direction of day-to-day research and will participate in the research tasks.

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	41,210	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	650	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	0	
7.	Mail and Phone	$	0	
8.	Supplies	$	500	
9.	Analyses	$	0	
10.	Miscellaneous	$	2,780	
	Total Direct Costs			$45,140
INDIRECT COSTS				
1.	Overhead	$	0	
2.	General and Administrative Expenses	$		
3.	Other Indirect Costs	$		
4.	Fee or Profit	$	0	
	Total Indirect Costs			$0
TOTAL PROJECT COSTS				**$45,140**

SUBCONTRACTORS' BUDGET SUMMARY

Subcontractor: Christine Hammer

Description of subcontractor's responsibility: Christine Hammer, a LEED® accredited professional with extensive experience working with and interviewing the commercial building community, will conduct interviews with building energy researchers, building operators, and energy managers; play a major role in the conduct of building case studies; and contribute to the final report.

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	23,270	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	1,240	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	0	
7.	Mail and Phone	$	0	
8.	Supplies	$	0	
9.	Analyses	$	0	
10.	Miscellaneous	$	780	
	Total Direct Costs			$25,290
INDIRECT COSTS				
1.	Overhead	$0		
2.	General and Administrative Expenses	$0		
3.	Other Indirect Costs	$0		
4.	Fee or Profit	$ 0		
	Total Indirect Costs			$0
TOTAL PROJECT COSTS				**$25,290**

SUBCONTRACTORS' BUDGET SUMMARY

Subcontractor: Loren Lutzenhiser

Description of subcontractor's responsibility: Dr. Lutzenhiser, a sociologist specializing in the social dynamics of building energy use, will contribute to the overall framework, literature and database synthesis, and interpretation of results. He will also help develop the energy researcher workshop as well as provide advice and review throughout the course of the project.

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	8,000	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	770	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	0	
7.	Mail and Phone	$	0	
8.	Supplies	$	0	
9.	Analyses	$	0	
10.	Miscellaneous	$	0	
	Total Direct Costs			$8,770
INDIRECT COSTS				
1.	Overhead	$	0	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$0
TOTAL PROJECT COSTS				**$8,770**

SUBCONTRACTORS' BUDGET SUMMARY

Subcontractor: University of California, Berkeley

Description of subcontractor's responsibility: John Goins, a survey specialist at the University of California, Berkeley, is the lead researcher of the Center for the Built Environment's Occupant Indoor Environmental Quality Survey project. In collaboration with Dr. Moezzi, he will be in charge of the survey data analysis and the development of the revised survey module, particulate in selected reviews, and contribute to the final report.

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	20,313	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	400	
5.	Electronic Data Processing	$	2,000	
6.	Reproduction/Publication	$	0	
7.	Mail and Phone	$	0	
8.	Supplies	$	600	
9.	Analyses	$	0	
10.	Miscellaneous	$	395	
	Total Direct Costs			$23,708
INDIRECT COSTS				
1.	Overhead	$	2,370	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$2,370
TOTAL PROJECT COSTS				**$26,078**

PROPOSED

State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 10-8

February 25, 2010

Agenda Item No.: 10-2-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2693-266, entitled "Measuring the Climate Impact of Residential Buildings: GreenPoint Rated Climate Calculator Version 2," has been submitted by the University of California, Berkeley;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee (RSC) has reviewed and recommends for funding:

> Proposal Number 2693-266 entitled "Measuring the Climate Impact of Residential Buildings: GreenPoint Rated Climate Calculator Version 2," submitted by the University of California, Berkeley, for a total amount not to exceed $101,075.

NOW, THEREFORE, BE IT RESOLVED that ARB, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of RSC and approves the following:

> Proposal Number 2693-266 entitled "Measuring the Climate Impact of Residential Buildings: GreenPoint Rated Climate Calculator Version 2," submitted by the University of California, Berkeley, for a total amount not to exceed $101,075.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $101,075.

ATTACHMENT A

Measuring the Climate Impact of Residential Buildings: GreenPoint Rated Climate Calculator Version 2

Background

Buildings represent the second largest source of California's greenhouse gas (GHG) emissions. The residential sector contributes 14 percent of the total GHG inventory with an estimated 66.5 million metric tons of carbon dioxide (CO_2) equivalent ($MMTCO_2E$) emissions generated annually during 2002-2004. The Climate Change Scoping Plan adopted green building as a strategy to reduce GHG emissions, but states that further research is needed to quantify GHG reductions. This project will address the knowledge gap needed to better quantify GHG reduction estimates of residential green buildings and fill a critical research need identified in the Assembly Bill (AB) 32 planning process for green buildings.

Objective

The objective of this proposed study is to quantify GHG emission reductions of a green home compared to a conventional home regardless of occupant behavior. Local governments are expected to use the climate calculator outputs in the climate action planning and implementation process. Cities and counties are also expected to use the climate calculator to quantify GHG emission reduction of existing home retrofits in their local jurisdiction, which will be useful to meet the goals of AB 32 and Executive Order S-03-03.

Methods

The investigators will validate existing methodologies and add new quantification metrics to the Green Point Rated Climate Calculator. They will conduct field testing of a variety of different building types and obtain stakeholder input to develop Version 2 of the green home climate calculator.

Expected Results

Results of this research are expected to better quantify GHG reduction estimates of residential green buildings and fill a critical research need identified in the AB 32 planning process for green buildings.

Significance to the Board

Air Resources Board (ARB or Board) is the lead agency implementing AB 32. This study will assist ARB with beginning to track GHG emission reductions from green buildings.

Contractor:

University of California, Berkeley

Contract Period:

20 months

Principal Investigator (PI):
Daniel M. Kammen, Ph.D.

Contract Amount:
$101,075

Basis for Indirect Cost Rate:
The State and the UC system have agreed to a ten percent indirect cost rate.

Past Experience with this Principal Investigator:
Professor Kammen will serve as the principal investigator of this project responsible for overall project guidance and intellectual contributions. Professor Kammen is the Director of the Renewable and Appropriate Energy Laboratory at UC Berkeley and is Principal Investigator for a related research project to develop a carbon footprint calculator for individuals, which aims to guide household decision making.

Prior Research Division Funding to University of California, Berkeley:

Year	2008	2007	2006
Funding	$1,169,448	$1,372,484	$1,607,398

BUDGET SUMMARY

Contractor: University of California, Berkeley

Measuring the Climate Impact of Residential Buildings: GreenPoint Rated Climate Calculator Version 2

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	49,511	
2.	Subcontractors	$	45,000	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	0	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	212	
7.	Mail and Phone	$	100	
8.	Supplies	$	0	
9.	Analyses	$	0	
10.	Miscellaneous	$	0	
	Total Direct Costs			$94,823
INDIRECT COSTS				
1.	Overhead	$	6,252	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$6,252
TOTAL PROJECT COSTS				**$101,075**

SUBCONTRACTOR'S BUDGET SUMMARY

Subcontractor: StopWaste.org

Description of subcontractor's responsibility: StopWaste.org will oversee the field testing for the project by providing stipends to GreenPoint Rated pilot projects, provide insight to the UCB on research efforts, and provide overall coordination with UCB staff. They will subcontract out a portion of the contract funds to Build It Green to organize stakeholder feedback with the UCB findings to update the climate calculator. StopWaste.org is also providing in-kind funding of an additional $25,000 to further the research needs of this project and programming of the updated climate calculator.

	DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$	0	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	0	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	0	
7.	Mail and Phone	$	0	
8.	Supplies	$	0	
9.	Analyses	$	0	
10.	Miscellaneous	$	21,000[1]	
	Total Direct Costs			$21,000
	INDIRECT COSTS			
1.	Overhead	$	0	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$0
	TOTAL PROJECT COSTS			**$21,000**

[1] The $21,000 in miscellaneous direct costs will be used to pay for 14 stipends to GreenPoint Raters that will collect field data for the climate calculator. Projects will be selected to cover different residential building types and green measures. Project data will be collected by GreenPoint Raters that are trained and certified experts in evaluating green homes in California.

SUBCONTRACTOR'S BUDGET SUMMARY

Subcontractor: Build It Green

Description of subcontractor's responsibility: Build It Green is the non-profit organization administering the GreenPoint Rated program, which offers the climate calculator and issues report cards for homes based on third-party verification by a Certified GreenPoint Rater. Build It Green will be responsible for organizing stakeholder feedback with the UCB findings to update the climate calculator. There are no other organizations that have expertise in developing and managing a residential green building rating system with a climate calculator in California.

	DIRECT COSTS AND BENEFITS			
11.	Labor and Employee Fringe Benefits	$	24,000	
12.	Subcontractors	$	0	
13.	Equipment	$	0	
14.	Travel and Subsistence	$	0	
15.	Electronic Data Processing	$	0	
16.	Reproduction/Publication	$	0	
17.	Mail and Phone	$	0	
18.	Supplies	$	0	
19.	Analyses	$	0	
20.	Miscellaneous	$	0	
	Total Direct Costs			$24,000
	INDIRECT COSTS			
5.	Overhead	$	0	
6.	General and Administrative Expenses	$	0	
7.	Other Indirect Costs	$	0	
8.	Fee or Profit	$	0	
	Total Indirect Costs			$0
	TOTAL PROJECT COSTS			**$24,000**

PROPOSED

State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 10-9

February 25, 2010

Agenda Item No.: 10-2-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2690-266, entitled "Are there any counteracting effects that reduce the global warming benefits attributed to diesel and other black carbon controls?" has been submitted by the University of California, San Diego (UC San Diego);

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee (RSC) has reviewed and recommends for funding:

> Proposal Number 2690-266, entitled "Are there any counteracting effects that reduce the global warming benefits attributed to diesel and other black carbon controls?" has been submitted by UC San Diego, for a total amount not to exceed $114,751.

NOW, THEREFORE, BE IT RESOLVED that ARB, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of RSC and approves the following:

> Proposal Number 2690-266, entitled "Are there any counteracting effects that reduce the global warming benefits attributed to diesel and other black carbon controls?" has been submitted by UC San Diego, for a total amount not to exceed $114,751.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $114,751.

ATTACHMENT A

Are there any counteracting effects that reduce the global warming benefits attributed to diesel and other black carbon controls?

Background
Atmospheric aerosols play an important role in the global climate system by modifying the global radiation budget: directly, by scattering and absorbing radiation; and indirectly, by modifying cloud properties. Black carbon (BC) is a major component of aerosol particles that is generally emitted by combustion sources such as automobile exhaust and biomass burning. Unlike the greenhouse gases, BC has a short atmospheric lifetime resulting in a strong correlation to regional emission sources. BC is the main light-absorbing component of atmospheric aerosols and has been associated with regional climate change by its contribution to global warming and its suppression of precipitation. The mitigation of BC climate change effects by emission controls has been proposed as a viable policy. This project will provide useful new measurements and analysis of immediate value for understanding the pathways by which BC affects climate change, and will serve to better inform policy-making on the regulation of BC emissions.

Objective
The objective of this proposed study is to separate the direct and indirect effects of BC on radiative forcing of the Earth's atmosphere by a comparison of a detailed chemical-microphysical model to the parameterizations embedded in global model simulations.

Methods
Chemically-resolved aerosol measurements collected in California, such as single particle data analyses (aerosol time-of-flight mass spectrometer and scanning transmission X-ray microscopy), will be compiled and analyzed. All available chemical measurements will be used to identify the chemical and physical properties of the aerosol for water uptake and light absorption. The observational data will be directly used as input in an aerosol-cloud parcel model to determine the indirect radiative effect due to BC, and to characterize BC mixing with other aerosol components. The impact of BC control will be predicted by repeating the case studies using a 50 percent and 90 percent reduction in total BC mass and number concentrations. The differences between the results of the baseline case and studies with reduced BC will be used to establish the role of BC in cloud droplet distributions, and to assess the future impact of BC controls. This research project will also include meaningful contributions from three consultants as part of this project.

Expected Results
The fundamental understandings of the BC indirect effects are important, as they may giver rise to radiative forcings that offset the warming effects due to BC aerosols. This research proposal will provide an assessment of the relative importance of the indirect

and direct forcing on California's climate due to the aerosol effects of BC. At the conclusion of the research project, a final report will be prepared describing data, model simulations, analyses and results.

Significance to the Board
The atmospheric lifetimes of BC aerosols are of the order of one week, much shorter than most greenhouse gases that have atmospheric lifetimes of several years or decades; and BC aerosols are not well-mixed in the atmosphere, but are geographically and temporally correlated to emission sources. Reducing BC emissions is therefore a viable control strategy for climate change that is expected to have an immediate and regional impact. Policy makers and air quality regulators need to be fully informed of the magnitude and importance of the BC radiative impacts, and the subsequent climate response, in their decision-making of control strategies to mitigate the climate effects of BC emissions.

Contractor:
Scripps Institution of Oceanography,
University of California, San Diego

Contract Period:
18 months

Principal Investigator (PI):
Professor Lynn Russell

Contract Amount:
$114,751

Basis for Indirect Cost Rate:
The State and the UC system have agreed to a ten percent indirect cost rate.

Past Experience with this Principal Investigator:
Professor Russell will serve as the principal investigator coordinating and synthesizing the effort for the overall project. Her 15+ years of experience in aerosol science and strong publication record make her ideal to fulfill this role.

Prior Research Division Funding to UC San Diego:

Year	2008	2007	2006
Funding	$591,261	$194,304	$174,998

BUDGET SUMMARY

Contractor: Scripps Institution of Oceanography, University of California, San Diego

Are there any counteracting effects that reduce the global warming benefits attributed to diesel and other black carbon controls?

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 80,197	
2.	Subcontractors	$ 20,000[1]	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 2,500	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 0	
7.	Mail and Phone	$ 972	
8.	Supplies	$ 650	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 0	
	Total Direct Costs		$104,319
INDIRECT COSTS			
1.	Overhead	$ 10,432	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$10,432
TOTAL PROJECT COSTS			**$114,751**

[1] Cost justification for subcontractors: Professor John Seinfeld consulting rate is $300/hr working for 33-1/3 hours for this project, and Professor Mark Jacobson consulting rate is $250/hr working for 40 hours for this project. They will perform the following tasks: Discussion of research objectives and research approaches; discussion of climate effects and treatment in global models; discussion of black carbon emissions inventory and inherent uncertainties; providing copies of current research to PI on this topic; participate in periodic conference calls and meetings at Scripps to review progress on the project; and review of progress reports and manuscripts prepared by the PI.

PROPOSED

State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 10-10

February 25, 2010

Agenda Item No.: 10-2-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2698-266, entitled "Improving Regional Biogenic Volatile Organic Compound (VOC) Emission Estimates Using an Airborne PTR MS Eddy Flux Measurement System," has been submitted by the University of California, Berkeley;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee (RSC) has reviewed and recommends for funding:

> Proposal Number 2698-266 entitled "Improving Regional Biogenic VOC Emission Estimates Using an Airborne PTR MS Eddy Flux Measurement System," submitted by University of California Berkeley, for a total amount not to exceed $400,000.

NOW, THEREFORE, BE IT RESOLVED that ARB, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of RSC and approves the following:

> Proposal Number 2698-266 entitled "Improving Regional Biogenic VOC Emission Estimates Using an Airborne PTR MS Eddy Flux Measurement System," submitted by University of California Berkeley, for a total amount not to exceed $400,000.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $400,000.

ATTACHMENT A

Improving Regional Biogenic VOC Emission Estimates Using an Airborne PTR MS Eddy Flux Measurement System

Background

California has countless native and "exotic" plants and diverse ecosystems from coastal chaparral to Alpine conifers and from high desert to flat inland farmland. Speed of urbanization and changes to established land use in California's modern history have also been significant. Cognizant of these particularities, staff, with help from the California and national academia, developed the Biogenic Emission Inventory through Geographic Information Systems (BEIGIS) simulation platform to project isoprene, terpene, and methyl butenol emission inventories specific to California. Input databases to BEIGIS are specific to California, but independent evaluation of BEIGIS predictions has relied on ground-based flux data from one site, the Blodgett Forest Research Station.

Moderate Resolution Imaging Spectro-radiometer (MODIS) leaf biomass input to BEIGIS produce significant additional isoprene emissions from oak savanna in California. The United States Environmental Protection Agency's Model of Emissions of Gases and Aerosols from Nature (MEGAN) simulations confirmed these increased oak biogenic volatile organic carbon (BVOC) emissions. Yet, for oak savanna there are no ground level flux measurements and no grid scale regional data. Without regional biogenic VOC measurements, there is no validation tool to confirm a new version of BEIGIS simulations.

Developing new or modified land cover databases may account for part of these increased emissions. Use of newer versions of MODIS may also be helpful. Nevertheless, we have no regional concentration or flux database to evaluate simulation output, to understand whether these uncertainties are issues of scaling from leaf/needle emissions to branch/canopy and finally to grid scale, or are these issues of new land cover and leaf mass databases.

Objective

The proposal is intended to provide BVOC concentration and flux data on a regional basis (in California) necessary to evaluate our current emission inventory simulations and to improve land use cover databases for these simulations.

Methods

Simulation Improvements: The principal investigators (PIs) will assist staff in combining all available sources of input data such as the National Land Cover Dataset (NLCD), the output of a UC Berkeley GIS and species identification project, and existing BEIGIS and MEGAN land cover and leaf biomass data for the most up-to-date and state-of-the-science California input data. With the enhanced database, staff will conduct BEIGIS

and MEGAN simulations and in concert with the PIs and other selected members of national and California academia would choose 12 regions for airborne VOC flux measurements. Staff, PIs, and experts in meteorological aeronautics will plan specific flight patterns during the first year of the project.

Field Measurements: Using the Center for Interdisciplinary Remotely-Piloted Aircraft Studies (CIRPAS) Twin Otter airplane, the PIs will measure VOC eddy fluxes to quantify regional BVOC emissions during summer 2011. Using an airborne Proton Transfer Reaction Mass Spectrometer-Eddy Covariance (PTRMS-EC) flux system, the PIs will measure isoprene and total terpene emissions. They will further speciate monoterpenes using gas chromatography with mass spectrometer and flame ionization detector (GC-MS/FID) and estimate emissions using a tracer flux ratio technique. Area emissions will be characterized over triangular pathways, resulting in emission measurements with a spatial resolution of ~ 1 km^2. Using a line source sampling strategy, oak woodland emissions will be characterized. Because oak landscapes are expected to be major emission sources of isoprene and dominant contributors to reactive BVOC emissions in California, oak landscapes with low, moderate, and high leaf area index will be targeted.

New Validated Simulation Platform: With the help of PIs and interested academia, staff will use these inputs and validation data as the basis for a new validated BVOC simulation platform at Air Resources Board (ARB or Board).

Expected Results
With this contract's data and this contractor's contribution, ARB expects to build a new biogenic VOC regionally validated version of the BEIGIS simulation platform.

Significance to the Board
Federal and state laws require ARB to produce compliance demonstrations through the SIP process for ozone and PM. As VOC emissions from power plants, stationary sources, mobile sources, and industrial activities have been reduced significantly, the impact of biogenic VOC emissions for ozone and PM formation has increased. Accurate BVOC emission inventories are a critical requirement of the SIP process. This project supports the essential task of producing an accurate BVOC emission inventory.

Contractor:
University of California, Berkeley

Contract Period:
36 months

Principal Investigator (PI):
Professor Allen Goldstein and Dr. Alex Guenther

Contract Amount:
$400,000

Basis for Indirect Cost Rate:
The State and the UC system have agreed to a ten percent indirect cost rate.

Past Experience with this Principal Investigator:
Professor Goldstein has contributed to development of BEIGIS through research projects "Whole Ecosystem Measurements of Biogenic Hydrocarbon Emissions: Impacts on Ozone and Aerosol Formation," and "Flux Measurements of Biogenic Precursors to Ozone and Particulate Matter in the Central Valley." Professor Goldstein has contributed results of numerous other biogenic emissions research work funded by others in the last decade.

Prior Research Division Funding to University of California, Berkeley:

Year	2008	2007	2006
Funding	$1,169,448	$1,372,484	$1,607,398

BUDGETSUMMARY

The Regents of the University of California, Berkeley

Improving Regional VOC Emission Estimates Using an Airborne PTRMS Eddy Flux Measurement System

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 141,583	
2.	Subcontractors	$ 189,442[1]	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 31,000	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 4,000	
7.	Mail and Phone	$ 0	
8.	Supplies	$ 10,287	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 0	
	Total Direct Costs		$376,312
INDIRECT COSTS			
1.	Overhead	$ 23,688	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$23,688
TOTAL PROJECT COSTS			**$400,000**

[1] The two subcontractors are bringing specialized intellectual resources, sampling platforms, and analytical capabilities that are indispensable to this effort, namely: providing aircraft, pilots, and flight time for regional measurements of biogenic emissions; and offering expertise and analytical support for regional biogenic measurements.

SUBCONTRACTORS' BUDGET SUMMARY

Naval Postgraduate School (Center for Interdisciplinary Remotely Piloted Aircraft Studies)

Description of subcontractor's responsibility: Provide aircraft, pilots, and flight time for regional measurements of biogenic emissions.

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 70,130[2]	
2.	Subcontractors	$ 0	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 0	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 0	
7.	Mail and Phone	$ 0	
8.	Supplies	$ 1,000	
9.	Analyses	$ 0	
10.	Miscellaneous (Aircraft Maintenance & Op)	$ 54,000[3]	
	Total Direct Costs		$125,130
INDIRECT COSTS			
1.	Overhead	$ 24,312	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$24,312
TOTAL PROJECT COSTS			**$149,442**

[2] Pilot and scientist labor constitutes more than 50% of the subcontractor's direct costs. Without their contribution the regional measurement campaign cannot occur.

[3] Twin Otter airplane is one of the most versatile and robust measurement platforms and its operations and maintenance costs are quite low compared to other airplanes for this type of application; on a per hour basis, these operation and maintenance costs are considered a bargain.

SUBCONTRACTORS' BUDGET SUMMARY

University Corporation for Atmospheric Research

Description of subcontractor's responsibility: Provide scientists and equipment for regional biogenic measurements.

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	0	
2.	Subcontractors	$	0	
3.	Equipment (HF Generator – PTR MS Comp)	$	24,000[3]	
4.	Travel and Subsistence	$	0	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	0	
7.	Mail and Phone	$	0	
8.	Supplies	$	10,500	
9.	Analyses	$	0	
10.	Miscellaneous	$	0	
	Total Direct Costs			$34,500
INDIRECT COSTS				
1.	Overhead	$	5,500	
2.	General and Administrative Expenses	$		
3.	Other Indirect Costs	$		
4.	Fee or Profit	$		
	Total Indirect Costs			$5,500
TOTAL PROJECT COSTS				**$40,000**

[3] Equipment here is 60% of the contract amount but is a critical component of the PTR-MS (Proton Transfer Reaction Mass Spectrometry worth $200,000) without which the airplane PTRMS would not function and the study could not occur.

PROPOSED

State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 10-11

February 25, 2010

Agenda Item No.: 10-2-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2696-266, entitled "On-Road Measurement of Emissions from Heavy Duty Diesel Trucks: Impacts of Fleet Turnover and ARB's Truck and Bus Rule," has been submitted by the University of California, Berkeley (UC Berkeley);

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee (RSC) has reviewed and recommends for funding:

> Proposal Number 2696-266 entitled "On-Road Measurement of Emissions from Heavy Duty Diesel Trucks: Impacts of Fleet Turnover and ARB's Truck and Bus Rule," submitted by UC Berkeley, for a total amount not to exceed $300,012.

NOW, THEREFORE, BE IT RESOLVED that ARB, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of RSC and approves the following:

> Proposal Number 2696-266 entitled "On-Road Measurement of Emissions from Heavy Duty Diesel Trucks: Impacts of Fleet Turnover and ARB's Truck and Bus Rule," submitted by UC Berkeley, for a total amount not to exceed $300,012.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $300,012.

ATTACHMENT A

On-Road Measurement of Emissions from Heavy Duty Diesel Trucks: Impacts of Fleet Turnover and ARB's Truck and Bus Rule

Background

Despite improvements in emission control technologies, particulate matter (PM) remains remain a serious pollution problem. Large portions of the California population, including those in the South Coast Air Basin and San Joaquin Valley are exposed to levels that exceed California health-based PM2.5 standards. PM also impacts climate and visibility. Ultra-low sulfur fuel was introduced in California in 2006 to allow use of post-combustion treatment devices on diesel trucks for better control of PM emissions.

Heavy-duty diesel (HDD) vehicles are an important source of emissions of nitrogen oxides (NO_X) and PM; however, their emissions are expected to be reduced due to recent regulatory changes. National standards for diesel engine exhaust were applied to new vehicles beginning in 2007 with phase-in through 2010. Due to longer service lives for heavy-duty compared to light-duty vehicles California has required retrofit or replacement of older diesel engines and this requirement is expected to change emissions dramatically over the next four years.

Research measurement programs funded by Air Resources Board (ARB or Board) and performed by the proposed contractor from the mid-1990s through 2006 have characterized fleet average emissions from light-duty and heavy-duty vehicle fleets operating inside the Caldecott Tunnel. The 2006 results provide a baseline for comparison with results from the proposed research.

The proposed research will measure emissions from a large sample of individual HDD vehicles operating in 2011 and 2013 and will build upon results from measurements of emissions from individual trucks that were operating under similar conditions in 2006 to assess the extent of changes in distributions of emissions.

Objective

The primary objective of the proposed research is to characterize both NO_x and PM emissions from in-use HDD vehicles. Specifically, the proposed research will obtain distributions of emission rates for NO, NO_2, particle number (PN), black carbon (BC), and, in the ultrafine size range, particle number by diameter N(Dp) from individual exhaust plumes of a large sample of heavy duty trucks operating in 2011 and 2013. The plumes of at least 500 individual trucks will be sampled in each year. License plates will be recorded with video and the California plate information will be merged with DMV data to identify the vehicle model year and manufacturer.

Methods

To obtain distributions of emission rates for NO, NO_2, PN, BC, and, in the ultrafine size range, N(Dp) from individual exhaust plumes of a large sample of heavy duty trucks operating in 2011 and 2013, this research will draw air into instruments that will rapidly

observe the changes in concentration associated with passage of individual truck plumes. Observations will be used to provide fuel-based emission rates specific to the individual vehicle for each of the pollutants measured. The emission rates from individual vehicles will be reported per mass of fuel combusted; for example as grams of NO_X emitted per kg of fuel consumed, or as PN emitted per kg of fuel consumed.

Based on work the conducted in 2006 to characterize exhaust plumes of individual trucks, the current proposal calls for use of the Caldecott Tunnel infrastructure to provide the staging area for the instrumentation. However, the proposed research is not a tunnel study per se and the current proposal differs from 2006 in that the measurements will be made near the entrance, not inside the tunnel. Near the entrance, the time-averaged baseline concentrations will be much lower and very similar to ambient concentrations and thus there will be a stronger signal above background from the individual truck exhaust plumes to provide more precise measurements of the plume concentrations above ambient.

Expected Results
The research results are expected to significantly improve our understanding of the emissions from the HD vehicle fleet and how those emissions changed with implementation of newer control technologies. The analysis will include quantification of changes in emission rates and assessment of any interactive effects between exhaust pollutants. The analysis will provide emission rates per mass of fuel burned at the time of passage of individual truck plumes. Distributions of emissions will be provided from a large sample of individual heavy duty trucks (at least 500 each year) operating at the Caldecott Tunnel in 2011 and 2013. The measurements will provide the NO/NO_2 emissions splits and emission factor distributions for black carbon, PN, and, in the ultrafine range, particle size.

Significance to the Board
Understanding the distribution of emissions from individual HD vehicles representative of an in-use HDDV fleet and how that distribution changes over a multi-year period in response to regulations which introduce new control methods is relevant to policy decisions intended to reduce levels of ozone and particulate matter to protect public health.

Contractor:
University of California, Berkeley

Contract Period:
48 months

Principal Investigator (PI):
Professor Robert Harley

Contract Amount:
$300,012

Cofunding:
Although the proposed project is not directly co-funded, it will benefit from and build upon related measurements of fleet average HDDV emissions made by the same contractor at the same location in 2010 and those will be funded entirely by the U.S. EPA.

Basis for Indirect Cost Rate:
The University of California has agreed to a ten percent indirect cost rate.

Past Experience with this Principal Investigator:
Professor Robert Harley has conducted extensive research relevant to the proposed project at this location and extensive research for ARB with exceptionally high level of performance. His work from the early 1990s through 2006 has provided significant information on the speciation of vehicle exhaust emissions from in-use light-duty and heavy-duty vehicle fleets and has quantified the changes in mass emission rates in response to changes in fuel specifications and fleet turnover. His past theoretical and observational work has provided significant advances in understanding of emissions. His understanding of the implications of inventory improvement is underpinned by the fact that he has utilized his empirical results for validation and improvement of emission inventories and has also applied those emission inventories for regional modeling of atmospheric chemistry.

Prior Research Division Funding to UC Berkeley:

Year	2008	2007	2006
Funding	$1,169,448	$1,372,484	$1,607,398

BUDGET SUMMARY

Contractor: University of California, Berkeley

On-Road Measurement of Emissions from Heavy Duty Diesel Trucks:
Impacts of Fleet Turnover and ARB's Truck and Bus Rule

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	166,279	
2.	Subcontractors	$	100,009[1]	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	4,000	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	75	
7.	Mail and Phone	$	100	
8.	Supplies	$	9,111	
9.	Analyses	$	0	
10.	Miscellaneous	$	1,500	
	Total Direct Costs			$281,074
INDIRECT COSTS				
1.	Overhead	$	18,938	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$18,938
TOTAL PROJECT COSTS				**$300,012**

[1] The subcontractor, a leading entity in the characterization of aerosols, will use advanced methods for aerosol measurements with high precision and fine time resolution

SUBCONTRACTORS' BUDGET SUMMARY

Subcontractor: Aerosol Dynamics, Inc.

Description of subcontractor's responsibility: The subcontractor will work in collaboration with Professor Harley. In particular, their work will focus on use of advanced methods for aerosol measurements with high precision and fine time resolution. Dr. Hering is the inventor of the water condensation particle counter used for real-time ultrafine PN measurements to be done as part of this research, and Aerosol Dynamics, Inc. has expert- level knowledge of aerosol measurements in general, and particle sizing and counting specifically.

	DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$	57,558	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	100	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	0	
7.	Mail and Phone	$	0	
8.	Supplies	$	2,060	
9.	Analyses	$	0	
10.	Miscellaneous	$	0	
	Total Direct Costs			$59,718
	INDIRECT COSTS			
1.	Overhead	$	40,291	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$40,291
	TOTAL PROJECT COSTS			**$100,009**

PROPOSED

State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 10-12

February 25, 2010

Agenda Item No.: 10-2-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2700-266, entitled "Modeling Optimal Transition Pathways to a Low Carbon Economy in California: Impacts of Advanced Vehicles and Fuels on the Energy System," has been submitted by the University of California, Davis (UC Davis);

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee (RSC) has reviewed and recommends for funding:

> Proposal Number 2700-266, entitled "Modeling Optimal Transition Pathways to a Low Carbon Economy in California: Impacts of Advanced Vehicles and Fuels on the Energy System," submitted by UC Davis, for a total amount not to exceed $278,356.

NOW, THEREFORE, BE IT RESOLVED that ARB, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of RSC and approves the following:

> Proposal Number 2700-266, entitled "Modeling Optimal Transition Pathways to a Low Carbon Economy in California: Impacts of Advanced Vehicles and Fuels on the Energy System," submitted by UC Davis, for a total amount not to exceed $278,356.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $278,356.

ATTACHMENT A

Modeling Optimal Transition Pathways to a Low Carbon Economy in California: Impacts of Advanced Vehicles and Fuels on the Energy System

Background
Reducing greenhouse gases (GHG) by 80 percent in 2050 will require a complete transformation of the State's energy economy affecting every sector including electricity production, transportation and fuels, rural and urban land use, industry, and agriculture. One of the challenges of developing strategies and policies to achieve this long-term climate change mitigation target is the difficulty of envisioning what our state might look like when we succeed. Scenario planning is a tool that can be used to help policy-makers define the strategies that will be most effective in achieving our goals. This project can develop a set of plausible and positive scenarios for the future of California that achieves the 2050 GHG reduction targets of 80 percent below 1990 levels. The scenarios would include information on technical, institutional, and political barriers that would need to be addressed to achieve the scenario.

Objective
The aim of the project is to create transparent, flexible, and publicly accessible modeling tools for understanding the future evolution of California's energy system in achieving the future GHG emission reduction goal in 2050. This project will develop an integrated system model, CA-TIMES (i.e., the next generation of MARKAL), that will identify optimized scenarios for meeting 2050 climate policy goals and evaluate the resource and economic impacts to the state of California.

Methods
UC Davis researchers propose to modify, calibrate, and apply two models for 2050 scenario analyses: CA-TIMES and the California Electricity Dispatch (CED) model. The first is the CA-TIMES/MARKAL model, based on an energy-economic-environment modeling tool widely used internationally. The model will characterize California's energy system and future energy technology pathways to meet energy and environmental challenges. UC Davis researchers will also expand the CED model, an electricity system dispatch model, to enable us to better model low carbon grids incorporating renewable energy. The key results extracted from the detailed hourly electricity dispatch model will be integrated into CA-TIMES. They will apply CA-TIMES to specific research questions pertinent to meeting the 2050 GHG reduction targets and explore a number of optimal scenarios for achieving the long-term climate goal.

Expected Results
One of the important deliverables is the technology database by sector in Excel. The CA-TIMES energy system model and the CED model will be built on a transparent and easy-to-access Excel database. Each sector-specific database includes data on technology characteristics (including efficiency, capital costs, operating and maintenance costs, lifetime, discount rate, etc.), energy balance, demand, and commodity flows. Therefore, ARB staff can run numerous policy scenarios in-house,

with the state-of-the-art modeling techniques and most complicated California-specific data. Another deliverable is the reports and presentations describing CA-TIMES and CED model development, technology database and model capabilities. Particularly, UC Davis researchers will deliver the report on the 2020 scenario analysis, including the analyses of introducing electric, biofuel, and hydrogen vehicles using CA-specific energy system models (including the CA-TIMES and CED models) and impact on energy system under various policy and technology assumptions and scenarios.

Significance to the Board
The two models to be developed will allow us to analyze the structure and operation of the future California energy system for various future energy demand scenarios, technology assumptions and carbon policies. The models and datasets can give us a big picture of what California's energy market will look like in 2020 and 2050, on the grounds of the energy and environmental policies and regulations proposed in Assembly Bill 32. Furthermore, using the 2020 results as the new baseline, future policies and technologies for meeting the 2050 climate goal can be examined and designed by running the models with the database.

Contractor:
Institute of Transportation Studies,
University of California, Davis

Contract Period:
24 months

Principal Investigator (PI):
Dr. Sonia Yeh

Contract Amount:
$278,356

Basis for Indirect Cost Rate:
The State and the UC system have agreed to a ten percent indirect cost rate.

Past Experience with this Principal Investigator:
Dr. Yeh will serve as the principal investigator coordinating and synthesizing the effort for the overall project. Her 9+ years of experience in energy modeling and strong publication records, especially her expertise in developing the model specific to this project, make her ideal to fulfill this role.

Prior Research Division Funding to UC Davis:

Year	2008	2007	2006
Funding	$1,209,135	$935,020	$1,684,890

BUDGET SUMMARY

Contractor: Institute of Transportation Studies, University of California, Davis

Modeling Optimal Transition Pathways to a Low Carbon Economy in California: Impacts of Advanced Vehicles and Fuels on the Energy System

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 220,975	
2.	Subcontractors	$ 0	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 6,420	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 150	
7.	Mail and Phone	$ 75	
8.	Supplies	$ 200	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 27,753[1]	
	Total Direct Costs		$255,573
INDIRECT COSTS			
1.	Overhead	$ 22,783	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$22,783
TOTAL PROJECT COSTS			**$278,356**

[1] Resident Fees for two Graduate Student Researchers, per year. Graduate researchers already trained with expertise directly related to projects of this kind will contribute significantly to this project.

PROPOSED

State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 10-13

February 25, 2010

Agenda Item No.: 10-2-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2699-266, entitled "Peripheral Blood Gene Expression in Subjects with Coronary Artery Disease and Exposure to Particulate Air Pollutant Components and Size Fractions," has been submitted by the University of California, Irvine (UC Irvine);

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee (RSC) has reviewed and recommends for funding:

Proposal Number 2699-266 entitled "Peripheral Blood Gene Expression in Subjects with Coronary Artery Disease and Exposure to Particulate Air Pollutant Components and Size Fractions," submitted by UC Irvine, for a total amount not to exceed $274,931.

NOW, THEREFORE, BE IT RESOLVED that ARB, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of RSC and approves the following:

> Proposal Number 2699-266 entitled "Peripheral Blood Gene Expression in Subjects with Coronary Artery Disease and Exposure to Particulate Air Pollutant Components and Size Fractions," submitted by UC Irvine, for a total amount not to exceed $274,931.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $274,931.

ATTACHMENT A

Peripheral Blood Gene Expression in Subjects with Coronary Artery Disease and Exposure to Particulate Air Pollutant Components and Size Fraction

Background

There is a gap in information on whether gene expression in biological pathways relevant to particulate matter (PM) exposure effects is associated with urban PM exposure in humans at potentially increased cardiac risk. There are two important classes of particles for which little is known regarding health effects in human populations: 1) Primary organic aerosols (POA) from combustion sources, which are primarily traffic-related in Los Angeles; 2) Secondary organic aerosols (SOA), which are photochemically produced from combustion-related, industrial, and biogenic volatile or semi-volatile precursors. Transition metals, such as those found in coarse particles, may have cardiovascular effects and examining these metals in coarse particles will be helpful in determining their toxicity in humans. The size, composition and sources of particles will likely determine their toxicity, their ability to enter the circulation, and pathophysiological mechanisms of effect. However, there is limited toxicity data in human populations. To address these research gaps, the proposed study will analyze the possible relationship between gene expression and particle composition and sources. The present study will leverage the data from a study funded by the National Institute of Environmental Health Sciences (NIEHS), referred to as the Cardiovascular Health and Air Pollution Study (CHAPS) as well as a genetic analysis of 42 specific genes in the same cohort funded by NIEHS.

Objective

The main objectives of this proposed research are to determine the organic composition of the accumulation mode PM2.5 in both indoor and outdoor environments throughout the study years; to conduct an extensive source apportionment study, which will include quasi-ultrafine PM exposures (already measured); and to analyze relationships of the various characterized exposures, including data from coarse particle mass and metals, to gene expression in the study subjects.

Methods

This study will make use of information from CHAPS and a genetic study of the same cohort funded by NIEHS. Subjects in CHAPS included 60 nonsmokers with a history of coronary artery disease (CAD) living in four retirement communities in the Los Angeles air basin. Each subject was followed intensively over 7-month periods with a number of health endpoints measured. An intensive exposure assessment at the retirement communities has been included to characterize exposures to indoor and outdoor criteria pollutant gases; PM gravimetric mass of quasi-ultrafine (PM0.25), accumulation (PM0.25-2.5), and (PM2.5-10) coarse modes; elemental and organic carbon; black carbon; and particle number concentration. Gene expression data for 42 selected genes will be available from the ongoing NIEHS funded work. This includes genes involved in oxidative stress, antioxidant defense, xenobiotic metabolism, inflammation, coagulation, and endoplasmic reticulum stress.

The proposed study will produce new particle composition data from archived accumulation mode filter samples, and then conduct an analysis of available gene expression data from CHAPS. The chemical speciation of quasi-ultrafine particles has been completed. Composition and source tracers will be used to detect differences in associations between POA and SOA. The investigation will compare gene expression in exposures to quasi ultrafine and accumulation mode particles carrying these organic aerosol types as well as transition metals and mass in coarse particles.

Expected Results
The study should demonstrate the value of gene expression analysis in circulating whole blood as a biomarker of response to air pollution exposure. This work has the potential to advance the knowledge of air pollution health effects in a susceptible population by using gene expression in peripheral blood and employing detailed pollutant measurements on particle sources, size and composition.

Significance to the Board
This study will provide information on the genetic effects of air pollution in a sensitive population under real life conditions and will also add new information on the effect of impacts by particle source, size, and composition. The exposure assessment data is a major strength of this proposal. Previous studies have largely relied on air monitoring data from central sites located far from subjects with little or no information about particle composition or sources. The data on detailed exposure assessment will be important for developing effective pollution control strategies for ARB in the future, since it could link biological outcomes to pollutant sources that have a major contribution to personal and indoor particle levels. It may also lay the groundwork for future studies of the mechanisms of air pollution impacts in vulnerable populations.

Contractor:
University of California, Irvine

Contract Period:
24 months

Principal Investigator (PI):
Dr. Ralph Delfino

Contract Amount:
$274,931

Basis for Indirect Cost Rate:
The State and the UC system have agreed to a ten percent indirect cost rate.

Past Experience with this Principal Investigator:
ARB has established a strong working relationship with the principal investigator, Dr. Ralph Delfino, which has resulted in successful completion of several studies to illuminate health effects of air pollution.

Prior Research Division Funding to UC Irvine:

Year	2008	2007	2006
Funding	$685,203	$1,457,755	$340,905

BUDGET SUMMARY

Contractor: University of California, Irvine

Peripheral Blood Gene Expression in Subjects with Coronary Artery Disease and Exposure to Particulate Air Pollutant Components and Size Fractions

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 87,998	
2.	Subcontractors	$ 170,163[1]	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 600	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 200	
7.	Mail and Phone	$ 400	
8.	Supplies	$ 200	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 1,300	
	Total Direct Costs		$260,861
INDIRECT COSTS			
1.	Overhead	$ 14,070	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$14,070
TOTAL PROJECT COSTS			**$274,931**

[1] Subcontractors will carry out sample preparation, conduct analyses, perform quality assurance and control checks, and serve to direct portions of the research.

SUBCONTRACTORS' BUDGET SUMMARY

Subcontractor: University of Southern California

Description of subcontractor's responsibility: Sample preparation and chemical and gravimetric analysis of air pollutants will be conducted here.

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	81,678	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	0	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	0	
7.	Mail and Phone	$	0	
8.	Supplies	$	0	
9.	Analyses	$	0	
10.	Miscellaneous	$	8,640	
	Total Direct Costs			$90,318
INDIRECT COSTS				
1.	Overhead	$	24,504	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$24,504
TOTAL PROJECT COSTS				**$114,822**

SUBCONTRACTORS' BUDGET SUMMARY

Subcontractor: University of Wisconsin-Madison

Description of subcontractor's responsibility: Dr. Schauer will serve as co-PI and overall project director. A post-doctoral scholar will review all data, perform level 2 quality assurance / quality control (QA/QC) checks, generate the data base for the project and will work on source attribution analysis. The subcontractor will also perform all of the chromatography / mass spectrometry analysis including the extraction, sample concentration, instrumental analysis, and quantification as well as all of the required QA/QC.

DIRECT COSTS AND BENEFITS				
11.	Labor and Employee Fringe Benefits	$	43,310	
12.	Subcontractors	$		
13.	Equipment	$		
14.	Travel and Subsistence	$		
15.	Electronic Data Processing	$		
16.	Reproduction/Publication	$	50	
17.	Mail and Phone	$	15	
18.	Supplies	$	6,935[2]	
19.	Analyses	$		
20.	Miscellaneous	$		
	Total Direct Costs			$50,310
INDIRECT COSTS				
5.	Overhead	$	5,031	
6.	General and Administrative Expenses	$		
7.	Other Indirect Costs	$		
8.	Fee or Profit	$		
	Total Indirect Costs			$5,031
TOTAL PROJECT COSTS				**$55,341**

[2] Essential supplies include substrates (sample collection filters, QA/QC support); chemicals (solvents for extraction, standards for GCMS analysis, chemicals for sample derivatization, GCMS gases); analytical supplies (instrumental consumables including GC columns, liners, and injectors parts) and office supplies (e.g., paper, data storage disks).

PROPOSED

State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 10-14

February 25, 2010

Agenda Item No.: 10-2-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2701-266, entitled "In-Duct Air Cleaning Devices: Ozone Emission Rates and Test Methodology," has been submitted by the Missouri University of Science and Technology;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee (RSC) has reviewed and recommends for funding:

> Proposal Number 2701-266 entitled "In-Duct Air Cleaning Devices: Ozone Emission Rates and Test Methodology," submitted by the Missouri University of Science and Technology, for a total amount not to exceed $325,000.

NOW, THEREFORE, BE IT RESOLVED that ARB, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of RSC and approves the following:

> Proposal Number 2701-266 entitled "In-Duct Air Cleaning Devices: Ozone Emission Rates and Test Methodology," submitted by the Missouri University of Science and Technology, for a total amount not to exceed $325,000.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $325,000.

ATTACHMENT A

In-Duct Air Cleaning Devices: Ozone Emission Rates and Test Methodology

Background

In 2007, Air Resources Board (ARB or Board) adopted a regulation that limits ozone emissions from indoor air cleaning devices. In-duct devices, i.e., those physically integrated within a central ventilation system, were exempted from the requirements of ARB's regulation because no suitable test method was available for measuring ozone emissions from such devices, and few data were available on their ozone emissions. The ozone chamber test method required by the current ARB regulation, Section 37 of Underwriters Laboratories, Inc. Standard 867, does not include a suitable test method for measuring ozone emissions from in-duct devices.

However, there are a number of in-duct air cleaner technologies marketed in California that can emit ozone. These technologies include intentional ozone generators, electrostatic precipitators, ionizers, filters enhanced by electrical power, and some air cleaners using ultraviolet light. Some of these technologies may generate significant amounts of ozone and/or ozone reaction byproducts such as formaldehyde.

In a few published studies, indoor ozone concentrations in homes and test homes with in-duct electronic air cleaners have ranged from 10 parts per billion (ppb) to 200 ppb. Current ARB air cleaner regulation limits ozone emission concentrations of portable air cleaners to 50 ppb. Therefore, the potential for in-duct electronic air cleaners to increase indoor ozone exposures to indoor ozone and its toxic by-products, and to produce the associated health effects, is substantial.

Objective

The primary objectives of the proposed research are to: 1) develop and test a method of measuring the ozone emissions from in-duct electrically-connected air cleaners ("device"), and 2) obtain real-world data on indoor ozone concentration increases due to use of these devices in field sites. Two secondary objectives are to: 3) apply the method to a number of commercially available units in a laboratory setting to measure emission rates, and 4) estimate the impact of in-duct air cleaners in typical California buildings.

Methods

The principal investigators (PIs) will first generate a list of in-duct electronic air cleaner models and their relative market share in California. Electronic air cleaner technologies, as well as other potential ozone-emitting technologies, will be identified and ranked. Next, the PIs will conduct laboratory experiments on available in-duct devices to measure ozone emission rates. This testing will be completed on approximately ten (but no less than seven) air cleaners to cover the most popular types of air cleaner technologies, and will include at least one ozone generator model. Then, these data will be used to develop a robust laboratory test method that can be applied by commercial testing laboratories to measure the ozone emission rates from such devices.

Concurrent with laboratory testing, the PIs will measure ozone increases from in-duct devices in three homes in Tulsa, Oklahoma, similar to types of homes found in California, in order to develop robust field data and techniques so that California home testing can be performed most efficiently. Next, the investigators will conduct field tests in California buildings with installed in-duct air cleaners, to measure any increase in indoor ozone concentrations that may result from the use of in-duct air cleaners. At least six buildings (five homes and one small commercial building) will be recruited and tested. Finally, PIs will use data from this study and from published research and reports to estimate the impact of ozone emissions from these devices on typical California homes. Modeling parameters appropriate for California homes will be used.

Expected Results
This contract will also provide information on levels of ozone emitted from in-duct air cleaners under a range of common conditions. It is expected that some of the devices tested produce indoor concentrations exceeding the federal eight-hour ozone standard of 75 ppb for outdoor air, and the state limit of 50 ppb for portable air cleaners. In addition, this study will provide a comprehensive test method for measuring the levels of ozone emitted from in-duct air cleaners.

Significance to the Board
The current regulation to limit ozone emissions from indoor air cleaning devices exempts in-duct air cleaners because there is currently no standardized test method for measuring ozone emissions from such devices, and because there is limited verified data on the amount of ozone emitted from them. This contract will provide both a test method for the levels of ozone emitted from in-duct air cleaners, and laboratory and real-world data on the levels of ozone emitted by devices currently in use. These data will help the board determine whether future regulation of in-duct air cleaners is warranted, and if so, provide a basic test method that can be used in such a regulation.

Contractor:
Missouri University of Science and Technology

Contract Period:
30 Months

Principal Investigator (PI):
Glenn Morrison, Ph.D.

Contract Amount:
$325,000

Basis for Indirect Cost Rate:
The State and Missouri University of Science and Technology have agreed to a ten percent indirect cost rate.

Past Experience with this Principal Investigator:
Dr. Morrison received funding in 2007 as partial funding for a scientific workshop he organized to examine new research on indoor air chemistry and the associated exposure and health implications. The workshop was extremely well-organized, and a scientific paper on the workshop conclusions was published soon after the workshop in *Environmental Science and Technology*.

Prior Research Division Funding to Missouri University of Science and Technology:

Year	2008	2007	2006
Funding	$0	$0	$4334

BUDGET SUMMARY

Contractor: Missouri University of Science and Technology

In-duct Air Cleaning Devices: Ozone Emission Rates and Test Methodology

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 68,905	
2.	Subcontractors	$ 222,336[1]	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 6,747	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 641	
7.	Mail and Phone	$ 820	
8.	Supplies	$ 1,230	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 11,137	
	Total Direct Costs		$311,816
INDIRECT COSTS			
1.	Overhead	$ 13,184	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$13,184
TOTAL PROJECT COSTS			**$325,000**

[1] The PI at the University of Texas at Austin, Dr. Seigel, has vast experience conducting research on heating, ventilation, and air conditioning systems, and has extensive connections to people in industry, which will aid in the market-share research. The PI at the University of Tulsa, Dr. Shaughnessy, led some of the early efforts to measure ozone emissions from air cleaners, and is highly qualified to conduct the fieldwork required for this research.

SUBCONTRACTOR'S BUDGET SUMMARY

Subcontractor: The University of Texas at Austin

Description of subcontractor's responsibility: The University of Texas, Austin will be responsible for market share analysis, laboratory testing, method development, and meeting with and reporting with the contractor on a regular basis.

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	77,005	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	1,889	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	0	
7.	Mail and Phone	$	0	
8.	Supplies	$	9,500	
9.	Analyses	$	0	
10.	Miscellaneous	$	14,611[2]	
	Total Direct Costs			$103,005
INDIRECT COSTS				
1.	Overhead	$	8,839	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$8,839
TOTAL PROJECT COSTS				**$111,844**

[2] Miscellaneous costs for this project will cover the tuition and fees for one graduate student. The cost is based on the two academic semesters and one summer semester that the student will work on the project and costs are based on 2009-2010 values from the Cockrell School of Engineering and assumed to increase by 5%.

SUBCONTRACTOR'S BUDGET SUMMARY

Subcontractor: The University of Tulsa

Description of subcontractor's responsibility: The University of Tulsa will be responsible for field testing in Tulsa, field testing in California, and meeting with and reporting to the contractor on a regular basis.

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	72,542	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	7,748	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	500	
7.	Mail and Phone	$	1,300	
8.	Supplies	$	3,250	
9.	Analyses	$	0	
10.	Miscellaneous	$	16,088[3]	
	Total Direct Costs			$101,428
INDIRECT COSTS				
1.	Overhead	$	9,064	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$9,064
TOTAL PROJECT COSTS				**$110,492**

[3] Miscellaneous costs will cover ozone equipment calibration ($1,000), Graduate student tuition for two semesters ($10,788; 6 hours/semester at $899/credit hour), incentive payments to occupants of California homes for participating in the study ($800), rental of one unoccupied test house ($1000), and payment for a contractor who will install and removed devices in Tulsa homes ($2,500)

CALIFORNIA AIR RESOURCES BOARD

NOTICE OF PUBLIC MEETING TO CONSIDER APPROVAL OF THE COACHELLA VALLEY PM10 REDESIGNATION REQUEST AND MAINTENANCE PLAN

The Air Resources Board (ARB or Board) will conduct a public meeting at the time and place noted below to consider the approval of the proposed PM10 Redesignation Request and Maintenance Plan for the Coachella Valley prepared by the South Coast Air Quality Management District (District). If adopted, ARB will submit these elements to the United States Environmental Protection Agency (U.S. EPA) for approval as a revision to the California State Implementation Plan.

DATE: February 25, 2010

TIME: 9:00 a.m.

PLACE: California Environmental Protection Agency
Air Resources Board
Byron Sher Auditorium, Second Floor
1001 I Street
Sacramento, California 95814

This item may be considered at a one-day meeting of the Board, which will commence at 9:00 a.m. on February 25, 2010. This item is scheduled to be heard on the Board's Consent Calendar. All items on the consent calendar will be voted on by the Board immediately after the start of the public meeting. Any item may be removed from the consent calendar by a Board member or by someone in the audience who would like to speak on that item.

BACKGROUND

The federal Clean Air Act (the Act) establishes planning requirements for those areas that routinely exceed the health-based National Ambient Air Quality Standards. These nonattainment areas must develop and implement a State Implementation Plan (SIP) that demonstrates how they will attain the standards by specified dates.

The South Coast Air Quality Management District (District) adopted the first PM10 attainment plan for the Coachella Valley in 1990. The plan focused on fugitive dust control strategies for attaining the national 24-hour PM10 standard. In various plan revisions, the District adopted increasingly stringent dust measures. Riverside County and nine cities also adopted and tightened local fugitive dust ordinances. The concerted adoption of District and local controls in the Coachella Valley resulted in the Coachella Valley attaining the PM10 standard by the 2006 attainment date.

On January 8, 2010, the District adopted the PM10 Redesignation Request and

Maintenance Plan for the Coachella Valley. The plan officially requests that the Coachella Valley be redesignated to attainment for the federal PM10 standard and charts the course for continued maintenance of the standard.

PROPOSED ACTION

ARB staff has reviewed the District's Maintenance Plan for the Coachella Valley and has concluded that it meets applicable federal requirements. ARB staff has also determined that the Maintenance Plan would ensure continued maintenance of the standard for the required ten years following redesignation. Staff is recommending that the Board approve the Maintenance Plan, as well as the corresponding transportation conformity budgets, emissions inventory, and maintenance demonstration as a revision to the California SIP. In addition, ARB staff is recommending that the Board approve the District's request that the Coachella Valley be redesignated from nonattainment to attainment for the national PM10 standard.

AVAILABILITY OF DOCUMENTS

ARB staff has prepared a written Staff Report. Copies of the Staff Report may be obtained from the ARB Public Information Office, 1001 "I" Street, First Floor, Environmental Services Center, Sacramento, California 95814, (916) 322-2990. This notice, the Staff Report, and the District's Coachella Valley PM10 Maintenance Plan will be available from ARB's website at: http://www.arb.ca.gov/planning/sip/planarea/scabsip.htm

SUBMITTAL OF COMMENTS

Interested members of the public may also present comments orally or in writing at the meeting, and written comments may be submitted by postal mail or by electronic mail before the meeting. To be considered by the Board, written comment submissions not physically submitted at the meeting must be received **no later than 12:00 noon, February 24, 2010,** and addressed to the following:

Postal mail: Clerk of the Board, Air Resources Board
1001 I Street, Sacramento, California 95814

Electronic submittal: http://www.arb.ca.gov/lispub/comm/bclist.php

Please note that under the California Public Records Act (Government Code section 6250 et seq.), your written and oral comments, attachments, and associated contact information (e.g., your address, phone, email, etc.) become part of the public record and can be released to the public upon request. Additionally, this information may become available via Google, Yahoo, and any other search engines.

The Board requests, but does not require 20 copies of any written submission. Also,

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 Ms. Sylvia Zulawnick, Manager of the Particulate Matter Analysis Section, Planning and Technical Support Division at (916) 324-7163, or Dr. Patricia Velasco, Staff Air Pollution Specialist, Planning and Technical Support Division at (916) 323-7560.

To request a special accommodation or language needs for any of the following:

- An interpreter to be available at the hearing.
- Have documents available in an alternate format (i.e. Braille, Large print) or another language.
- A disability-related reasonable accommodation.

Please contact the Clerk of the Board at (916) 322-5594 or by facsimile at (916) 322-3928 as soon as possible, but no later than 10 business days before the scheduled Board hearing. TTY/TDD/Speech to Speech users may dial 711 for the California Relay Service.

Para solicitar alguna comodidad especial o necesidad de otro idioma para alguna de las siguientes:

- Un intérprete que esté disponible en la audiencia
- Tener documentos disponibles en un formato alterno (por decir, sistema Braille, o en impresión grande) u otro idioma.
- Una acomodación razonable relacionados con una incapacidad.

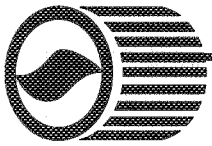
Por favor llame a la oficina del Secretario del Consejo de Recursos Atmosféricos al (916) 322-5594 o envíe un fax al (916) 322-3928 no menos de diez (10) días laborales antes del día programado para la audiencia. Para el Servicio Telefónico de California para Personas con Problemas Auditivos, ó de teléfonos TDD pueden marcar al 711.

CALIFORNIA AIR RESOURCES BOARD

James N. Goldstene
Executive Officer

Date: February 11, 2010

State of California



California Environmental Protection Agency

AIR RESOURCES BOARD

Staff Report

Analysis of the Coachella Valley PM10 Redesignation Request and Maintenance Plan

Release Date: February 11, 2010
Scheduled for Consideration: February 25, 2010

This document has been reviewed by the staff of the California 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 the mention of trade names or commercial products constitute endorsement or recommendation for use.

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EXECUTIVE SUMMARY

Background

The Coachella Valley is currently designated as a serious nonattainment area for the 24-hour national ambient air quality standard (NAAQS or standard) for particulate matter of 10 microns in diameter or smaller (PM10). The South Coast Air Quality Management District (District) adopted the first PM10 attainment plan for the Coachella Valley in 1990. The plan focused on fugitive dust as the primary control strategy for attaining the national 24-hour and the annual PM10 standards. The 2002 plan revision requested extension of the attainment date to 2006. This revision was approved by the United States Environmental Protection Agency (U.S. EPA). In various plan revisions, the District adopted increasingly stringent dust measures. Riverside County and nine cities also adopted and tightened local fugitive dust ordinances. The concerted adoption of District and local controls in the Coachella Valley resulted in this area attaining the 24-hour PM10 standard by the 2006 attainment date.

On January 8, 2010, the District adopted the PM10 Redesignation Request and Maintenance Plan for the Coachella Valley (Coachella Valley PM10 Maintenance Plan). The plan officially requests this area be redesignated to attainment for the PM10 standard and charts the course for continued maintenance of the standard.

Maintenance Plan Addresses Act Requirements

The Coachella Valley PM10 Maintenance Plan includes the following components:

- Attainment emission inventories for directly emitted PM10;
- Demonstration that PM10 attainment concentrations at federal reference monitoring stations will be maintained for ten years after redesignation;
- Commitment to ongoing monitoring network operation for continued verification of attainment; and
- Contingency provisions to address any future violations.

In addition, eight years after the area is redesignated as attainment, the District will submit a revised Coachella Valley PM10 Maintenance Plan providing for continued attainment for an additional ten years.

Staff Recommendation

Air Resources Board (ARB) staff concurs with the District's PM10 Redesignation Request and Maintenance Plan for the Coachella Valley. ARB staff recommends that the Board approve the District's Coachella Valley PM10 Maintenance Plan as a revision to the California State Implementation Plan for submittal to U.S. EPA. In addition, ARB staff recommends that the Board approve the District's request that the Coachella Valley be redesignated from nonattainment to attainment for the national PM10 standard.

I. BACKGROUND

The Coachella Valley portion of the Salton Sea Air Basin is designated as a serious nonattainment area for the 24-hour PM10 national ambient air quality standard (NAAQS or standard). The area is under the jurisdiction of the South Coast Air Quality Management District (District). In 1987, the U.S. EPA adopted the PM10 NAAQS consisting of a 24-hour PM10 standard of 150 micrograms per cubic meter ($\mu g/m^3$) and an annual standard of 50 $\mu g/m^3$. Effective December 18, 2006, U.S. EPA revoked the annual portion of the PM10 standard.

PM10 is a complex mixture of primary or directly emitted particles (dust and soot), and secondary particles or aerosol droplets formed in the atmosphere from precursor gases (NOx, SOx, VOC, and ammonia). PM10 includes the subsets of fine particles with a diameter of 2.5 microns or less (PM2.5) and of coarse particles with a diameter between 2.5 and 10 microns. Secondary particles are found mostly in the PM2.5 portion of PM10.

In the Coachella Valley, the coarse fraction contributes between 70 and 80 percent to ambient PM10 concentrations. Dust is the main component of the coarse fraction in this area. Emissions of particulate matter precursors from the neighboring South Coast Air Basin (SCAB) also contribute to the secondary portion of PM10 in the Coachella Valley.

The District adopted the first PM10 Plan for the Coachella Valley in 1990. This plan established a dust-focused control strategy for attaining the national 24-hour and annual PM10 standards. Control measures were adopted to address fugitive dust emissions from paved and unpaved roads, agricultural activities, construction and demolition activities, and open area wind erosion. The District subsequently adopted PM10 Plan revisions in 1994, 1996, 2002, and 2003. In addition, per these Plan revisions, Riverside County and nine cities adopted and tightened local fugitive dust ordinances. The concerted adoption of District and local control strategies resulted in the Coachella Valley attaining the PM10 standard by the 2006 attainment date.

On January 8, 2010, the District adopted the PM10 Redesignation Request and Maintenance Plan for the Coachella Valley. This plan officially requests this area be redesignated to attainment for the PM10 standard and charts the course for continued maintenance of the standard through 2030.

II. REDESIGNATION REQUIREMENTS

ARB staff reviewed the Coachella Valley PM10 Maintenance Plan within the context of the Clean Air Act (Act), which identifies the following requirements an area must meet to be redesignated to attainment:

A. The PM10 standard has been attained;
B. The District has an approved State Implementation Plan (SIP) and the State has met all applicable Act requirements for PM10 in the nonattainment area;
C. The improvement in PM10 air quality is due to permanent and enforceable emission reductions; and
D. U.S. EPA has approved a maintenance plan.

The Act also sets the general framework for maintenance plans[1]. Each PM10 maintenance plan must provide for continued maintenance of the PM10 standard for ten years after redesignation and includes the following components:

1. Attainment emission inventory;
2. Maintenance demonstration;
3. Commitment to continue the monitoring network operation;
4. Commitment for verification of continued attainment; and
5. Contingency plan to promptly correct any violation of the PM10 NAAQS that occurs after the area has been redesignated.

III. EVALUATION OF THE COACHELLA VALLEY PLAN

Based on review of the Coachella Valley PM10 Maintenance Plan and the District's supporting technical analysis, ARB staff concurs that the Plan meets the requirements. The following sections describe the major elements of the Plan and the redesignation request.

A. Coachella Valley Attains the 24-Hour PM10 Standard

PM10 concentrations are measured at two monitoring stations located in the Coachella Valley (Figure 1). At both sites, federal reference monitors (FRMs) collect PM10 samples on a 24-hour basis and real-time monitors collect samples on an hourly basis. Table 1 lists air quality data for the 2005-2007 three-year period for the FRMs demonstrating that the Coachella Valley meets the 24-hour PM10 standard. The 24-hour standard is met when the estimated number of exceedances measured over a three year period averages one or less per year.

[1] Calcagni, John, Memorandum, *Procedures for Processing Requests to Redesignate Areas to Attainment, Office of Air Quality Planning and Standards*, Research Triangle Park, North Carolina, September 4, 1992. http://www.epa.gov/ttn/oarpg/t5/memoranda/redesignmem090492.pdf

Figure 1. PM10 Monitoring Stations in the Coachella Valley portion of the Salton Sea Air Basin

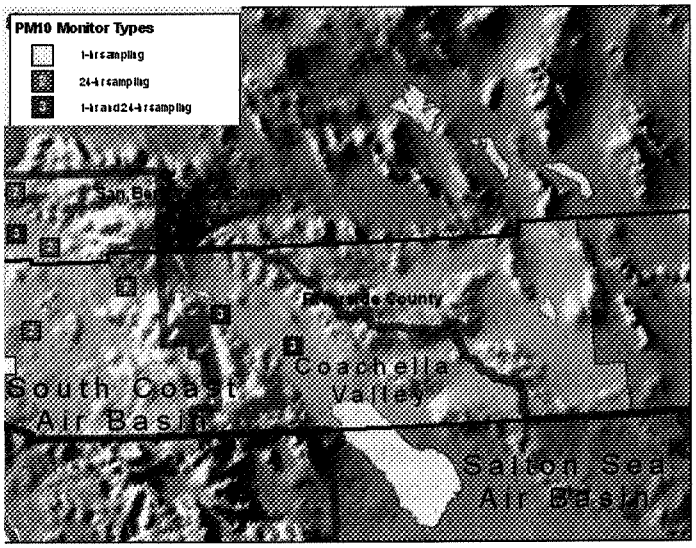


Table 1. Coachella Valley FRM PM10 Data from 2005 to 2007

Monitoring Station Name	Observed Maximum 24-hour Concentration[a] ($\mu g/m^3$)			Estimated 24-Hour Exceedance Days
	2005	2006	2007	2005-2007
Palm Springs	66	73	83	0
Indio	106	122	146	0

a. Data do not include PM10 concentrations caused by natural/exceptional events which are excluded from regulatory consideration.

On three days over the 2005 to 2007 period, the 24-hour standard was exceeded due to high wind conditions that suspended blowsand in protected environmental preserves and dispersed it throughout the Valley. These exceedances can be excluded under the federal rule for exceptional events since they are not reasonably preventable or controllable. Documentation for these events was submitted to U.S. EPA for concurrence as exceptional events.

B. U.S. EPA Approved the Coachella Valley PM10 SIP and the State Has Met Applicable Act Requirements

On April 18, 2003, U.S. EPA approved the 2002 Coachella Valley PM10 and granted an extension of the PM10 attainment date to December 31, 2006. On November 14, 2005, U.S. EPA approved the District's 2003 PM10 attainment plan strengthening control measures in the Coachella Valley. In addition, ARB and the District have met all of the

Act requirements applicable for a serious PM10 nonattainment area to be considered for redesignation.

C. Improvement in Coachella Valley's PM10 Air Quality is Due to Permanent and Enforceable Reductions in Emissions

Since the first Coachella Valley PM10 attainment plan was adopted in 1990, the District and ten local jurisdictions (Riverside County and nine cities) have adopted increasingly stringent dust control rules and local ordinances that were committed to in the original plan and the subsequent plan revisions. These measures have provided for continuous attainment of the 24-hour PM10 standard (excluding exceptional or natural events) in the region since 2003, despite regional growth.

Based on analyses of long-term meteorological variables, including rainfall and wind speeds, the District found that meteorological conditions during the 2005-2007 period were conducive to higher PM10 concentrations. Yet, excluding exceptional events, the Coachella Valley did not violate the 24-hour PM10 standard during this three-year period.

D. Maintenance Plan

The Coachella Valley PM10 Maintenance Plan includes the following components: attainment emission inventory; maintenance demonstration; commitment to continue monitoring network operation; commitment for verification of continued attainment; contingency plan; and transportation conformity budgets.

1. Attainment Emission Inventory

An emission inventory is a critical tool used to support evaluation, control, and mitigation of air pollution which is comprised of a systematic listing of the sources of air pollutants along with the amount of pollutants emitted from each source or category over a given period of time. Emission inventories are estimates of the air pollutant emissions released into the environment – they are not direct ambient concentration measurements. To determine the expected emissions in future years, emission inventories incorporate the effects of growth and existing regulations (baseline inventories). An attainment inventory identifies the level of emissions during the period when air quality data show attainment.

The Coachella Valley PM10 Maintenance Plan presents an updated 2006 attainment inventory of direct PM10 emissions split by source subcategory. Inventory updates include the latest point and area source emission information the District used in the 2007 Air Quality Management Plan (AQMP) to demonstrate attainment for the ozone standard in the Coachella Valley; ARB EMFAC 2007 mobile source emissions; and on-road and paved road dust emission estimates based on planning assumptions in the Southern Association of Governments (SCAG) 2007 Regional Transportation Plan (2007 RTP) plus adjustments for consistency with SCAG's final 2008 RTP. In addition

to the 2006 attainment year adjusted baseline PM10 emissions, the Coachella Valley PM10 Maintenance Plan lists PM10 emissions for 2002 and 2008, plus projected emissions for 2010 through 2012 (providing a bracket for the start of the maintenance period depending upon plan approval by U.S. EPA), 2014, 2020, and 2023 (bracketing the expected 10-year maintenance period), and 2030.

2. Maintenance Demonstration

In the 2003 PM10 attainment plan, the District used a combination of chemical mass balance (CMB) receptor modeling and the linear rollback technique to demonstrate attainment. CMB is a statistical model using information on the chemical composition of ambient air samples collected at monitoring sites and information on the composition of source emissions to apportion each source's contribution to the measured ambient sample. Data collected at the Palm Springs and Indio monitoring sites during the 1989 particulate matter monitoring field study served as input to the CMB modeling. Linear rollback assumes that future PM10 levels above background concentrations will decrease in proportion to projected emission reductions. In the linear rollback for each site, CMB source categories are matched to the appropriate emission inventory categories. For these analyses the District assumed the total amount of secondary particles in Coachella Valley was the result of transport from the SCAB. The District determined the amount of PM10 transported to the Coachella from the SCAB based on the regional photochemical modeling the District had previously conducted to demonstrate attainment for the PM2.5 and PM10 standards in the SCAB as part of the 2007 AQMP. Table 2 lists the 2010 through 2012, 2014, 2020, 2023, and 2030 projected maximum 24-hour PM10 values at Indio, which demonstrate continued attainment in the Coachella Valley.

Table 2. Projected Maintenance of 24-hour PM10 NAAQS in the Coachella Valley

Year	Projected Maximum 24-hour Concentration ($\mu g/m^3$)
2010	129.7
2011	129.1
2012	129.5
2014	129.8
2020	133.7
2023	136.0
2030	142.0

The Coachella Valley is projected to maintain attainment with the PM10 standards due to ARB, District, and other State and local control measures already in place. In addition, future emissions in PM10 precursors are projected to decrease even further as a result of the implementation of controls in the 2007 AQMP for PM2.5 and ozone in the SCAB.

3. PM10 Monitoring Network

The District commits to continue PM10 monitoring to verify sustained attainment of the PM10 standards. The existing PM10 monitoring network in the Coachella Valley includes co-located FRM and real-time PM10 monitors at Indio and Palm Springs (Figure 1). Federal regulations require daily sampling at the site reporting peak PM10 concentrations. The real-time PM10 monitors meet this daily monitoring requirement.

4. Verification of Continued Attainment

To verify continued attainment of the PM10 standards, the District commits to reevaluate the Coachella Valley PM10 Plan as part of the District's comprehensive Air Quality Management Plan (AQMP) revision currently scheduled for 2011. The District also commits to submit to U.S. EPA in 2018 the required revision to the PM10 Maintenance Plan demonstrating maintenance of the standard for the following ten year period. On a regular basis, the District will analyze PM10 data from FRM and continuous monitors and compare daily PM10 values to the level of the 24-hour standard. The District commits to annually review the effectiveness of the current District dust rules.

5. Contingency Plan

The Act requires the maintenance plan to include contingency provisions for prompt correction of any PM10 standard violation that might occur after the area has been redesignated to attainment. The maintenance plan is not required to contain fully adopted contingency measures that will go into effect without further state action as is required in attainment SIPs. Instead, for maintenance plans, the area must have a plan to ensure that contingency measures are adopted once they are triggered.

Implementation of the 2007 AQMP serves as an on-going contingency measure for maintaining the PM10 standard in the Coachella Valley. Emission reductions from control measures designed to attain the PM2.5 and ozone standards in the SCAB will reduce the levels of PM2.5 transported to Coachella Valley, effectively reducing the PM10 concentrations. If nonetheless the 24-hour PM10 standard is violated, and data evaluation shows the violation is not due to a natural or exceptional event, the District will evaluate further enhancements to key existing PM10 measures to achieve necessary emission reductions as expeditiously as possible.

6. Transportation Conformity Budgets

Under section 176(c) of the Act, transportation activities that receive federal funding or approval must be found to be fully consistent with the SIP. The federal transportation

conformity regulation[2] found in 40 CFR parts 51 and 93 requires SIPs to specify on-road motor vehicle emission budgets (budgets) that are consistent with attainment and maintenance of NAAQS. To receive federal funding, transportation agencies must demonstrate that emissions from regional transportation plans, programs, and projects do not exceed these "emission budgets."

The PM10 Maintenance Plan includes the transportation conformity emission budgets (budgets) for the Coachella Valley the District updated using ARB's latest on-road mobile source emission factor model EMFAC2007 and transportation activity data from SCAG's 2007 RTP, plus adjustments for consistency with SCAG's final 2008 RTP. The budgets U.S. EPA previously approved as part the 2003 Coachella Valley PM10 Plan were based on EMFAC 2002 and SCAG's 2001 RTP.

On-road motor vehicle emission budgets for transportation conformity were established for the years 2010, 2020, and 2030. The new PM10 emission budgets are shown in Table 3. The PM10 Maintenance Plan sets the budgets in three tiers: 1) from 2010 through 2019 at 13 tons per day (tpd); 2) from 2020 through 2029 at 16 tpd; and 3) for 2030 and following years at 20 tpd.

Table 3. Transportation Emission Budgets for PM10 in the Coachella Valley, (Annual average)

Emission Budget (tons per day)	**2010**	**2020**	**2030**
PM10	13	16	20

The emission budgets established in the Coachella Valley PM10 Maintenance Plan fulfill the requirements of the Act and U.S. EPA regulations to ensure that transportation activities support attainment of the PM10 standards.

IV. STAFF RECOMMENDATION

ARB staff has reviewed the PM10 Redesignation Request and Maintenance Plan for the Coachella Valley and consulted with the District staff during this review. ARB staff finds that the Coachella Valley PM10 Maintenance Plan meets all applicable Act requirements. ARB staff believes that implementation of this plan will continue to maintain PM10 levels below the national air quality standard in the Coachella Valley. Therefore, we recommend that the Board adopt the Coachella Valley PM10 Maintenance Plan as a revision to the California SIP for submittal to U.S. EPA. In addition, ARB staff recommends that the Board approve the District's requests that the the Coachella Valley be redesignated from nonattainment to attainment for the national PM10 standard.

[2] U.S. EPA maintains online information on its transportation conformity program, including access to relevant rulemakings, policy guidance, and reports at: http://www.epa.gov/otaq/stateresources/transconf/index.htm

PROPOSED

State of California
AIR RESOURCES BOARD

Resolution 10-20

February 25, 2010

Agenda Item No.: 10-2-10

WHEREAS, the Legislature in Health and Safety Code section 39602 has designated the State Air Resources Board (ARB or Board) as the air pollution control agency for all purposes set forth in federal law;

WHEREAS, the ARB is responsible for the preparation of the State Implementation Plan (SIP) for attaining and maintaining the national ambient air quality standards (NAAQS) as required by the federal Clean Air Act (the Act; 42 U.S.C. section 7401 et seq.), and to this end is directed by Health and Safety Code section 39602 to coordinate the activities of all local and regional air pollution control and air quality management districts (districts) necessary to comply with the Act;

WHEREAS, section 39602 of the Health and Safety Code also provides that the SIP shall include only those provisions necessary to meet the requirements of the Act;

WHEREAS, the ARB has the responsibility for ensuring districts meet their responsibilities under the Act pursuant to sections 39002, 39500, 39602, and 41650 of the Health and Safety Code;

WHEREAS, the ARB is authorized by section 39600 of the Health and Safety Code to do such acts as may be necessary for the proper execution of its powers and duties;

WHEREAS, sections 39515 and 39516 of the Health and Safety Code provide that any duty may be delegated to the Board's Executive Officer as the Board deems appropriate;

WHEREAS, the local air districts have primary responsibility for controlling air pollution from nonvehicular sources and for adopting control measures, rules, and regulations to attain the NAAQS within their boundaries pursuant to sections 39002, 40000, 40001, 40701, 40702, and 41650 of the Health and Safety Code;

WHEREAS, the South Coast Air Quality Management District (District) is the local air district with jurisdiction over the Riverside County portion of the Salton Sea Air Basin (Coachella Valley), pursuant to sections 40410 and 40413 of the Health and Safety Code;

WHEREAS, the Southern California Association of Governments (SCAG) is the regional transportation agency for the Coachella Valley and has responsibility for preparing and implementing transportation control measures to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling and traffic congestion for the purpose of reducing motor vehicle emissions pursuant to sections 40460(b) and 40465 of the Health and Safety Code;

WHEREAS, the Coachella Valley is designated a nonattainment area with a classification of "serious" for the inhalable particulate matter (PM10) 24-hour NAAQS with an attainment date of December 31, 2006;

WHEREAS, the District first adopted a PM10 plan for the Coachella Valley in 1990 that focused on controlling dust sources;

WHEREAS, on June 21, 2002, the District adopted the 2002 Coachella Valley PM10 Plan requesting an extension of the PM10 attainment deadline to December 31, 2006;

WHEREAS, on April 18, 2003, the United States Environmental Protection Agency (U.S. EPA) approved the 2002 Coachella Valley PM10 Plan and granted an extension of the PM10 attainment deadline to December 31, 2006;

WHEREAS, on August 1, 2003, the District amended the Coachella Valley PM10 Plan to update transportation conformity budgets and strengthen control measures;

WHEREAS, on November 14, 2005, U.S. EPA approved the 2003 revision to the Coachella Valley PM10 Plan strengthening control measures and updating transportation conformity budgets for PM10;

WHEREAS, section 107(d)(3)(D) of the Act provides that a state may request U.S. EPA to redesignate an area from nonattainment to attainment for the NAAQS;

WHEREAS, section 107(d)(3)(E) of the Act sets forth the requirements which must be met for U.S. EPA to redesignate an area from nonattainment to attainment;

WHEREAS, consistent with section 107(d)(3)(E)(i) of the Act, the District has demonstrated attainment with no violations of the PM10 NAAQS in the 2005-2007 period for the Coachella Valley, based on quality-assured federal reference method monitoring data from the State and local monitoring network;

WHEREAS, consistent with section 107(d)(3)(E)(ii) of the Act, ARB has met all applicable requirements and the condition that the Coachella Valley has an approved PM10 SIP pursuant section 110(k) of the Act;

WHEREAS, consistent with section 107(d)(3)(E)(iii) of the Act, the District has demonstrated in the PM10 Maintenance Plan and Request for Redesignation for the Coachella Valley (Coachella Valley PM10 Maintenance Plan) that the improvement in air quality is due to permanent and enforceable emission control measures;

WHEREAS, consistent with section 107(d)(3)(E)(iv) of the Act, the District has prepared a maintenance plan for the Coachella Valley meeting the requirements of section 175A of the Act;

WHEREAS, consistent with section 107(d)(3)(E)(v) of the Act, ARB and the District have met all applicable requirements under section 100 and part D of the Act for the Coachella Valley;

WHEREAS, consistent with section 175A of the Act, the Coachella Valley PM10 Maintenance Plan provides for maintenance of the PM10 NAAQS for at least ten years after redesignation and contains contingency provisions to assure prompt correction of any PM10 violation which occurs after the redesignation of the area to attainment;

WHEREAS, federal law set forth in section 110(l) of the Act and Title 40, Code of Federal Regulations, section 51.102, requires that one or more public hearings, preceded by at least 30 days notice and opportunity for public review, must be conducted prior to the adoption and submittal to the U.S. EPA of any SIP revision;

WHEREAS, as required by federal law, the District made the Coachella Valley PM10 Maintenance Plan available for public review at least 30 days prior to the hearing date;

WHEREAS, following a public hearing on January 8, 2010, the Governing Board of the District voted to:

1. Adopt the Coachella Valley PM10 Maintenance Plan to fulfill the applicable requirements of the Act for a serious PM10 nonattainment area to be redesignated to attainment; and

2. Request a redesignation for the Coachella Valley to attainment for the PM10 standard;

WHEREAS, the District submitted the Coachella Valley PM10 Maintenance Plan to ARB as a SIP revision on January 15, 2010, along with proof of public notice publication and environmental documents in accordance with State and federal law;

WHEREAS, the transportation conformity emission budgets included in the adopted Coachella Valley PM10 Maintenance Plan have been updated to accommodate updated vehicle activity data provided by SCAG;

WHEREAS, the California Environmental Protection Act (CEQA) requires that no project which may have significant adverse environmental impacts may be adopted as originally proposed if feasible alternative or mitigation measures are available to reduce or eliminate such impacts, unless specific overriding considerations are identified outweigh the potential adverse consequences of any unmitigated impacts;

WHEREAS, the Coachella Valley PM10 Maintenance Plan contains already adopted regulations and rules that have undergone environmental review at the time of their adoption, and any measure that may be triggered as part of the contingency provision will undergo environmental review at the time of adoption;

WHEREAS, the Board finds that:

1. California's air pollution control programs have successfully reduced PM10 ambient concentrations leading to PM10 NAAQS attainment in the Coachella Valley;

2. The Coachella Valley PM10 Maintenance Plan is necessary for U.S. EPA to redesignate the Coachella Valley to attainment for the PM10 NAAQS;

3. The Coachella Valley PM10 Maintenance Plan complies with the requirements of section 107(d)(3)(E) of the Act;

4. The Coachella Valley PM10 Maintenance Plan provides for maintenance of the PM10 NAAQS through 2023;

5. Consistent with U.S. EPA guidance, the Coachella Valley PM10 Maintenance Plan includes an attainment emission inventory, commitments by the District to continue operating the particulate matter monitoring network; and a process to verify continued PM10 attainment;

6. The Coachella Valley PM10 Maintenance Plan includes contingency provisions to ensure prompt correction of any post-redesignation violation of the PM10 NAAQS;

7. The Coachella Valley PM10 Maintenance Plan has identified PM10 emission budgets for transportation conformity for 2010, 2020, and 2030 based on current emissions and activity data, and the budgets are adequate to ensure continued maintenance of the PM10 NAAQS;

8. The Coachella Valley PM10 Maintenance Plan relies entirely on adopted regulations to demonstrate continued maintenance. ARB regulations which

have been adopted and are reflected in the baseline emission projections were subject to environmental review at the time they were adopted, and no further analysis is required at this time; and

WHEREAS, the Board further finds that the:

ARB has reviewed and considered the Coachella Valley PM10 Maintenance Plan, along with the comments presented by interested parties, and ARB staff finds the plan meets the requirements of the Act and CEQA.

NOW, THEREFORE, BE IT RESOLVED that the Board hereby adopts the Coachella Valley PM10 Maintenance Plan and Redesignation Request as a revision to the California SIP.

BE IT FURTHER RESOLVED that the Board hereby directs the Executive Officer to submit the Coachella Valley PM10 Maintenance Plan and Redesignation Request, together with the appropriate supporting documentation to the U.S. EPA for approval as revision to the California SIP, to be effective, for purposes of federal law, upon approval by U.S. EPA.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to work with the District and U.S. EPA and take appropriate action to resolve any completeness or approvability issues that may arise regarding the SIP submission.

BE IT FURTHER RESOLVED that the Board authorizes the Executive Officer to include in the SIP submittal any technical corrections, clarifications, or additions that may be necessary to secure U.S. EPA approval.

BE IT FURTHER RESOLVED that the Board hereby certifies pursuant to title 40, Code of Federal Regulations section 51.102 that the Coachella Valley PM10 Maintenance Plan was adopted after notice and public hearing as required by Title 40, Code of Federal Regulations, section 51.102.

TITLE 17. CALIFORNIA AIR RESOURCES BOARD

NOTICE OF PUBLIC HEARING TO CONSIDER ADOPTION OF A PROPOSED REGULATION FOR REDUCING SULFUR HEXAFLUORIDE EMISSIONS FROM GAS INSULATED SWITCHGEAR

The Air Resources Board (ARB or Board) will conduct a public hearing at the time and place noted below to consider the adoption of a new regulation to reduce sulfur hexafluoride (SF_6) emissions from gas insulated switchgear used in electric power systems.

DATE: February 25, 2010

TIME: 9:00 a.m.

PLACE: California Environmental Protection Agency
Air Resources Board
Byron Sher Auditorium, Second Floor
1001 I Street
Sacramento, California 95814

This item will be considered at a two-day meeting of the Board, which will commence at 9:00 a.m., February 25, 2010 and may continue at 8:30 a.m., February 26, 2010. This item may not be considered until February 26, 2010. Please consult the agenda for the meeting date and time, which will be available at least 10 days before February 25, 2010, to determine the day on which this item will be considered.

INFORMATIVE DIGEST OF PROPOSED ACTION AND POLICY STATEMENT OVERVIEW

Sections Affected: Proposed adoption of California Code of Regulations, title 17, division 3, chapter 1, subchapter 10, article 4, subarticle 3.1., Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear, sections 95350, 95351, 95352, 95353, 95354, 95355, 95356, 95357, 95358, and 95359.

Background:
Governor Schwarzenegger signed the California Global Warming Solutions Act of 2006 (AB 32) on September 27, 2006. When the Legislature adopted AB 32, it declared that global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. AB 32 directed ARB to establish a statewide greenhouse gas (GHG) emissions limit for 2020 based on 1990 emissions.

AB 32 directs the Board to carry out specific tasks related to reducing GHG emissions. These tasks include monitoring GHG emissions, implementing a program of annual reporting of GHG emissions from GHG emission sources, and accounting for all GHG emissions, including emissions from electricity generated in California or imported from

other states, providing reporting tools for such data, and ensuring emitting sources maintain records of GHG emissions.

AB 32 directed ARB to adopt a Scoping Plan by January 1, 2009, that shows how emission reductions will be achieved from significant GHG sources through regulations, market mechanisms, and other actions. The Scoping Plan identifies the regulation for reduction of SF_6 from electrical equipment as a possible GHG emission reduction measure. ARB and other State agencies are now developing and implementing proposed measures to meet the State's GHG emission reduction goals.

SF_6 is a colorless, ordorless, nontoxic, and nonflammable gas with a global warming potential that is 23,900 times that of carbon dioxide (CO_2). Since the 1980s, SF_6 has been used extensively in electrical power systems as a dielectric medium (insulator) and interrupter (arc quencher) in medium and high voltage gas insulated switchgear or "GIS." The term switchgear, used in association with the electric power system, refers to the combination of electrical switches, disconnects, fuses and/or circuit breakers used to isolate electrical equipment. This equipment is commonly found in electrical substations and can be located either above or below ground in protected vaults. Nearly 80 percent of California's SF_6 emissions result from leakage and handling losses from GIS.

Worldwide, only the European Commission currently regulates SF_6 use in GIS. Nationally, in 1999, the United States Environmental Protection Agency (U.S. EPA) created a voluntary SF_6 emission reduction program which has been effective in gaining substantial emission reductions from its participants. However, because this is a voluntary program, only five of the scores of California utilities and power producers are active in the U.S. EPA's voluntary program.

Although a potent greenhouse gas, SF_6 has properties that allow the optimized operation of electrical switchgear and electricity networks throughout California. Despite international research efforts, no equivalent alternative has been identified, nor is currently available. Because of its simplicity and cost-effectiveness, this proposed measure may influence future national and international SF_6 regulations.

DESCRIPTION OF THE PROPOSED REGUALTORY ACTION

The proposed regulation would require owners of gas insulated switchgear (GIS) to establish an initial, maximum emission rate of ten percent of their nameplate capacity of SF_6 by January 1, 2011. GIS owners would be required to continually reduce SF_6 emission rates by one-percent-per-year over the following nine-year period beginning in 2011 and ending in 2020. The maximum emission rate in 2020 would be set at one percent. This time period coincides with the timeline established by the Global Warming Solutions Act (Health & Saf. Code §§ 35800 *et seq.*) to meet GHG emission reductions.

Specific methods to attain required emission reductions are not set out in the proposed regulation. Rather, affected entities would determine which methods they would employ

to meet the requirements. Currently, least-cost gas management techniques employed nationally and globally include technician training, SF_6 leak detection and repair, gas recycling, equipment evacuation, and equipment refurbishment or replacement. The following summarizes these established gas management techniques.

Leak Detection and Repair (LDAR). SF_6 leak detection is achieved using various techniques, including "sniffing" for gas with SF_6 gas sensors and using laser-based remote sensing technology. LDAR-based repairs, address small leaks on specific components, such as a bushing or flange gasket.

SF_6 Recycling. Recycling gas cart systems are available which can withdraw, purify, and return SF_6 to gas-insulated equipment.

Evacuation of Equipment. Evacuation attains a high level of SF_6 recovery from closed-pressure equipment.

Equipment Refurbishment. Equipment refurbishment encompasses comprehensive repairs for large leakage losses. Refurbishment consists of disassembling, rebuilding and possibly upgrading equipment using remachined, cleaned, and/or new components. Generally, equipment refurbishment represents a less expensive option than equipment replacement.

Equipment Replacement. Equipment replacement is undertaken when equipment parts are no longer available or when refurbishment will not correct leakage problems.

Applicability

The proposed regulation would affect approximately 75 private and public entities including eight investor owned utilities, four large corporations (refineries employing on-site distributed electrical generation), approximately 50 publically-owned utilities and rural electric cooperatives, one State agency (Department of Water Resources), two federal agencies (Western Area Power Association and U.S. Department of Defense), and two national laboratories.

Standards

The proposed regulation would establish maximum annual SF_6 emission rates for GIS owners. The emission rate requirements begin in 2011 at ten percent of the GIS owners' total equipment capacity averaged over the year. The emission rate would steadily decline by one percent per year until 2020. Beginning in 2020, the SF_6 emission rate would be set at one percent.

Exemptions

Beginning in 2020 emissions due to an "emergency event" could be exempted from the emission rate calculation for that year, if those emissions cause the one percent emission rate limit to be exceeded. GIS owners would be required to demonstrate to the Executive Officer that the emergency event causing the emission rate to be exceeded was beyond the control of the GIS owner.

Recordkeeping and Reporting

The regulation would require GIS owners annually to: (1) report their SF_6 emissions and emission rate; and (2) provide a complete inventory of all gas containers and GIS equipment. GIS owners would also be required to maintain and have this information available for ARB enforcement staff for inspection and verification.

Environmental Impacts:

Staff estimates that the proposed SF_6 emission reduction measure would decrease GHG emissions by an average of 25,300 metric tons CO_2-equivalent ($MTCO_2e$) annually and 253,000 $MTCO_2e$ cumulatively over a ten year period. Because the proposed regulation reduces only GHG emissions by improving SF_6 management practices, it is not expected to result in any significant adverse air quality, wastewater, or hazardous waste impacts.

Economic Impacts:

The projected total cost of the regulation over the ten year regulatory period is estimated to range from $4,500,000 to $7,000,000. The average cost per metric ton of CO_2e emissions reduced, including recordkeeping and reporting costs, would range from $18/$MTCO_2e$ to $28/$MTCO_2e$. Unit costs of emission reductions for the proposed SF_6 GIS regulation vary greatly among emission reduction methods—from -$1/$MTCO_2e$ for SF_6 recycling to $55/$MTCO_2e$ for GIS repair and replacement. ARB staff assumed that less expensive methods are employed first, and that the unit cost of SF_6 emission reductions steadily increases over the regulatory period. The high end of the estimate is extremely conservative based on final emission reductions resulting exclusively from equipment replacement, which is the most costly emission control technique. During the final years of the regulatory period, staff believes a combination of less costly emission reduction methods will continue to be used in addition to undertaking equipment replacement, maintaining reduction costs nearer to $18/$MTCO_2e$.

COMPARABLE FEDERAL REGULATIONS

There are no federal regulations that mandate the reduction of SF_6 from GIS.

AVAILABILITY OF DOCUMENTS AND AGENCY CONTACT PERSONS

ARB staff has prepared a Staff Report: Initial Statement of Reasons (ISOR) for the proposed regulatory action, which includes a summary of the economic and environmental impacts of the proposal. The ISOR is entitled, "Initial Statement of Reasons for the Proposed Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear."

Copies of the ISOR and the full text of the proposed regulatory language may be accessed on ARB's website listed below, or may be obtained from ARB's Public Information Office, Visitors and Environmental Services Center, 1001 I Street, First Floor, Sacramento, California, 95814, (916) 322-2990.

Upon its completion, the Final Statement of Reasons (FSOR) will be available and copies may be requested from the agency contact persons identified below, or may be accessed on ARB's website listed below.

Inquiries concerning the substance of the proposed regulation may be directed to the designated agency contact persons, Mr. David Mehl, Stationary Source Division, Energy Section Manager, at (916) 323-1491, or Ms. Michelle Garcia, Air Pollution Specialist, at (916) 322-8387.

Further, the agency representative and designated back-up contact persons to whom non-substantive inquiries concerning the proposed administrative action may be directed are Ms. Lori Andreoni, Manager, Board Administration & Regulatory Coordination Unit, (916) 322-4011, and Ms. Amy Whiting, Regulations Coordinator, (916) 322-6533.

The Board has compiled a record for this rulemaking action, which includes all the information upon which the proposal is based. This material is available for inspection upon request to the contact persons.

This notice, the ISOR, and all subsequent regulatory documents, including the FSOR, when completed, are also available on ARB's website for this rulemaking at http://www.arb.ca.gov/regact/2010/sf6elec/sf6elec.htm.

COSTS TO PUBLIC AGENCIES AND TO BUSINESSES AND PERSONS AFFECTED

The determinations of the Board's Executive Officer concerning the costs or savings necessarily incurred by public agencies and private persons and businesses in reasonable compliance with the proposed regulations are presented below. The ARB Executive Officer has determined that, except as discussed below, the proposed regulatory action would not create costs or savings, as defined in Government Code sections 11346.5(a)(5) and 11346.5(a)(6), to any State agency or in federal funding to the State, costs or mandate to any local agency or school district, whether or not reimbursable by the State pursuant to part 7 (commencing with section 17500), division 4, title 2 of the Government Code, or other nondiscretionary costs or savings to any State or local agencies.

The proposed regulation would impose costs on some State and local agencies, but not on school districts. One State agency that may experience an economic impact is the State Department of Water Resources (DWR). DWR generates electricity and owns GIS used in its electrical power systems. However, there may be no net fiscal impact on DWR if it is able to either offset its costs by reduced purchases of SF_6 gas, or if it is able to use existing administrative mechanisms to pass minor costs on to its customers.

The Executive Officer has determined that the proposed regulatory action may create costs and impose a mandate on some local agencies. The local agencies impacted would be publically-owned utilities, which own GIS within their electric power systems. However, there may be no net fiscal impact on the publically-owned utilities if they are able to either offset their costs by reduced purchases of SF_6 gas, or are able to use existing administrative mechanisms to pass the costs on to their customers.

Because the requirements imposed by the regulation are generally applicable to all entities subject to the regulations, the Executive Officer has determined that the proposed regulatory action imposes no costs on local agencies or school districts that are required to be reimbursed by the State pursuant to part 7 (commencing with section 17500), division 4, title 2 of the Government Code, and does not impose a mandate on local agencies or school districts that is required to be reimbursed pursuant to section 6 of Article XIII B of the California Constitution.

In developing this regulatory proposal, ARB staff evaluated the potential economic impacts on representative private persons or businesses. ARB has determined that representative private persons may be affected by the cost impacts from the proposed regulatory action. The Executive Officer has made an initial determination that the proposed regulatory action would not have a significant statewide adverse economic impact directly affecting businesses, including the ability of California businesses to compete with businesses in other states, or on representative private persons.

In accordance with Government Code section 11346.3, the Executive Officer has determined that the proposed regulatory action would not affect the creation or

elimination of jobs within the State of California, the creation of new businesses or elimination of existing businesses within the State of California, or the expansion of businesses currently doing business within the State of California. A detailed assessment of the economic impacts of the proposed regulatory action can be found in the ISOR.

The Executive Officer has also determined, pursuant to California Code of Regulations, title 1, section 4, that the proposed regulatory action would affect small businesses.

In accordance with Government Code sections 11346.3(c) and 11346.5(a)(11), the Executive Officer has found that the reporting requirements of the regulation which apply to businesses are necessary for the health, safety, and welfare of the people of the State of California.

Before taking final action on the proposed regulatory action, ARB must determine that no reasonable alternative considered by ARB, or that has otherwise been identified and brought to the attention of ARB, would be more effective in carrying out the purpose for which the action is proposed or would be as effective and less burdensome to affected private persons than the proposed action.

SUBMITTAL OF COMMENTS

Interested members of the public may also present comments orally or in writing at the meeting, and comments may be submitted by postal mail or by electronic submittal before the meeting. The public comment period for this regulatory action will begin on January 11, 2010. To be considered by the Board, written comments, not physically submitted at the meeting, must be submitted on or after January 11, 2010, and received **no later than 12:00 noon, February 24, 2010**, and must be addressed to the following:

Postal mail: Clerk of the Board, Air Resources Board
1001 I Street, Sacramento, California 95814

Electronic submittal: http://www.arb.ca.gov/lispub/comm/bclist.php

Please note that under the California Public Records Act (Gov. Code, § 6250 et seq.), your written and oral comments, attachments, and associated contact information (e.g., your address, phone, email, etc.) become part of the public record and can be released to the public upon request. Additionally, this information may become available via Google, Yahoo, and other search engines.

The Board requests, but does not require, that 20 copies of any written statement be submitted and that all written statements be filed at least 10 days prior to the hearing so that ARB staff and Board Members have time to fully consider each comment. The Board encourages members of the public to bring to the attention of staff in advance of the hearing any suggestions for modification of the proposed regulatory action.

STATUTORY AUTHORITY AND REFERENCES

This regulatory action is proposed under the authority granted to ARB in Health and Safety Code sections 38510, 38560, 38580, 39600, 39601, 41510, 41511, and 41513. The proposed regulations will implement, interpret and/or make specific Health and Safety Code sections 38560, 38580, 39600, 39601, 41510, 41511, and 41513.

HEARING PROCEDURES

The public hearing will be conducted in accordance with the California Administrative Procedure Act, Government Code, title 2, division 3, part 1, chapter 3.5 (commencing with section 11340).

Following the public hearing, the Board may adopt the regulatory language as originally proposed, or with non-substantial or grammatical modifications. The Board may also adopt the proposed regulatory language with other modifications if the text, as modified, is sufficiently related to the originally proposed text that the public was adequately placed on notice that the regulatory language, as modified, could result from the proposed regulatory action. In the event that such modifications are made, the full regulatory text, with the modifications clearly indicated, will be made available to the public for written comment at least 15 days before it is adopted.

The public may request a copy of the modified regulatory text from ARB's Public Information Office, Visitors and Environmental Services Center, 1001 I Street, First Floor, Sacramento, California, 95814, (916) 322-2990.

SPECIAL ACCOMMODATION REQUEST

To request a special accommodation or language needs for any of the following:

- An interpreter to be available at the hearing.
- Have documents available in an alternate format (i.e. Braille, large print) or another language.
- A disability-related reasonable accommodation.

Please contact the Clerk of the Board at (916) 322-5594 or by facsimile at (916) 322-3928 as soon as possible, but no later than 10 business days before the scheduled Board hearing. TTY/TDD/Speech to Speech users may dial 711 for the California Relay Service.

Para solicitar alguna comodidade especial o si por su idioma necesita cualquiera de los siguientes:

- Un intérprete que esté disponible en la audiencia.
- Documentos disponibles en un formato alternativo (es decir, sistema Braille, letra grande) u otro idioma.
- Una acomodación razonable relacionados con una incapacidad.

Porfavor llame a la officina del Consejo a (916) 322-5594 o envie un fax a (916) 322-3928 lo mas pronto possible, pero no menos de 10 dias de trabajo antes del el dia programado para la audencia del Consejo. TTY/TDD/ Personas que nesessitan este servicion pueden marcar el 711 para el Servicio de Retransmisión de Mensajes de California.

CALIFORNIA AIR RESOURCES BOARD

for James N. Goldstene
Executive Officer

Date: December 29, 2009

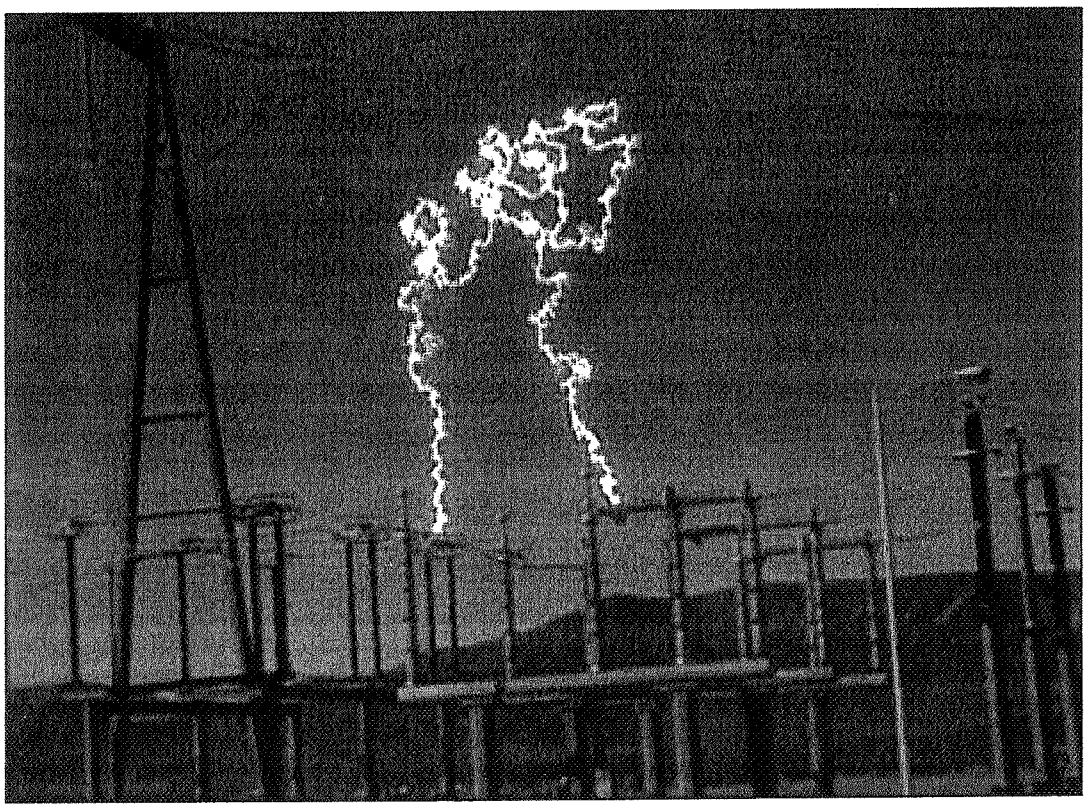
The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs see our website at www.arb.ca.gov.

California Environmental Protection Agency

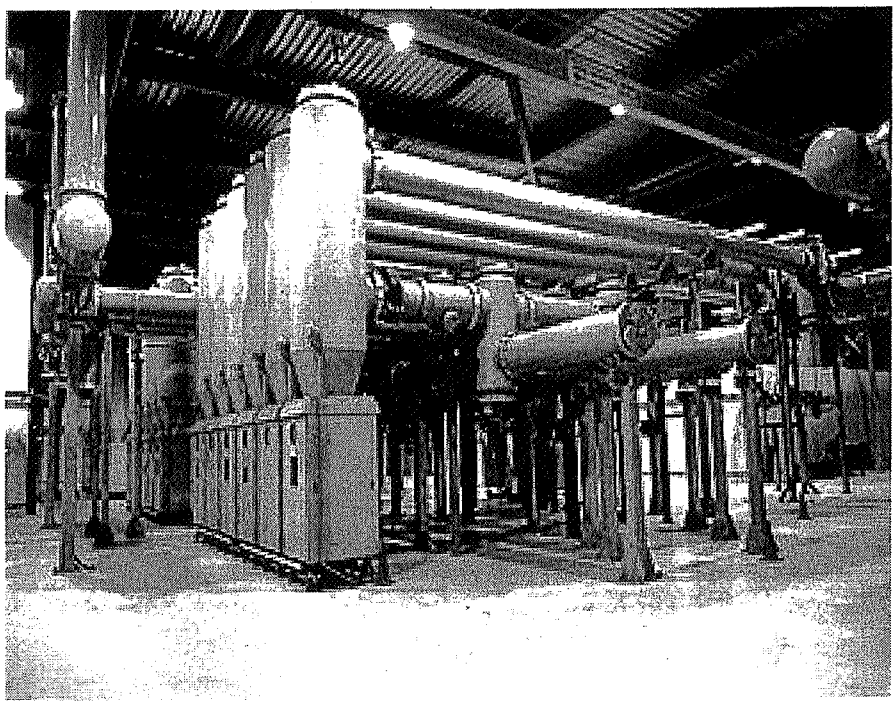
Air Resources Board

Proposed Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear

Staff Report: Initial Statement of Reasons

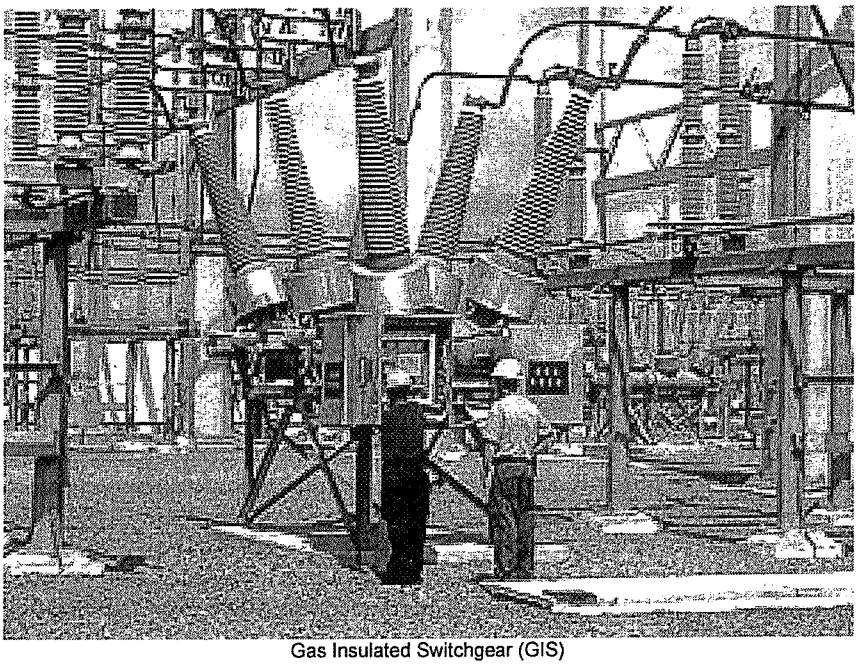


Release Date: January 7, 2010



Gas Insulated Switchgear (GIS)

Typical 245 kV gas insulated substation (GIS) using SF_6 gas as internal insulation and interrupting medium.



Gas Insulated Switchgear (GIS)

Typical 245 kV dead tank circuit breakers using SF_6 gas as internal insulation and interrupting medium.

State of California
AIR RESOURCES BOARD

STAFF REPORT: INITIAL STATEMENT OF REASONS FOR PROPOSED RULEMAKING

Public Hearing to Consider Proposed Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear

To be considered by the Air Resources Board on February 25, 2010, at:

California Environmental Protection Agency
Headquarters Building
1001 I Street
Byron Sher Auditorium
Sacramento, California

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State of California
AIR RESOURCES BOARD

Public Hearing to Consider Proposed Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear

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EXECUTIVE SUMMARY

A. Introduction

The California Global Warming Solutions Act of 2006 (Act or AB 32) (Assembly Bill 32, Ch. 488, Stats 2006) created a comprehensive multi-year program to reduce greenhouse gas (GHG) emissions in California. The Act requires the Air Resources Board (ARB or Board) to create and implement measures needed to reduce current GHG emissions to 1990 levels by 2020. This proposed measure was submitted by the Climate Action Team as an early action measure and approved by the Board at its June 2007 meeting. In addition, on December 11, 2008, the Board approved a Climate Change Scoping Plan (Scoping Plan) describing California's strategy for meeting the greenhouse gas emissions reductions required by AB 32. One of the emission reduction measures contained within the Scoping Plan proposes to reduce sulfur hexafluoride (SF_6) emissions from electrical sector uses.

This Executive Summary outlines ARB staff's proposal to adopt an SF_6 emission reduction measure for gas insulated switchgear used in electrical power systems. It includes an overview of the proposed emission reduction measure, public outreach efforts undertaken, a summary of staff recommendations, and a discussion of the environmental and economic impacts resulting from the proposal. The Executive Summary precedes the full staff report which also comprises the Initial Statement of Reasons for the Proposed Regulation as required by the Administrative Procedure Act (Government Code 11340, *et seq.*).

B. Overview

All greenhouse gases can be classified by a Global Warming Potential (GWP). This value, established by the Intergovernmental Panel on Climate Change (IPPC), provides comparisons among the different greenhouse gases to trap heat in the atmosphere. GWPs are based on the heat-absorbing ability of each gas relative to that of carbon dioxide (CO_2), as well as the decay rate of each gas (the amount removed from the atmosphere over a given timeframe). GWPs may be used to define the impact greenhouse gases will have on global warming over different time periods—usually 20 years, 100 years, or 500 years.

According to the IPCC, SF_6 is the most potent of the six main greenhouse gases with a GWP of 23,900 times that of CO_2 over 100 years. Although the atmospheric concentration of SF_6 is lower than that of other greenhouse gases, reducing SF_6 emissions is important due to its high GWP and long atmospheric lifetime (3200 years). Proportionally, reducing the emissions from one pound of SF_6 is equivalent to an 11 metric ton reduction of CO_2.

Since the 1980s, SF_6 has been used extensively in electrical power systems as a dielectric medium (insulator) and interrupter (arc quencher) in medium and high voltage gas insulated switchgear or "GIS." GIS is commonly found in electrical substations and in underground vaults located in densely populated urban areas. The term switchgear, used in association with an electrical power system, refers to all electrical power

equipment insulated with SF_6 gas regardless of its location. GIS includes switches, stand-alone gas-insulated equipment, and any combination of electrical disconnects, fuses, electrical transmission lines, transformers and/or circuit breakers used to isolate gas insulated electrical equipment. Switchgear is used both to de-energize equipment to allow work to be done safety and to clear electrical faults. Nearly 80 percent of California's SF_6 emissions result from leakage and handling losses from GIS.

Worldwide, only the European Commission, the Executive Branch of the European Union (EU), currently regulates SF_6 use in GIS. The *EU Regulation on Certain Fluorinated Greenhouse Gases* (Regulation EC No. 842/2006) became effective in 2006. The regulations require SF_6 gas in high voltage switchgear to be recovered by trained and certificated personnel for recycling, reclamation, or destruction purposes. All EU member states were required adopt the regulations with final implementation of all phases occurring in July 2009.

Nationally, in 1999, the U.S. Environmental Protection Agency (U.S. EPA) created a voluntary SF_6 emission reduction program which has been effective in gaining substantial emission reductions from its participants. However, because this is a voluntary program, only five of the dozens of California's utilities and power producers participate in U.S. EPA's voluntary program.

In 2008, the U.S. Department of Defense (DOD) added SF_6 to its list of "Emerging Contaminants Action" list. DOD plans to curtail uses and releases of SF_6 in its procurement chain which will limit the ability of DOD contractors to sell products to the DOD that contain unnecessary amounts of SF_6.

Although a potent greenhouse gas, SF_6 also has properties that allow the optimized operation of electrical switchgear and electricity networks throughout California. Despite international research efforts, no equivalent alternative has been identified. However, currently available low-cost mitigation options are not being consistently applied by electrical switchgear owners. Consequently, the imposition of an SF_6 emission reduction measure is warranted.

C. Summary of the Proposed SF_6 Emission Reduction Measure

The proposed regulation would require GIS owners to reduce SF_6 emissions from electrical equipment used mostly for the transmission and distribution of electricity throughout the State. GIS owners encompass approximately 75 private and public entities including eight investor owned utilities, four large corporations (refineries employing on-site distributed electrical generation), 50 publically-owned utilities and rural electric cooperatives, one State agency (Department of Water Resources), two federal agencies (Western Area Power Association and U.S. Department of Defense), and two national laboratories.

The proposed SF_6 emission reduction measure would require GIS owners to reduce their SF_6 emission rate by one percent per year over a ten year period, from 2011 to 2020. This time period coincides with the timelines established by the Global Warming Solutions Act for greenhouse gas reduction measures.

The initial maximum annual emission rate would be set at ten percent of a GIS owner's nameplate capacity non-hermetically sealed GIS. The annual emission rate would decrease one percent per year until 2020. Beginning January 1, 2020, the maximum annual emission rate would be at one percent.

The measure would also require GIS owners to: (1) annually report their SF_6 emissions; (2) emission rate; (3) provide a complete inventory of all gas insulated switchgear and their SF_6 capacities; (4) produce a SF_6 gas container inventory; and (5) keep all information current for ARB enforcement staff inspection and verification.

D. Regulatory Development Public Process

In developing any regulation, the public and affected industries play an important role in shaping the regulatory proposals. ARB staff has made the following efforts to ensure an open process and provide ample opportunity for input by all parties.

During the past year, ARB staff has held three technical working group meetings and a public workshop; and toured three utility substations, one medical center linear accelerator, and two particle accelerators. Staff has additionally participated at the national level by presenting and discussing California's proposal at two U.S. EPA SF_6 Volunteer Program Conferences. ARB staff has maintained a website to facilitate the dissemination of up-to-date information on the progress of the modifications of the SF_6 emission reduction measure. The website is located at http://www.arb.ca.gov/cc/sf6elec/sf6elec.htm.

In addition, ARB staff established an e-mail list serve to notify affected industries and other interested parties of the technical workgroup meetings, agendas, and information to be discussed at the meetings. Nearly 900 individuals from federal, state, and local government; environmental groups; and industry subscribe to the list serve.

Staff also participated in numerous individual meetings and conference calls with affected industry, the U.S. EPA, and other stakeholders to discuss and resolve issues specific to the proposed emission reduction measure.

Staff revised the proposed SF_6 emission reduction measure in consideration of the comments received during the public process. Staff has made and will continue to make the effort needed to consider all comments and recommendations received.

E. Environmental and Economic Impacts of the Proposed Regulation

Environmental Impact

Based on available data, staff estimates current annual SF_6 emissions from GIS to be 40,000 metric tons CO_2-equivalent ($MTCO_2e$). The proposed SF_6 emission reduction measure is estimated to decrease greenhouse gas emissions by an average of 25,300 $MTCO_2e$ annually, and 253,000 $MTCO_2e$ cumulatively over a ten year regulatory period. Without the proposed regulation, staff estimates annual SF_6 emissions in 2020 would be 33,000 $MTCO_2e$. The proposed

regulation would reduce this projection by 70 percent or 23,000 MTCO2e in 2020. Staff estimates that as a result of the proposed regulation, maximum annual SF_6 emissions from GIS in 2020 and beyond would be 10,000 MTCO2e.

Because the proposed regulation reduces only greenhouse gas emissions by improving SF_6 management practices, it is not expected to result in any significant adverse air quality, wastewater, or hazardous waste impacts.

Economic Impacts

Staff estimates the projected total cost of the regulation over the ten year regulatory period would range from $4,500,000 to $7,000,000. The average cost per metric ton of CO_2e emissions reduced, including recordkeeping and reporting costs, would range from $18/MTCO_2e to $28/MTCO_2e. Unit costs of emission reductions for the proposed SF_6 GIS regulation vary greatly among emission reduction methods—from -$1/MTCO_2e for SF_6 recycling to $55/MTCO_2e for GIS repair and replacement. ARB staff assumed that less expensive methods are employed first, and that the unit cost of SF_6 emission reductions steadily increases over the regulatory period. The high end of the estimate is extremely conservative based on final emission reductions resulting exclusively from equipment replacement, which is the most costly emission control technique. During the final years of the regulatory period, staff believes a combination of less costly emission reduction methods will continue to be used in addition to undertaking equipment replacement, maintaining reduction costs nearer to $18/MTCO_2e.

The costs and savings occurring in the early years of the proposed regulation would likely be absorbed by the regulated entities. Costs which cannot be absorbed may be passed to consumers as increased electricity costs. If the total cost of the measure were passed to consumers, it would increase electricity rates by approximately $0.000016 to $0.000025 per kilowatt-hour. This increase equates to a 0.012 percent to 0.018 percent monthly increase, or one to one and one-half cents per month for an average residential electricity bill.

Recordkeeping and reporting requirements would be required by this proposed regulation. Costs to meet these requirements will vary among regulated entities based on the quantity of their GIS equipment and the physical size of their service territory and will be higher during the first year of the regulatory period. Staff assumed that per-utility recordkeeping and reporting costs for the first year would range between approximately $500 and $1,900. Annual recordkeeping and reporting costs for succeeding years would range between $240 and $960 per entity.

F. Recommendation

The staff recommends that the Board adopt the proposed regulation to reduce SF_6 from GIS.

I. INTRODUCTION

This Initial Statement of Reasons (Staff Report) presents an evaluation of the need to reduce sulfur hexafluoride (SF_6) emissions from gas insulated switchgear (GIS). The term switchgear, used in association with electric power systems, refers to the combination of electrical disconnects, fuses and/or circuit breakers used to isolate electrical equipment. Switchgear is used both to de-energize equipment to allow work to be done and to clear electrical faults.

This evaluation summarizes the proposed regulation and presents its potential emission reductions and estimated costs for compliance. The alternative proposals considered by staff are also discussed. A copy of the proposed regulation is provided in Appendix A.

A. Overview

This report provides:

- The authority of the Air Resources Board (ARB or Board) to adopt the proposed SF_6 emission reduction measure;
- A discussion of current SF_6 emission reduction measures, voluntary reduction programs, and international reduction efforts;
- A summary of the proposed SF_6 emission reduction measure for gas insulated switchgear;
- The environmental and economic impacts of the proposed regulation;
- The proposed regulation; and
- Other supplemental information.

B. Enabling Legislation

In June 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05, which established targets for reducing greenhouse gas (GHG) emissions in California. The Executive Order requires GHG emissions to be reduced to 2000 levels by 2010, to 1990 levels by 2020, and finally to 80 percent below 1990 levels by 2050. In 2006, the Governor signed Assembly Bill 32, the California Global Warming Solutions Act (AB 32 or Act) (Stats. 2006, ch. 488), which established the 2020 GHG emission reduction goal in State law (HSC § 38500 et seq.) and made the ARB responsible for monitoring and reducing GHG emissions.

AB 32 required the Board, by January 1, 2009, to design and adopt an overall plan to reduce GHG emissions to 1990 levels by 2020. On December 11, 2008, the Board approved a Climate Change Scoping Plan (Scoping Plan) describing California's strategy for meeting the greenhouse gas emissions reductions required by AB 32.

This proposed measure was submitted by the Climate Action Team as an early action measure and approved by the Board at its June 2007 meeting. The Board approved Scoping Plan identified the reduction of sulfur hexafluoride (SF_6) emissions from electrical sector uses as an emission reduction measure to help achieve the State's GHG emission goals.

The Act requires the Board to create and implement measures needed to reduce current GHG emissions to 1990 levels by 2020. The Board has until January 1, 2011, to adopt the necessary regulations to implement the Scoping Plan. Full implementation of regulations adopted pursuant to AB 32 must begin no later than January 1, 2012. The emission reduction target must be fully achieved by January 1, 2020.

C. Background

Sulfur hexafluoride (SF_6) is a potent greenhouse gas with an atmospheric lifetime of 3,200 years and a one-hundred year global warming potential (GWP) of 23,900 times that of carbon dioxide (CO_2). In the last five years, atmospheric concentrations have been growing at a rate of five percent per year. The growth rate could be the result of increasing emissions in any or all emission sectors. However, given the long atmospheric lifetime of SF_6, even declining emissions will result in an increasing atmospheric concentration. Without intervention, it is anticipated that the growth rate will continue at a similar rate for the next several years.

Since the 1980s, SF_6 has been used extensively in electrical power systems as a dielectric medium (insulator) and interrupter (arc quencher) in medium and high voltage gas insulated switchgear or "GIS." GIS is commonly found in electrical substations ground and in underground vaults in densely populated urban areas. The term switchgear, used in association with an electrical power system, refers to all electrical power equipment insulated with SF_6 gas regardless of its location. GIS includes switches, stand-alone gas-insulated equipment, and any combination of electrical disconnects, fuses, electrical transmission lines, transformers and/or circuit breakers used to isolate gas insulated electrical equipment. Switchgear is used both to de-energize equipment to allow work to be done safety and to clear electrical faults. Nearly 80 percent of California's SF_6 emissions result from leakage and handling losses from GIS.

Although a potent greenhouse gas, SF_6 has properties that allow the optimized operation of electrical switchgear and electricity networks throughout California. The advantages of using SF_6 in electrical switchgear are considerable, primarily because the gas is non-flammable, non-corrosive to internal switchgear components, and its thermal properties make it an excellent arc suppressant. Even when SF_6 is momentarily broken down during arcing, due to its "self-healing" properties, the decomposition products re-combine back into its original state. In its pure form, it is non-toxic and does not pose a hazard to human health. Combined, these properties enable placement of high voltage switchgear in compact configurations in small areas, and demand less frequent maintenance than equipment using air or oil for arc extinguishing and insulation.

Despite continued international research efforts, no equivalent alternative has been identified. Worldwide, only the European Commission, the Executive Branch of the European Union (EU) currently regulates SF_6 use in GIS. The *EU Regulation on Certain Fluorinated Greenhouse Gases* (Regulation EC No. 842/2006) became effective in 2006. The regulations require SF_6 gas in high voltage switchgear to be recovered by trained and certificated personnel for recycling, reclamation, or destruction purposes.

All EU member states were required adopt the regulations with final implementation of all phases occurring in July 2009.

Nationally, in 1999, the U.S. Environmental Protection Agency (U.S. EPA) created a voluntary SF_6 emission reduction program which has been effective in gaining substantial emission reductions from its participants. However, because this is a voluntary program only five of the dozens of California's utilities and power producers participate in the U.S. EPA's voluntary program. In the absence of regulations, currently available low cost mitigation options are not being consistently utilized by all GIS owners.

In 2008, the United States' Department of Defense (DOD) added SF_6 to its "Emerging Contaminants Action" list. DOD plans to curtail uses and releases of SF_6 in its procurement chain which will limit the ability of DOD contractors to sell products to the DOD that contain unnecessary amounts of SF_6.

SF_6 is used in a several other economic sectors including the semiconductor industry, tracer gas uses, electronics manufacture, magnesium casting and military operations. SF_6 emission reductions from these uses were addressed under separate regulations adopted by the Board.

II. STATUTORY REQUIREMENTS

AB 32 contains standards in Health and Safety Code section 38562 that apply to regulations adopted consistent with the Scoping Plan. Those criteria are summarized here along with staff's assessment as to why the proposed regulatory action complies.

-The State Board shall adopt rules and regulations in an open public process to achieve the *maximum technologically feasible and cost effective greenhouse gas emission reduction from sources or categories of sources.*

The proposal was developed in consultation with affected parties in an open process through *three* technical working group meetings, several industry-specific consultation meetings, one public workshop, and numerous telephone conferences. Draft regulatory concepts were modified through discussion and feedback during this process to ensure that least-cost methods to achieve reductions were proposed. Section III of this report provides details of staff outreach activities.

-Design the regulations, including distribution of emissions allowance where appropriate, in a manner that is equitable, seeks to minimize costs and maximize the total benefits *to California, and encourages early action to reduce greenhouse gas emissions.*

The proposed regulation was designed to acknowledge SF_6 emission reductions made through voluntary efforts. By setting a maximum emission rate rather than a percentage reduction mandate, those gas insulated switchgear owners who have voluntarily reduced their emissions will not be unfairly burdened with higher cost emission reduction requirements. All regulated parties will be required to meet the same emission rates.

The proposed regulation does not mandate specific actions to meet the mandatory emission limit. Entities are allowed to choose from least-cost methods which best fit their operational needs.

-Ensure that activities undertaken to comply with the regulations do not disproportionately impact low-income communities.

SF_6 emissions from GIS occur throughout California. Activities to reduce these emissions will occur equally in all communities, regardless of income, and will have no adverse environmental effects.

-Ensure that entities that have voluntarily reduced their greenhouse gas emissions prior to the implementation of this section receive appropriate credit for early voluntary reductions.

Five GIS owners that would be subject to the proposed regulation participate in the U.S. EPA's voluntary SF_6 emission reduction partnership program. Each of these entities has created its own emission reduction program and has substantially reduced its emission rate over time. Because the participants have

already invested resources through participation in the volunteer program, their current emission rates fall below the early emission rate requirements of the proposed regulation. By establishing an emission rate requirement rather than imposing performance or prescriptive standards, volunteer program participants' early efforts are acknowledged and nominal costs are anticipated during the first years of the proposed regulation.

-Ensure that activities undertaken pursuant to the regulations complement and do not interfere with, efforts to achieve and maintain federal and state ambient air quality standards and to reduce toxic air contaminant emissions.

GIS owners will be required to reduce SF_6 emissions from electrical equipment used mostly for the transmission and distribution of electricity throughout the State. The methods normally employed to attain these reductions—equipment leak detection and repair, gas recycling, equipment evacuation, refurbishment, and equipment replacement—will have no impact on efforts to achieve and maintain state or federal ambient air quality standards.

-Consider cost-effectiveness of these regulations.

The cost-effectiveness of the regulation would range from $18 to $28 per metric ton of emissions (CO_2e) reduced, See Section VI and Appendix D of this report for detailed information regarding cost-effectiveness.

-Consider overall societal benefits, including reductions in other air pollutants, diversification of energy sources, and other benefits to the economy, environment, and public health.

The proposed regulation will allow the lowest-cost emission reduction methods of SF_6 from gas insulated switchgear to be utilized. The proposed regulation may serve as a model for future federal regulations further reducing GHG emissions from this high global warming potential gas.

Increased GIS equipment maintenance has the potential to enhance electrical system reliability.

-Minimize the administrative burden of implementing and complying with these regulations.

The administrative burden of complying with the proposed regulation has been minimized to the extent possible by ensuring that the proposed regulation's reporting requirements are consistent with those contained in ARB's mandatory reporting regulations (17 CCR Sections 95100, *et seq.*). The proposed SF_6 emission reduction measure also requires the development and maintenance of a gas insulated switchgear and container inventory. Staff believes that the GIS owners currently develop these or similar inventories in order to determine and submit their required SF_6 emission inventory information to ARB.

The proposed regulation mandates GIS owners to progressively reduce their SF_6 emission rate over a ten-year period. The annual emission rate must be calculated and reported to ARB. GIS equipment and gas container inventories must also be annually reported. In order to minimize duplication and avoid the submission of multiple reports, ARB's on-line reporting tool, used to collect greenhouse gas emissions information under its mandatory greenhouse gas reporting regulations, would be modified to accept SF_6 emission rate, GIS equipment, and SF_6 container information.

The proposed regulation includes recordkeeping requirements. These requirements are consistent with those established by ARB's mandatory reporting regulations and should not create an excessive administrative burden.

-Minimize leakage

Leakage occurs when State policy causes activities and related emissions to move outside of California. The proposed regulation affects California electrical power equipment which must remain near the load it serves. Moving this equipment out of the state would be infeasible, inefficient, and cost-prohibitive. Consequently, the proposed regulation would not cause any leakage problems.

-Consider the significance of the contribution of each source or category of sources to statewide emissions of greenhouse gases.

Sulfur hexafluoride has the highest GWP currently identified by the Intergovernmental Panel on Climate Change (IPCC) at 23,900 times that of CO_2 and a very long atmospheric lifetime of 3,200 years. In the last five years, atmospheric concentrations have been growing at a rate of five percent per year. Given the long lifetime and potent GWP, all SF_6 emission reductions are important to consider. The projected reductions that will be achieved through implementation of the proposed regulation are equivalent to reducing 253,000 metric tons CO_2-equivalent ($MTCO_2e$).

-The greenhouse gas emission reductions achieved are real, permanent, quantifiable, verifiable, and enforceable by the State board.

Real Reductions. Staff believes that the emission reductions for GIS operations would be real because they were based on actual current emissions as reported in data submitted within surveys and pursuant to ARB's mandatory emission reporting regulations by the affected industries. All entities subject to the regulation (with the exception of a couple entities) would be required to reduce emissions to comply with the proposed 2020 emission rate. The GHG emissions, reductions, and emission rates would be based on a mass balance approach derived from the U.S. EPA's voluntary SF_6 emission reduction program, and would be based on GWP values defined by the IPCC Second Assessment Report. The GHG reductions would be verifiable through annual reporting and recordkeeping requirements included in the proposed regulation.

Permanency. The proposed regulations would require GIS owners to attain a one percent emission rate by 2020. The proposed regulation does not allow for emission rates to exceed this amount.

Quantification and Verification. The proposed regulations would require GIS owners to maintain detailed inventories of SF_6 gas both within equipment and gas containers. Specific measuring procedures would be used. Scales used to measure replacement SF_6 would be required to be accurate to within one percent. Quantification methods are specified in the regulation to account for all SF_6 emitted annually. ARB's SF_6 emission reduction regulations governing non-electric sector and non-semiconductor uses are scheduled to become effective in 2010. These regulations will require SF_6 distributors to maintain documentation related to California-specific sales and purchases. This documentation will be available to ARB upon request and could be used to verify the accuracy of the GIS owner's records.

Enforceability. The regulation, as proposed, contains requirements which support enforcement efforts, including report submissions with data that can be verified by on-site inspections and third party information. Once the proposed regulation is approved by the Office of Administrative Law, the proposed emission rate limits will become State law.

-The reduction is in addition to any greenhouse gas emission reduction otherwise required by law or regulation, and any other greenhouse gas emission reduction that otherwise would occur.

Sulfur hexafluoride emission reductions from GIS are not included in any other federal or State regulation.

-If applicable, the greenhouse gas emission reduction occurs over the same time period and is equivalent in amount to any direct emission reduction required pursuant to this division.

This requirement does not apply to the proposed regulation because it achieves its emission reductions as direct emissions.

-The State board shall rely upon the best economic and scientific information and its assessment of existing and projected technological capabilities when adopting the regulations required by the law.

ARB staff used the best available economic and scientific information available to develop the proposed regulation. Staff surveyed all potential regulated entities and conducted a literature review for other available economic and scientific information. Staff relied upon data obtained through development of ARB's mandatory reporting regulations, the U.S. EPA, and industry organizations including the Electric Power Research Institute, and the International Council on Large Electric Systems (CIGRE).

III. PROPOSED REGULATION DEVEOPMENT

Following is a general overview of the proposed regulation, the steps taken to develop the proposal, and a discussion of the alternatives to the proposal which were considered by staff.

A. Public Outreach

ARB staff has made extensive efforts to have an open process and provide ample opportunity for input by all parties. Industries affected by this proposed regulation played an important role in shaping this regulatory proposal.

During the past year, ARB staff has held three technical working group meetings and a public workshop; and toured three utility substations, one medical center linear accelerator, and two particle accelerators. Staff has additionally participated at the national level by presenting and discussing California's proposal at two U.S. EPA SF_6 Volunteer Program Conferences. ARB staff has maintained a website to facilitate the dissemination of up-to-date information on the progress of the modifications of the SF_6 emission reduction measure. The website is located at http://www.arb.ca.gov/cc/sf6elec/sf6elec.htm.

In addition, ARB staff established an e-mail list serve to notify affected industries and other interested parties of the technical workgroup meetings, agendas, and information to be discussed at the meetings. Over 900 individuals from federal, State, and local government; environmental groups; and industry subscribe to the list serve.

Staff also participated in numerous individual meetings and conference calls with affected industry, the U.S. EPA, and other stakeholders to discuss and resolve issues specific to the proposed emission reduction measure.

Staff revised the proposed SF_6 emission reduction measure in consideration of the comments received during the public process. Staff has made and will continue to make the effort needed to consider all comments and recommendations received.

(See Public Outreach Table at Appendix C for more detail on public outreach activities.)

B. Regulation Development

ARB staff first identified GIS owners and other stakeholders from industry, trade organizations, and government. Staff then developed a survey to determine equipment inventories, current emissions, and supply costs. Recipients of the survey included electrical utilities, universities, national laboratories, and industries using distributed generation technologies. Appendix B provides a copy of the survey and an aggregate of the results.

In addition to the survey, ARB obtained information on emissions and mitigation options from the U.S. EPA based on its volunteer emissions reduction partnership program for electric power systems. The partnership program was established in 1999. Although

established as volunteer program, utilities which agreed to membership in the program were required to:

- Estimate initial annual SF_6 emissions;
- Annually inventory emissions of SF_6 using an emissions inventory protocol;
- Establish a strategy for replacing older, more leak-prone pieces of equipment;
- Implement SF_6 recycling;
- Ensure that only knowledgeable personnel handle SF_6; and
- Submit annual progress reports.

U.S. EPA estimates that the partnership's SF_6 emission rate has dropped from 17 percent in 1999 to 6.5 percent in 2006. U.S. EPA data and technical reports were included in the analysis for this proposal. Additionally, five California utilities (Kings River Conservation District, Southern California Edison (SCE), Pacific Gas and Electric Corporation (PG&E), Pacific Corp, and the City of Palo Alto) participate in the U.S. EPA volunteer partnership program. ARB staff toured substations of both PG&E and SCE and discussed their current SF_6 emission reduction programs. Knowledge gained through these discussions helped to inform the development of the proposed regulation.

A technical working group was established during the regulation development process and served an invaluable role by providing input on emission reduction opportunities and implementation costs. Based on information received through ARB's survey, U.S. EPA, and the technical working group, staff developed specific proposals and alternatives and presented them to the working group and the public. Staff made modifications to the original proposal after consideration and evaluation of comments.

C. Alternatives Considered

Government Code section 11346.2 requires ARB to consider and evaluate reasonable alternatives to the proposed regulation and provide reasons for rejecting those alternatives. Staff identified three alternative approaches to the current proposal: "No Action," "Establishing an SF_6 Emission Reduction Measure for GIS and Particle Accelerators," and "Establishing Performance and Equipment Standards."

1. Alternative One – No Action

A "No Action" alternative would be to forego adopting the proposed regulation. The "No Action" alternative would have no cost to business but would allow emissions to continue at current levels or increase.

2. Alternative 2 – Establishing an SF_6 Emission Reduction Measure for GIS and Particle Accelerators

Because both GIS and particle accelerators use SF_6 as an insulator and arc quencher, an SF_6 emission reduction measure was proposed within the Scoping Plan which included both applications. During the regulatory development process, ARB staff toured several particle accelerators including those used for cancer radiation treatment and physics research, which represent the majority of the State's particle accelerator inventory. Particle accelerators are also used within scanning equipment by U.S. Customs and the military.

Staff found that particle accelerators used and emitted very small amounts of SF_6. For example, at one medical center's radiation treatment facility, a five-pound container of SF_6 was still in use after a five-year period. Staff determined that imposing reduction standards beyond those already achieved by these particle accelerators would be costly and burdensome for these applications.

On-site substations which power particle accelerators at national laboratories would still be subject to the proposed regulations.

3. Alternative Three – Establishing Performance and Equipment Standards

Staff evaluated the option of establishing performance standards and mandating the replacement of medium voltage (<69 kilovolt (kV)) switchgear. Staff also evaluated requiring establishing standards for new equipment. However, by choosing instead to set a less-prescriptive, maximum allowable emissions rate to meet the GHG emission reduction goal, affected entities would be motivated to purchase the lowest emitting GIS equipment.

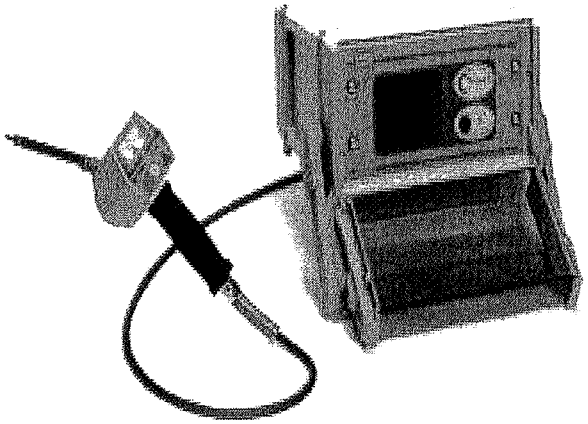
Performance standards for training, emission notification equipment, and 24-hour repair requirements were considered. Technical working group members commented that this alternative was infeasible and provided information to substantiate this position.

One utility would have been required to substitute non-SF_6 equipment for nearly 2,000 circuit breakers. The cost of replacing each breaker exceeded $50,000—totaling approximately $100,000,000. Although this substitution would have resulted in reducing 48,000 pounds of SF_6 (520,000 $MTCO_2e$) from this utility, the reductions were cost-prohibitive relative to the benefits derived. The development of these standards would be time and resource intensive and the resulting regulations would be burdensome to implement and enforce.

D. Alternative Means of Compliance

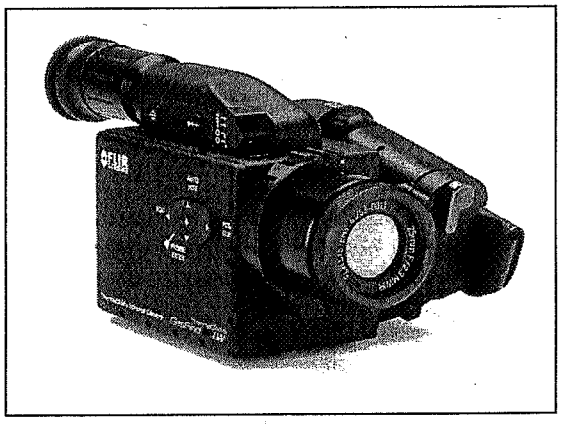
The proposed regulation allows regulated entities to choose the least-cost means of compliance to reduce their emission rate. Least-cost gas management techniques currently employed by participants in the U.S. EPA's voluntary SF_6 emission reduction program and within the European Union regulations consist of technical training programs, SF_6 leak detection and repair, gas recycling, equipment evacuation, and equipment refurbishment or replacement. The following summary illustrates these established gas management techniques.

Leak Detection and Repair (LDAR). SF_6 leak detection is achieved using various techniques, including "sniffing" for gas with SF_6 gas sensors and using laser-based remote sensing technology. LDAR-based repairs address small leaks on specific components, such as a bushing or flange gasket.



Handheld Sniffer

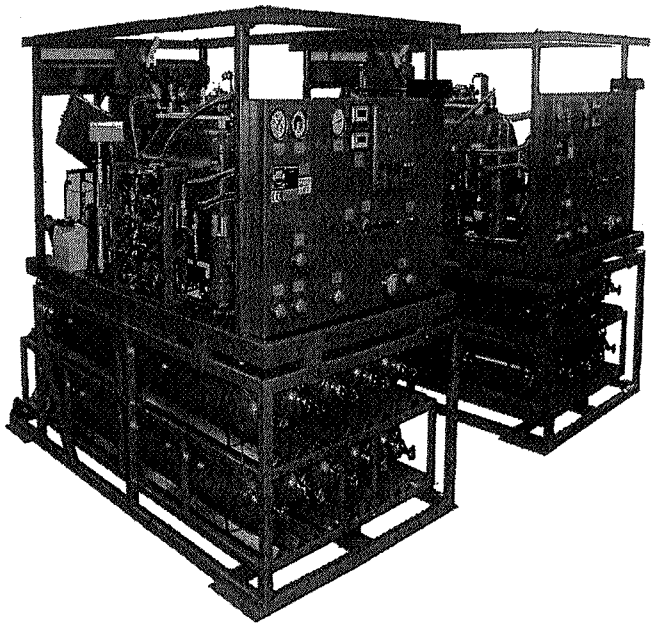
(LACO Technologies,
http://lacotech.com/product_pages/GasCheck_SF6_Leak_Detector_672214792.html)



Infrared Camera

(FLIR Thermography - Infrared Cameras and Thermal Imagers
http://www.flir.com/thermography/americas/us/)

SF_6 Recycling. Recycling gas cart systems are available which can withdraw, purify, and return SF_6 to gas-insulated equipment. Recycling equipment is capable of capturing nearly 100 percent of SF_6. However, normal industry practice limits recovery to approximately 80 percent of the gas held in high-voltage equipment because of the additional time required to recover it fully. Because it would take as much time to recover the final 20 percent of the gas as it takes to recover the first 80 percent (by mass), the costs of this level of evacuation are much higher and are addressed as a separate SF_6 emission reduction option.



SF_6 gas evacuation, storage and cleaning systems

(Dilo Company, SF6 Gas Recycling Equipment and Services, http://dilo.com/index2.html)

Evacuation of Equipment. Evacuation includes costs associated with attaining a higher level of SF_6 recovery from closed-pressure equipment (i.e., drawing evacuation pressure from 50 millibar [mbar] down to 20 mbar). The lower the residual pressure in a container, the less SF_6 is left in the container to escape once the container is opened.

Equipment Refurbishment. Equipment refurbishment encompasses comprehensive repairs for large leakage losses. Refurbishment consists of disassembling, rebuilding and possibly upgrading equipment using remachined, cleaned, and/or new components. Generally, equipment refurbishment represents a less expensive option than equipment replacement. Costs to refurbish a 362 kilovolt (kV) circuit breaker are estimated to be $100,000.

Equipment Replacement. Equipment replacement is the most expensive option and is undertaken when equipment parts are no longer available or when refurbishment will not correct leakage problems. Costs for replacing a large breaker (362 kV) can range from $300,000 to $400,000.

IV. PROPOSED REGULATION SUMMARY

The following provides a summary and explanation for each section of the proposed regulation. The full text of the proposed regulation is found in Appendix A.

§ 95350. Purpose, and Applicability.

Purpose. The proposed regulation is to reduce greenhouse gas emissions in California.

Sources of SF_6 Emissions Addressed by the Proposed Regulation. The proposed regulation would reduce SF_6 emissions from gas insulated switchgear (GIS) found in electrical power systems. GIS is commonly found in electrical substations and in underground vaults located in densely populated urban areas. The term switchgear, used in association with an electrical power system, refers to all electrical power equipment insulated with SF_6 gas regardless of its location. GIS includes switches, stand-alone gas-insulated equipment, and any combination of electrical disconnects, fuses, electrical transmission lines, transformers and/or circuit breakers used to isolate gas insulated electrical equipment. Switchgear is used both to de-energize equipment to allow work to be done safety and to clear electrical faults. Nearly 80 percent of California's SF_6 emissions result from leakage and handling losses from GIS.

Affected Industries. The proposed regulation would affect approximately 75 private and public entities including eight investor owned utilities, four large corporations (refineries employing on-site distributed electrical generation), 50 publically-owned utilities and rural electric cooperatives, one State agency (Department of Water Resources), two federal agencies (Western Area Power Association and U.S. Department of Defense), and two national laboratories.

§ 95351. Definitions. The proposed regulation defines terms related to GIS which could have more than one meaning to regulated parties.

§ 95352. Maximum Annual SF_6 Emission Rate. The proposed regulation would establish maximum annual SF_6 emission rates for GIS owners. The emission rate requirements begin in 2011 at ten percent of the GIS owners' total equipment capacity averaged over the year. The rate steadily would decline by one percent per year over a ten year period. Beginning in 2020, the maximum allowable annual emission rate would be one percent. The proposed regulation does not mandate specific actions to meet the mandatory emission limit. Entities are allowed to choose from least-cost methods which best fit their operational needs. Examples of currently available emission reduction methods are detailed in Section III. D, Pages 11 and 12 of this report.

§ 95353. Emergency Event Exemption. Beginning in 2020, the SF_6 emission rate would be set at one percent. Emissions resulting from a defined "emergency event" could be exempted from the emission rate calculation for that year, if those emissions cause the one percent rate to be exceeded. GIS owners would be required to demonstrate to the Executive Officer that the emergency event causing the emission rate to be exceeded could not have been prevented by any available means.

§ 95354. SF_6 Inventory Measurement Procedures. This proposed regulation section would address the accuracy of procedures, measurements, and scales used to calculate SF_6 emissions. These procedures are consistent with proposed federal SF_6 emission reporting regulations.

§ 95355. Recordkeeping. Regulated parties would be required to develop and maintain records related to GIS equipment and SF_6 purchases and retain these records for a minimum of three years. Upon request by the Executive Officer, regulated parties would need to provide these records to ARB.

§ 95356. Annual Reporting Requirements. The proposed regulation would require GIS owners to submit an annual report which includes their GIS equipment and SF_6 container inventories, their annual SF_6 emissions, and overall emission rate.

The majority of GIS owners are currently required to report annual SF_6 emissions to ARB under its mandatory greenhouse gas reporting requirements for entities which generate electricity (title 17, California Code of Regulations, Sections 95100, *et seq.*). These reporting requirements would be extended to a limited number of entities not currently covered by the mandatory greenhouse gas reporting regulations (*e.g.*, entities which own gas insulated switchgear but do not generate electricity).

§ 95357. Treatment of Confidential Information. This section informs GIS owners under what circumstances information required to be submitted to ARB would be considered confidential.

§ 95358. Enforcement. This section states the circumstances for which penalties may be assessed for violations of the regulation.

§ 95359. Severability The proposed regulation states that if any part of the regulation is held to be invalid, the remainder of the regulation shall continue to be effective.

V. ENVIRONMENTAL IMPACTS

The goal of this regulation is to reduce GHG emissions from GIS. An additional consideration is the impact that the proposed regulation may have on the environment. This section describes the potential impacts that the proposed regulation may have on air quality, water treatment, and hazardous waste disposal. Based upon available information, staff has determined that no significant adverse environmental impacts should occur as a result of adopting the proposed regulation.

A. Legal Requirements Applicable to the Analysis

The California Environmental Quality Act (CEQA) and ARB policy require an analysis to determine the potential environmental impacts of proposed regulations. ARB's program for adopting regulations has been certified by the Secretary of Resources, pursuant to Public Resources Code section 21080.5. Consequently, the CEQA environmental analysis requirements may be included in the Initial Statement of Reasons (ISOR) for the proposed regulation. In the ISOR, the ARB must include a functionally equivalent document, rather than adhering to the format described in CEQA of an Initial Study, a Negative Declaration, and an Environmental Impact Report. In addition, staff will respond to all significant environmental issues raised by the public during the 45-day public review period or at the Board hearing in the Final Statement of Reasons for the proposed regulation.

Public Resources Code section 21159 requires that the environmental impact analysis conducted by ARB include the following:

- An analysis of reasonably foreseeable environmental impacts of the methods of compliance;
- An analysis of reasonably foreseeable feasible mitigation measures; and
- An analysis of reasonably foreseeable alternative means of compliance with the proposed regulation.

B. Summary of Project Environmental Impacts, Occupational Safety Concerns, and Mitigation Options

The proposed regulations would reduce 253,000 $MTCO_2$ over the ten year regulatory period. Parties affected by the proposed regulation would be required to have no more than a ten percent SF_6 emission rate for their GIS equipment and to continue to reduce this annual emission rate by one percent per year beginning in 2011. Specific methods to attain these reductions are not set out in the proposed regulation. Rather, affected entities would determine which methods they would employ to meet the requirements. Currently, least-cost gas management techniques employed by participants in the U.S. EPA's voluntary SF_6 emission reduction program and within the European Union consist of technician training, SF_6 leak detection and repair, gas recycling, equipment evacuation, and equipment refurbishment or replacement. (See Section III. D, Pages 11 and 12 for examples of these emission reduction methods.) These emission reduction techniques would have no adverse effect on criteria or toxic air pollutants. Because SF_6 is chemically inert, contains no chlorine or bromine atoms, it has no

impact on stratospheric ozone depletion. SF_6 is not a criteria pollutant, a precursor compound, or a toxic air pollutant.

While SF_6 is inert during normal use, when electrical discharges occur within SF_6-filled equipment, toxic byproducts may be produced which pose a health threat to workers who come into contact with them. Employee exposure limits have been set by the National Institute for Occupational Safety and Health (NIOSH) and the United States' Occupational Safety and Health Administration (OSHA). Guidelines have been published by U.S. EPA, the International Council on Large Electric Systems (CIGRE), NIOSH and others regarding the handling, detection, and safety of SF_6 gas and its byproducts. These guidelines indicate that employee exposure should be minimized by wearing protective equipment when handling and disposing SF_6 byproducts and by meeting the exposure concentration standards.

Staff has concluded that no significant adverse environmental or employee health impacts should occur from adoption of, and compliance with, the proposed regulation. An additional benefit of this emission reduction measure is a possible reduction in employee exposure to SF_6 toxic byproducts. Because the proposed regulation reduces only greenhouse gas emissions by improving SF_6 management practices, it is not expected to result in any significant adverse air quality, wastewater, or hazardous waste impacts. Consequently, no mitigation measures are needed.

C. Other Potential Environmental Impacts

Staff does not expect any adverse environmental impacts in other sectors (including waste disposal and water quality) or increased energy use as a result of implementing the proposed regulation.

D. Environmental Justice and Community Health

State law defines environmental justice as the fair treatment of all people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies. ARB is committed to evaluating community impacts of proposed of proposed regulation, including environmental justice concerns.

The proposed regulation will reduce statewide greenhouse gases without increasing other pollutants. All Californians should benefit equally from the reduction in these greenhouse gas emissions.

VI. ECONOMIC IMPACTS

A. Legal Requirements

Section 11346.3 of the Government Code requires State agencies to assess the potential for adverse economic impacts on California business enterprises and individuals when proposing to adopt any administrative regulation. The assessment must include a consideration of the impact of the proposed regulation on California jobs, business expansion, elimination or creation; and the ability of California businesses to compete with businesses in other states. (See Appendix D for SF_6 emission detail, cost information, and calculation tables.)

Also, State agencies are required to estimate the cost or savings to any State or local agency and school district in accordance with instructions adopted by the Department of Finance. The estimate shall include any nondiscretionary cost or savings to local agencies and the cost or savings in federal funding to the State.

B. Potential Impact on California Businesses

Affected Businesses
Any business which owns gas insulated switchgear in California can be affected by the proposed regulation. Approximately 75 entities could be impacted by this regulation. Of these 75 entities, 11 are private businesses and 64 are public entities (59 municipal utilities (local government entities), one state government entity, and four federal government entities).

Potential Impact on Small Businesses
Of the approximately 75 affected businesses and government agencies, only the Mountain Utilities can be categorized as a small business[1]. Because this business maintains limited GIS equipment and is currently subject to State mandatory emissions reporting regulations, the impact of the proposed regulation should be minimal.

Potential Impact on Business Creation, Elimination, or Expansion
The costs of the proposed measure are not expected to have a significant impact on the profitability of affected businesses in California. The proposal may have a limited, positive impact on job creation. It not expected to have any impact on business creation, elimination, or expansion in California.

Potential Impact on Business Competitiveness
The proposed measure affects equipment and services located only within the State and will have no impact on the ability of California businesses to compete nationally and internationally.

[1] Mountain Utilities, LLC, is a private company with estimated annual sales totaling $750,000 and employs a staff of approximately 10 people.

Potential Impact on California Consumers
The proposed regulation is not expected to have an adverse impact on California consumers. Costs which cannot be absorbed by the regulated entities may be passed to consumers as increased electricity costs. If the total cost of the measure were passed to consumers, it would increase electricity rates by approximately $0.000016 to $0.000025 per kilowatt-hour. This increase equates to a 0.012 percent to 0.018 percent monthly increase, or one to one and one-half cents per month for an average residential electricity bill.

Potential Impact on California Employment
The proposed measure is not expected to have an adverse impact on California employment and payroll. The proposal may require larger GIS owners to increase jobs to meet the requirements of the proposed regulation.

Analysis of Potential Impacts to California State or Local Agencies
The proposed regulation will affect publically-owned and municipal utilities, and one State agency—the Department of Water Resources (DWR). These local agencies and DWR are currently subject to ARB's mandatory emission reporting regulations. The proposed regulation will expand on the recordkeeping and reporting requirements already required by the mandatory reporting regulations. The additional requirements are minimal and will have a limited impact on DWR and local agencies. SF_6 emission reduction activities will incur a cost savings during the initial years of the ten year regulatory period and will continue to be minimal until the final three years of this period. During these initial years, any additional costs to state and local agencies may be offset by savings from reductions in SF_6 usage, absorbed within current operating costs or, if needed, passed on to electricity consumers.

Based on current data, the total cost of the proposed regulation over its ten year regulatory period is estimated to range from $4,500,000 to $7,000,000. Survey data received from affected entities which supports staff's economic analysis reflects that between 18 and 21 percent of the cost will be borne by the publically-owned utilities. This results in a total cost range to local entities of $940,000 to $1,300,000 during the ten year regulatory period.

Survey respondents represent approximately 95 percent of the load in the State. For the remainder of the utilities that did not report, staff extrapolated the data from the utilities that did report. This yields an average annual cost of $1,600 to $2,100 per year per publicly-owned utility over the ten year regulatory period.

Average annual costs for the one affected state government agency (Department of Water Resources) are estimated to be $1,700 to $2,500 per year.

Because ARB's compliance cost estimation method relies on unverified, self-reported emission and nameplate data, and emission rates for some regulated entities are based on U.S. EPA national data, state and local costs contain some uncertainty. Staff requests and will respond to all additional cost information raised by the public during the 45-day public review period or at the Board hearing in the Final Statement of Reasons for the proposed regulation.

C. Analysis of Cost-Effectiveness

ARB evaluates the costs to comply with the proposed regulation by considering the potential impacts on business, the cost-effectiveness of the proposed regulation, and the estimated cost impacts to consumers. The term "cost-effectiveness" within this analysis is defined as the dollar cost per metric ton of CO_2e emissions reduced.

Based on our analysis, staff estimates the overall cost-effectiveness of the proposed regulation ranges from $18 to $28 per metric ton of CO_2e reduced. This cost corresponds to an estimated range of $450,000 to $700,000 per year over the ten year life of the regulation, or a total cost range of $4,500,000 to $7,000,000. These amounts include the cost of emission reduction opportunities, reporting and recordkeeping.

D. SF_6 Emission Rate Reduction Cost Estimation Methodology

This section outlines ARB's method for estimating the compliance cost of the proposed regulation to reduce SF_6 emissions from gas-insulated switchgear (GIS). The proposed regulation requires GIS owners to achieve an initial emission (leak) rate of ten percent beginning January 1, 2011, and to achieve progressively lower emission rates in subsequent years (one percent per year) concluding with a one percent emission rate beginning January 1, 2020.

This cost estimation method has two main elements:

1. An estimate of the amount of emission reductions needed to comply with the proposed regulation; and

2. An estimate of the unit cost of emission reductions.

Values generated for required reductions and unit cost are multiplied together to estimate compliance cost.

SF_6 emission reduction requirements are quantified as metric tons of CO_2-equivalent emissions reduced. The unit costs of emission reduction are expressed in terms of 2008 dollars per metric ton of CO_2 equivalent reduction and are presented for a discount rate of ten percent and a regulated entity tax rate of 40 percent.

Estimating the Quantity of Emission Reductions Needed

To estimate the quantity of emission reductions required, values are needed for:

- SF_6 nameplate capacity,
- Initial SF_6 leak rate, and
- Targeted leak rate(s) for the compliance period.

To estimate the cost of compliance for a given regulatory period, it is necessary to establish an initial (pre-regulatory) leak rate (***LR***) for regulated entities. ***LR*** can be calculated by dividing annual SF_6 emissions (***E***) by the "nameplate capacity" of non-hermetically sealed GIS owned by the regulated entity (***NP***).

LR (percent) = E (lbs) / NP (lbs)

This equation also permits us to use any two known variables to calculate the value of any unknown third variable.

Of the two values needed to calculate baseline leak rates for regulated entities, only one—SF_6 emissions—is widely available. Self-reported data on the annual (2008) SF_6 emissions of regulated entities are available through the mandatory AB 32 GHG reporting program administered by ARB's Emissions Inventory Branch. Of the 75 entities believed to be subject to the proposed SF_6 regulation, only 20 reported SF_6 emissions through ARB's mandatory reporting program. However, within these 20 entities are those which are responsible for serving approximately 95% of the State's electrical load. Although SF_6 usage is not directly correlated to electrical generation, for purposes of this analysis, staff assumes that the affected entities which generate the most electricity will also own the majority of gas insulated switchgear and the greatest volume of SF_6.

In addition, only a few regulated entities self-reported SF_6 nameplate capacity in response to an ARB survey. Accurate, complete GIS nameplate capacity data and therefore emission rates will not become available until 2012, when the proposed SF_6 GIS regulation would establish a verified GIS inventory for regulated entities.

In those cases where regulated entities self-reported both SF_6 emissions and SF_6 nameplate capacity, ARB staff applied those self-reported data to calculate initial leak rates and estimate compliance requirements.

Where regulated entities did not self-report SF_6 nameplate capacity in response to the ARB survey, nameplate capacity is estimated on the basis of other information. Non-reporting entities represent approximately five percent of electricity sales in the State. Staff estimated the unreported GIS capacity to be proportional to the reported capacity based on electricity sales. For the non-reported capacity, the initial leak rate is based on the experience of electric utilities participating in U.S. EPA's voluntary SF_6 reduction program between 1999 and 2008. According to statistics published by the U.S. EPA partnership, the average initial leak rate of its participants was 15.2 percent. Nameplate capacity for regulated California entities is estimated by combining their reported emissions data with the U.S. EPA leak rate.

Using values developed for each regulated entity's SF_6 emissions, initial leak rate, and nameplate capacity, ARB staff estimated the amount of emission reductions needed to comply with the proposed standards. In any given year, emission reductions needed to meet the proposed standard can be calculated using the formula:

- $\Delta E = \Delta LR * NP$
- ΔE is the amount in pounds by which SF_6 gas emissions (or their CO_2 equivalent) must be reduced (changed) to achieve compliance in a given period;
- ΔLR is the percentage reduction (change) in leak rate required to achieve compliance in a given period;
- ***NP*** is the nameplate capacity in pounds of the regulated entity's GIS switchgear.

This calculation yields the number of pounds of SF_6 emissions that must be reduced in a given period to achieve compliance. To convert that amount into metric tons of equivalent CO_2 emission reductions needed, we multiply by 23,900 (the GWP of SF_6), and then divide by 2204 (the number of pounds in a metric ton).

The estimated lifespan of regulated (non-hermetically sealed) GIS equipment is approximately 40 years. However, for the ten year period of the proposed regulation, staff assumed a ten percent replacement rate of GIS inventory due to attrition based on survey responses. Given the reduced size, maintenance requirements, and emissions profile of new GIS, we assume that it replaces obsolescent GIS with higher nameplate capacities and emission rates. Although current GIS nameplate capacity is projected to gradually diminish over the ten year period of the proposed regulation due to normal turnover, new GIS installations are not anticipated to occur due to the minor anticipated load growth. ARB staff assumed a 2.0 percent annual reduction to nameplate capacity over the regulatory period due to the turnover of old high capacity GIS with newer low volume GIS.

Estimating the Unit Cost of Emission Reduction

The second main element of the cost estimation methodology—the cost to reduce one metric ton of CO_2-equivalent SF_6 emissions—is multiplied by the amount of required emission reductions to yield estimated compliance cost.

Estimated unit costs to reduce SF_6 emissions from GIS are taken from U.S. EPA's June 2006 report, "Global Mitigation of Non-CO_2 Greenhouse Gases." The report includes 2010 and 2020 unit cost estimates for all major SF_6 emission reduction methods applicable to the United States, including:

- SF_6 Recycling,
- Leak Detection and Repair, and
- Equipment Refurbishment.

In developing its unit cost estimates for these three SF_6 emission reduction methods, the report's authors projected that by 2010, 80 percent of available reductions would already have been achieved. The study estimates that 50 to 60 percent of remaining SF_6 emissions in the electricity sector can be reduced through these methods at the estimated costs. To be conservative, ARB staff assumed that these techniques could only be utilized to achieve the first 66 percent of reductions from the national average, or until an emission rate of five

percent was achieved. After that point, it was assumed that the more expensive techniques would be progressively used to achieve further reductions. (See Section III. D., Pages 11 and 12 of this report for detailed descriptions of these emission reduction techniques.)

In addition, the report presents estimated unit costs for more expensive SF_6 reduction methods that may be employed in countries with more advanced SF_6 emission reduction regimes. These include equipment evacuation, repair, and replacement.

Each of the U.S. EPA study's emission reduction unit cost estimates is comprised of a range of values, expressed in 2000$/MTCO$_2$e and presented for a discount rate of ten percent and a tax rate of 40 percent. ARB staff converted these values to 2008$ by adjusting for inflation.

To estimate unit costs of reduction for the proposed SF_6 GIS regulation, ARB staff assumed that less expensive methods are employed first and that the unit cost of SF_6 emission reductions steadily increases over the regulatory period. To approximate the gradual increase of marginal abatement costs, annual values were evenly scaled from the lowest estimated 2010 unit cost (-$1/MTCO$_2$e for SF_6 recycling) to the highest estimated 2020 unit cost ($33/MTCO$_2$e for equipment evacuation for the low end of the range to $55/MTCO$_2$e for GIS repair and replacement for the high end of ranges) over the regulatory period. ARB's cost estimation methodology integrates the full range of abatement options and their associated unit cost estimates as projected by the U.S. EPA study.

Presentation of Results

ARB staff's compliance cost analysis, based on the estimation methodology described above, indicates that the proposed SF_6 emission reduction regulation would reduce a total of 253,000 metric tons of CO_2-equivalent SF_6 emissions at a total cost of $4.5 to $7 million (2008 dollars). Emission reductions for rule compliance would occur over a period of ten years but the vast majority of projected reductions would not be required until 2019, due to the largest utilities voluntary emission reductions. (See Appendix D for detailed SF_6 emission detail, cost information and calculation tables.)

Because this compliance cost estimation method relies on unverified, self-reported emission and nameplate data, and because emission rates for some regulated entities are based on U.S. EPA national data, the results should not be regarded as evidence of GHG emission reductions achieved by individual regulated entities. The results of this cost-estimation method are primarily intended for use in aggregated form.

VII. IMPLEMENTATION AND ENFORCEMENT

GIS owners would be required to demonstrate compliance with the emission rate standards contained within the proposed regulation. Compliance would be demonstrated primarily through recordkeeping and reporting requirements. GIS owners would be required to develop and maintain records related to SF_6 containing equipment (GIS equipment and gas container inventories) and SF_6 purchases. These records must be maintained for three years and provide them to ARB upon request of the Executive Officer.

GIS owners would also be required to submit annual reports detailing their GIS equipment and SF_6 container inventories, their annual SF_6 emissions, and overall emission rate. Most GIS owners would be required to submit these reports electronically via ARB's greenhouse gas reporting tool. The majority of GIS owners are currently required to report annual SF_6 emissions to ARB under its mandatory greenhouse gas reporting requirements for entities which generate electricity (title 17, California Code of Regulations, sections 95100, *et seq.*). GIS owners not subject to mandatory reporting would be allowed to select their method of reporting.

Enforcement activities would be pursued to assure that all gas insulated switchgear owners are in compliance with the proposed regulation. This would include inspection of the above mentioned records provided by GIS owners and cross-verified by inspection of SF_6 distributor records. ARB enforcement staff may also inspect facilities, gas containers, and GIS equipment to ensure consistency with the owner's reports and inventories.

Penalties may be assessed for noncompliance with the reporting and allowable emission rate requirements. Penalties may be assessed for any violation of this subarticle pursuant to Health and Safety Code section 38580. Each day during any portion of which a violation occurs is a separate offense. Any exceedance of the maximum allowable SF_6 emission rate for a calendar year shall constitute a single, separate violation of this subarticle for each day of the calendar year. Enforcement actions can also include developing a court case, testifying in court, and responding to legal action.

Staff expects enforcement to be primarily conducted through the recordkeeping and reporting requirements. As most reporting will be done via electronic submittals using an existing ARB reporting tool, staff expects ARB to absorb the cost of enforcing the proposed regulation utilizing existing resources.

VIII. REFERENCES

1. ARB, 2009. *California Greenhouse Gas Emissions Inventory Data – 2000 to 2006*, http://www.arb.ca.gov/cc/inventory/data/data.htm

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Appendix A

Proposed Regulation Order

Division 3. AIR RESOURCES

Chapter 1. AIR RESOURCES BOARD

Subchapter 10. Climate Change

Article 4. Regulations to Achieve Greenhouse Gas Emission Reductions

Subarticle 3.1.
Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear

PROPOSED REGULATION ORDER

Adopt new Subarticle 3.1, Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear sections 95350 to 95359, title 17, California Code of Regulations, to read as follows:

[Note: All of the text below is new language to be added to the California Code of Regulations (CCR)]

Subchapter 10. Climate Change

Article 4. Regulations to Achieve Greenhouse Gas Emission Reductions

Subarticle 3.1. Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear

§ 95350. Purpose, Scope, and Applicability.

(a) *Purpose.* The purpose of this regulation is to achieve greenhouse gas emission reductions by reducing sulfur hexafluoride (SF_6) emissions from gas insulated switchgear.

(b) *Applicability.* The provisions of this subarticle apply to owners of gas insulated switchgear. Any person who is subject to this subarticle must meet the requirements of this subarticle, notwithstanding any contractual arrangement that person may have with any third parties.

NOTE: Authority cited: Sections 38510, 38560, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38560, 39600, and 39601, Health and Safety Code.

§ 95351. Definitions.

(a) For the purposes of this subarticle, the following definitions apply:

(1) **"Active GIS Equipment"** means non-hermetically sealed SF_6 gas insulated switchgear that is actively connected (i.e., interconnected through busbars or cables which are actively conducting electricity) to the GIS owner's electrical power system. "Active equipment" does not include equipment in storage.

(2) **"Electrical Power System"** means the combination of electrical generators (i.e., power plants), transmission and distribution lines, equipment, circuits, and transformers used to generate and transport electricity from the generator to consumption areas or to adjacent electrical power systems.

(2) **"Emergency Event"** means a situation arising from a sudden and unforeseen natural disaster such as an earthquake, flood, or fire.

(3) **"Emission rate"** means, subject to the provisions of section 95356(e), a GIS owner's total annual SF_6 emissions from all active GIS equipment divided by the total SF_6 nameplate capacity of all active GIS equipment.

(4) **"Executive Officer"** means the Executive Officer of the California Air Resources Board (ARB) or his or her designee.

(5) **"Gas container"** means a vessel containing or designed to contain SF_6. "Gas container" includes pressurized cylinders, gas carts, or other containers.

(6) **"Gas-insulated switchgear or GIS"** means all electrical power equipment insulated with SF_6 gas regardless of location. Gas insulated switchgear or GIS includes switches, stand-alone gas-insulated equipment, and any combination of electrical disconnects, fuses, electrical transmission lines, transformers and/or circuit breakers used to isolate gas insulated electrical equipment.

(7) **"GIS Owner"** means the person who owns gas insulated switchgear. For purposes of this regulation "GIS owner" excludes temporary ownership by the original equipment manufacturer during GIS equipment transport and installation at a customer's site.

(8) **"Hermetically Sealed Gas Insulated Switchgear"** means switchgear which is designed to be gas-tight and sealed for life

(9) **"Nameplate Capacity"** means the design capacity of SF_6 specified by the manufacturer for optimal performance of a GIS device. Nameplate capacity may be found on the nameplate attached to the GIS device, or may be stated within the manufacturer's official product specifications.

(10) **"NIST-Traceable Standards" means** national, traceable measurement standards developed by the National Institute of Standards and Technology (NIST).

(11) **"Person"** shall have the same meaning as defined in Health and Safety Code section 39047.

(12) **"Responsible Official"** means one of the following:

(A) For a corporation, a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person; or

(B) For a partnership or sole proprietorship, a general partner or the proprietor, respectively; or

(C) For a municipal, state, federal, or other public agency, either a principal executive officer or a ranking elected official.

NOTE: Authority cited: Sections 38510, 38560, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38560, 39600, and 39601, Health and Safety Code.

§ 95352. Maximum Annual SF_6 Emission Rate.

For each calendar year specified below, the maximum annual SF_6 emission rate for each GIS owner's active GIS equipment shall not exceed the following:

Maximum Annual SF_6 Emission Rate	
Calendar Year	**Maximum Allowable SF_6 Emission Rate**
2011	10.0%
2012	9.0%
2013	8.0%
2014	7.0%
2015	6.0%
2016	5.0%
2017	4.0%
2018	3.0%
2019	2.0%
2020, and each calendar year thereafter	1.0%

NOTE: Authority cited: Sections 38510, 38560, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38560, 39600, and 39601, Health and Safety Code.

§ 95353. Emergency Event Exemption.

(a) After January 1, 2020, a GIS owner may request emissions from an emergency event to be exempted from the calculation of the maximum allowable emission rate if it is demonstrated to the Executive Officer's satisfaction that the release of SF_6:

(1) Could not have been prevented by the exercise of prudence, diligence, and care; and

(2) Was beyond the control of the GIS owner.

(b) A request for an exemption pursuant to this section must be submitted in writing to the Executive Officer within 30 calendar days after the occurrence of the emergency event, and must contain the following information:

(1) The GIS owner's name, physical address, mailing address, e-mail address and telephone number;

(2) A detailed description of the emergency event, including but not limited to the following:

(A) The nature of the event (e.g., fire, flood, earthquake);

(B) The date and time the event occurred;

(C) The location of the event;

(D) The GIS equipment that was affected by the event;

(E) The amount of SF_6 released (in pounds);

(3) A statement and supporting documentation that the release occurred as a result of an emergency event; and

(4) A signed and dated statement, under penalty of perjury, provided by the appropriate responsible official that the statements and information contained in the submitted request are true, accurate, and complete.

NOTE: Authority cited: Sections 38510, 38560, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38560, 39600, and 39601, Health and Safety Code.

§ 95354. SF_6 Inventory Measurement Procedures.

(a) GIS owners must do all of the following:

(1) Establish and adhere to written procedures to track and weigh all gas containers as they are leaving and entering storage;

(2) Weigh all gas containers on a scale that is certified to be accurate to within one percent of the true weight;

(3) Calibrate all scales used to measure quantities that are to be reported under this subarticle by:

(A) Using calibration procedures specified by the scale manufacturer; or

(B) If a scale manufacturer has not specified calibration procedures, using:

1. A NIST traceable standard; and

2. A published calibration method identified as appropriate for that scale by either the International Society of Weighing and Measurement or the National Conference on Weights and Measures.

(4) Calibrate scales used to measure quantities reported under this subarticle prior to the first reporting year.

(5) Recalibrate scales used to measure quantities reported under this subarticle at least annually, or at the minimum frequency specified by the manufacturer, whichever is more frequent.

(b) GIS owners must:

(1) Establish and maintain a log of all measurements required by this section;

(2) Record the scale calibration methods used pursuant to this section; and

(3) Retain all documents and records required by this section for a minimum of three years.

NOTE: Authority cited: Sections 38510, 38560, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38560, 39600, and 39601, Health and Safety Code.

§ 95355. Recordkeeping.

Owners of gas insulated switchgear must:

(a) Establish and maintain a current and complete GIS equipment inventory which includes the following information:

(1) Manufacturer serial number;

(2) Equipment type (e.g., circuit breaker, transformer, etc);

(3) Seal type (hermetic or non-hermetic);

(4) Equipment manufacturer name;

(5) Date equipment was manufactured;

(6) Equipment voltage capacity (in kilovolts);

(7) Equipment SF_6 nameplate capacity (charge in pounds);

(8) Equipment status (active or inactive); and

(9) Equipment location:

(A) The physical address for each piece of equipment must be listed; and

(B) Complete records must be kept of changes to the equipment inventory and the dates the changes occurred (such as installation of new equipment, removal of equipment, and disposition or the equipment (e.g, sold, returned to manufacturer, etc.)).

(b) Establish and maintain a current and complete inventory of gas containers, which includes the following information for each container:

(1) A unique identification number;

(2) Size;

(3) Location;

(4) A chronological accounting, by weight in pounds, of SF_6 transferred into or out of the container;

(5) The current SF_6 residual, by weight in pounds.

(c) Retain SF_6 gas and equipment purchase documentation (such as contracts, material invoices, receipts, etc.);

(d) Retain all records required by this subarticle for a minimum of three calendar years;

(1) GIS owners headquartered in California must retain all records at a location within California;

(2) GIS owners headquartered in other states may retain all records at a location in California or at their business offices nearest to California;

(e) Have all records available for ARB inspection at time of inspection; and

(f) Upon request by ARB, provide these records to the Executive Officer.

NOTE: Authority cited: Sections 38510, 38560, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38560, 39600, and 39601, Health and Safety Code.

§ 95356. Annual Reporting Requirements.

(a) Beginning in calendar year 2011 for emissions occurring during the previous calendar year, and each calendar year thereafter, each GIS owner must submit the following annual report to the Executive Officer no later than the applicable deadline specified in title 17, California Code of Regulations, Section 95100, *et seq.*:

(b) The annual report must contain all of the following information:

(1) Reporting entity name, physical address, and mailing address;

(2) Location of records and documents maintained in California if different from the reporting entity's physical address.

(3) Name and contact information including e-mail address and telephone number of the person submitting the report, and the person primarily responsible for preparing the report;

(4) The year for which the information is submitted;

(5) A signed and dated statement provided by the appropriate responsible official that the information has been prepared in accordance with this subarticle, and that the statements and information contained in the submitted emission data are true, accurate, and complete.

(6) Annual SF_6 emissions as calculated using the equation specified in subsection (d), below;

(7) Annual SF_6 emission rate as calculated using the equation specified in subsection (e), below;

(8) A gas insulated switchgear inventory report containing the information required by Section 95355, subsections (a)(1) through (a)(8); and

(9) A gas container inventory report containing the information required by Section 95355(b).

(c) The annual report shall be submitted to the Executive Officer as follows:

(1) GIS owners subject to the requirements of title 17, California Code of Regulations Sections 95100 *et seq.*, shall use the ARB Greenhouse Gas Reporting Tool, as specified in title 17, California Code of Regulations section 95104(e).

(2) GIS owners not subject to the requirements of title 17, California Code of Regulations Sections 95100 *et seq.*, may either:

(A) Use the ARB's Greenhouse Gas Reporting tool, as specified in title 17, California Code of regulations section 95104(e); or

(B) Submit reports in writing to ARB through the US Postal Service, electronic mail or by personal delivery.

(d) *Annual SF_6 Emissions.* GIS owners must use the following equation to determine their SF_6 emissions:

Equation for determining annual SF_6 emissions:

User Emissions = (Decrease in SF_6 inventory) + (Acquisitions of SF_6) – (Disbursements of SF_6) – (Net increase in total nameplate capacity of non-hermetically sealed GIS equipment owned)

Where:
Decrease in SF_6 inventory = (SF_6 stored in containers, but not in equipment, at the beginning of the year) - (SF_6 stored in containers, but not in equipment, at the end of the year).

Acquisitions of SF_6 = (SF_6 purchased from chemical producers or distributors in bulk) + (SF_6 purchased from equipment manufacturers or distributors with or inside non-hermetically sealed GIS equipment) + (SF_6 returned to site after off-site recycling).

Disbursements of SF_6 = (SF_6 in bulk and contained in non-hermetically sealed GIS equipment that is sold to other entities) + (SF_6 returned to suppliers) + (SF_6 sent off site for recycling) + (SF_6 sent to destruction facilities).

Net increase in total nameplate capacity of non-hermetically sealed GIS equipment operated = (The nameplate capacity of new non-hermetically sealed GIS equipment) - (Nameplate capacity of retiring non-hermetically sealed GIS equipment). (Note that nameplate capacity refers to the manufacturer's SF_6 design capacity rather than to the actual charge, which may reflect leakage.)

(e) *Annual SF_6 Emission Rate.* GIS owners shall use the following equations to determine their SF_6 emission rate.

Equation for determining emissions rate:

$$ER = \frac{Emissions}{C_{avg}}$$

Where:	ER	=	Emission Rate
	Emissions	=	Annual emissions per subsection (d) (lbs)
	C_{avg}	=	Average system nameplate capacity as expressed in the equation below (lbs)

$$C_{avg} = \frac{\sum_{i=1}^{n}(d_i C_i)}{365}$$

Where:	C_{avg}	=	The average system nameplate capacity (in lbs.)
	n	=	The number of GIS devices
	d_i	=	The number of days during the year the GIS device was in active service
	C_i	=	The nameplate capacity (lbs) of the GIS device

NOTE: Authority cited: Sections 38510, 38560, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38560, 39600, and 39601, Health and Safety Code.

§ 95357. Treatment of Confidential Information

Information submitted pursuant to this subarticle may be claimed as confidential. Such information shall be handled in accordance with the procedures specified in title 17, California Code of Regulations, sections 91000 through 91022.

NOTE: Authority cited: Sections 38510, 38560, 38580, 39600, 39601, and 41511 Health and Safety Code. Reference: Sections 38560, 39600, 39601, and 41511 Health and Safety Code.

§ 95358. Enforcement.

(a) *Penalties.* Penalties may be assessed for any violation of this subarticle pursuant to Health and Safety Code section 38580. Each day during any portion of which a violation occurs is a separate offense.

(b) Each day or portion thereof that any report required by this subarticle remains unsubmitted, is submitted late, or contains incomplete or inaccurate information, shall constitute a single, separate violation of this subarticle.

(c) Any exceedance of the maximum allowable SF_6 emission rate for a calendar year shall constitute a single, separate violation of this subarticle for each day of the calendar year.

(d) *Injunctions.* Any violation of this subarticle may be enjoined pursuant to Health and Safety Code section 41513.

NOTE: Authority cited: Sections 38510, 38560, 38580, 39600, 39601, 41510, and 41513, and Health and Safety Code. Reference: Sections 38560, 38580, 39600, 39601, 41510, and 41513 Health and Safety Code.

§ 95359. Severability.

Each part of this subarticle is deemed severable, and in the event that any part of this subarticle is held to be invalid, the remainder of this subarticle shall continue in full force and effect.

NOTE: Authority cited: Sections 38510, 38560, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38560, 39600, and 39601, Health and Safety Code.

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APPENDIX B

Summary of Survey Results

and

Sample Survey Questionnaire

Summary of Survey Results/Sample Survey Questionnaire

On January 13, 2009, ARB staff issued a survey questionnaire to entities on ARB's list serve for the proposed SF_6 emission reduction measure for gas insulated switchgear (GIS). These entities included all California and out-of-state utilities and electrical generators which own GIS within the state. The survey was also sent to particle accelerators, universities, laboratories, and businesses which generate electricity for their own on-site use and which also own GIS used to distribute their electricity.

Staff requested information on the various elements of California's GIS equipment inventory including type and age of gear, SF_6 capacity and current emission reduction programs. Staff received survey responses from 23 entities: five investor-owned utilities, nine publically-owned utilities, six cogenerators, two power producers, and one particle accelerator. The responding utilities serve over 95 percent of California's electrical load.

Survey responses, coupled with actual SF_6 emissions data received from entities responding to ARB's mandatory reporting regulations, indicate that current sulfur hexafluoride emission rates range from 0.04 percent to 11 percent. The average emission rate for respondents is 7 percent.

Staff requested information on the age of gas insulated switchgear to determine the future potential for emission reductions based on retirement of aging equipment. New equipment requires less SF_6, has improved seals and much less leakage potential. Of those entities responding to the survey, the average age of current gas insulated equipment is 10 years. The majority (67 percent) falls within the one to ten-year range. The life span of most GIS is 40 years. Ten percent of the California inventory is 30 years old or older and so is expected to be retired prior to 2020.

CALIFORNIA ELECTRICITY SECTOR AND PARTICLE ACCELERATOR SULFUR HEXAFLUORIDE (SF_6) SURVEY

General Information Requested from All Participants:

Company Name: _____
Parent Company Name, if Applicable: _____
Company Address: _____
Contact Person: _____
Job Title: _____
Phone Number: _____
e-mail Address: _____
Webpage Address: _____

Information Requested from Particle Accelerator Operators:

Is this information confidential? Yes __ No __

1. As a particle accelerator operator, are you responsible for electricity transmission or distribution equipment (circuit breakers, current-interruption equipment, transmission lines, transformers, substations, etc.)? If "yes":

   a. Does any of the equipment use sulfur hexafluoride (SF_6)? Yes__ No__

2. Do you use SF_6 for any purpose other than as a dielectric medium for electricity transmission or distribution equipment? If yes, please describe these purposes.

[**NOTE:** If your answers to Questions 1 and 2 above are "yes" please respond to Questions 4 and 6 through 18, inclusive, below. If your answers to Questions 1 and 2 are "no" please sign, date and return this survey questionnaire as specified in the cover letter.]

CALIFORNIA ELECTRICITY SECTOR AND PARTICLE ACCELERATOR SULFUR HEXAFLUORIDE (SF_6) SURVEY

Information Requested from Electricity Service Providers:

Is this information confidential? Yes __ No __

General

3. As an electricity service provider, does your company own, or is it directly responsible for the maintenance of, electrical transmission and distribution equipment in California (circuit breakers, current-interruption equipment, transmission lines, transformers, substations)? If "yes":

   a. Does any of the equipment use sulfur hexafluoride (SF_6)? Yes__ No__

[**NOTE:** If your answer to Question 3 is "yes" please respond to questions 4 through 18, below. If your answer is "no," please sign, date and return this survey questionnaire as specified in the cover letter.]

4. Does your company have an SF_6 emission reduction program? If "yes" please describe your program (attach extra sheets as needed).

5. Does your company participate in the U.S. EPA's SF_6 Emission Reduction Partnership for Electric Power Systems? Yes ___ No ___

Cost and Quantity

Is this information confidential? Yes __ No __

6. What were your estimated SF_6 emissions (in kilograms) each year for the years 2006, 2007, and 2008? Please see Attachment A for emission reduction calculation methodology.

Year	SF_6 Emissions (in kilograms)
2006	
2007	
2008	

7. What is the current price you pay for sulfur hexafluoride US$/kg.)?_____

Equipment

Is this information confidential? Yes __ No __

8. Please complete the table below **for each piece** of electrical transmission and distribution equipment which uses SF_6. [Note: the table will expand to accommodate the total number of entries made.]

Identification Number *	Equipment Type	Voltage	Age	Seal Technology	Service Frequency	Date Last Serviced	Charge (in lbs.)

*If the equipment does not have an identification number, please sequentially list each piece of equipment.

Equipment Servicing Procedures

Is this information confidential? Yes __ No __

9. Please describe your company's current servicing procedures (attach extra sheets as needed).

Equipment Replacement/Transmission and Distribution Equipment Expansion

Is this information confidential? Yes __ No __

10. Does your company have a plan to upgrade its current SF_6-containing equipment? If "yes," please describe your plan and its time line (attach extra sheets as needed).

11. Does your company plan to expand its transmission and distribution network? If "yes":

    a. Please describe your plan and its time line (attach extra sheets as needed).
    b. Please estimate any anticipated increase in use of SF_6.

Handling Procedures

Is this information confidential? Yes __ No __

12. Please describe your company's current SF_6 transfer procedures (attach extra sheets as needed).

Recycling

Is this information confidential? Yes __ No __

13. Does your company have a recycling program for SF_6? If "yes" please describe your current recycling practices and their costs on a dollars-per-pound of SF_6 basis (attach extra sheets as needed).

14. If your answer to Question 13 is "no":
    a. Why do you not recycle? (Attach extra sheets as needed.)
    b. What is done with the SF_6 remaining in decommissioned equipment? (Attach extra sheets as needed.)

Leak Detection and Repair (LDAR)

Is this information confidential? Yes __ No __

15. Does your company have an SF_6 leak detection and repair (LDAR) program? If "yes" please describe your company's program and its LDAR costs on a dollars-per-pound of SF_6 basis (attach extra sheets as needed).

Optional Mediums/Equipment

Is this information confidential? Yes __ No __

16. Does your company use other insulating gasses? If "yes:"
    a. What are the gasses?
    b. Please describe their uses (attach extra sheets as needed).

17. Does your company use vacuum sealed equipment for electricity transmission and distribution? If "yes" please describe its use (attach extra sheets as needed).

18. Has your company researched using alternatives to SF_6 in the electricity sector and for use in particle accelerators? If "yes" please describe your findings (attach extra sheets as needed).

Name and Title of Person Completing the Survey

_____

Name **Title**
Please type or print

Signature_____

Date _____

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APPENDIX C

Public Outreach Table

PUBLIC OUTREACH TABLE

Date(s)	Location	Participants/ Comments
Tours: Utilities		
January 28, 2009 and August 4, 2009	Sacramento Municipal Utility District (SMUD)	Presentation/substation tour. Discussion of SMUD SF_6 emission reduction program. Field and distribution discussion.
April 23, 2009	Pacific Gas and Electric	Presentation/substation tour. Discussion of PG&E SF_6 emission reduction program.
March 12, 2009	Southern California Edison	Presentation/substation tour. Discussion of SCE SF_6 emission reduction program.
Tours: Particle Accelerators		
March 5, 2009	University of California, Davis Medical Center	Discussion/tour; de minimus use for linear accelerator for cancer treatment.
March 10, 2009	University of California, Stanford, Linear Accelerator	Presentation/accelerator tour. On-site substation; experimental use phasing out SF_6.
Technical Working Group Meetings		
January 13, 2009	Cal/EPA-Conference Room/Conference call	Small group; good call-in participation; introduction of measure to group
April 14, 2009	Cal/EPA-Conference Room/Conference call	Larger group; both particle accelerators and utilities represented; concepts introduced.
July 27, 2009	Cal/EPA-Conference Room/Conference call	Utility/PA represented. PA experiments now covered by other ARB SF_6 measure; concepts discussed.
Public Workshop		
September 2, 2009	Cal/EPA Sierra Hearing Room/Webcast	PG&E; SDG&E; SCE; SMUD; LADWP;

Date(s)	Location	Participants/ Comments
Conference Calls		
August 18, 2009	ARB	Los Angeles Department of Water and Power
August 20, 2009	ARB	Northern CA Power Authority
August 25, 2009	ARB	Meet w/Randall Friedman, U.S. Navy; Conf. call included for Scott Dickinson, U.S. Air Force
September 8, 2008	ARB	Bob Mueller, Airgas Corporation
September 29, 2009	ARB	LADWP, NCPA, PG&E, Redding Electric Utility, SMUD, SDG&E, SCE
Other		
February 4, 2009	Phoenix, AZ	U.S. EPA SF_6 Volunteer Program Conference Presenter
June 2, 2009	Chicago, Il (Via conference call)	U.S. EPA SF_6 Volunteer Program Conference Presenter

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APPENDIX D

SF_6 EMISSION DETAIL, COST INFORMATION AND CALCULATION TABLES

SF_6 Emission Detail, Cost Information and Calculation Tables

ARB staff's compliance cost analysis estimates that the proposed SF_6 emission reduction regulation would reduce a total of 253,000 metric tons of CO_2-equivalent SF_6 emissions at a total cost of $4.5 to $7.0 million (2008 dollars). Emission reductions for rule compliance would occur over a period of ten years but the vast majority of projected reductions would not be required until 2019, due to the largest utilities voluntary emission reductions.

Because this compliance cost estimation method relies on unverified, self-reported emission and nameplate data, and because emission rates for some regulated entities are based on the U.S. EPA national data, the results should not be regarded as evidence of GHG emission reductions achieved by individual regulated entities. The results of this cost-estimation method are primarily intended for use in aggregated form.

The proposed regulation will expand on the recordkeeping and reporting requirements already required by the mandatory reporting regulations. The additional requirements are minimal and will have a limited impact on state and local agencies. Estimated recordkeeping and reporting costs are listed on Table D-1.

Tables D-2A and D-2B present the direct costs of reducing SF_6 emissions. These costs must be added to the recordkeeping and reporting costs of Table D-1 to obtain a total estimate of costs for an entity to comply. The costs were presented in different tables to better present the cost impact of the proposed regulation.

Two entities (San Diego Gas & Electric and Los Angeles Department of Water and Power) are expected to have no costs associated with reducing SF_6 emissions as these entities' SF_6 emission rates are already less than the proposed 2020 emission rate limits. These entities would be subject to the recordkeeping and reporting provisions of the proposed regulation and would incur a nominal average cost of approximately $500 per year to comply with the proposed regulation.

SF_6 emission reduction activities will incur a cost savings during the initial years of the ten year regulatory period and will continue to be minimal until the final three years of this period. During these initial years, any additional costs may be offset by savings from reductions in SF_6 usage, absorbed within current operating costs or, if needed, passed on to electricity consumers. Measure costs passed to consumers are estimated to increase electricity rates by $0.000016 to $0.000025 per kilowatt-hour. This equates to an increase of between one and one and one-half cents per month for the average residential electricity bill. (See Table D-3, below.)

Costs of the proposed regulation would be apportioned among affected categories as follows: Investor-owned utilities represent 79 – 82%; publically-owned utilities (local government entities): 18 – 21%; electricity generators: < 1%; corporations with on-site electricity: < 1% ; state government: < 1% , federal government: < 1%. (See Table D-4, Total and Annual Measure Cost/Percentage of Measure Cost by Category, below.)

There are approximately 60 local publically-owned utilities and rural cooperatives affected by the proposed regulation. Of these 60, 13 responded to ARB's SF_6 mandatory reporting requirements which formed the basis for the fiscal analysis. Although each entity's emission reduction cost will differ based on the extent of their service territory and size of their GIS inventory, under the assumptions used for ARB's cost estimation method, local entities will incur an annual cost savings of $730 during fiscal year 2011. Per entity costs for fiscal year 2012 are estimated to be $35, and $110 in fiscal year 2013. Average annual costs for the one affected state government agency (Department of Water Resources) are estimated to incur a cost savings of $830 for fiscal year 2010, a cost of $130 for fiscal year 2011, and $410 for fiscal year 2012. (See Table D-5, below.) These costs are for emission reductions only and must be added to recording keeping and reporting costs to estimate total regulation costs.

Table D-1: Recordkeeping and Reporting Costs and Cost Effectiveness				
Initial Year Costs				
Number of Entities	**Hrs/yr**	**Labor Cost/hr**	**Total Cost**	**Avg Cost/Entity/Yr**
Large Entities				
4	40	$48	$7,680	$1,920
Medium Entities				
25	20	$48	$24,000	$960
Small Entities				
46	10	$48	$22,080	$480
Total First Year Costs			**$54,000**	
Subsequent Year Costs	**1/2 of 1st yr costs/entity**	**Number of Years**	**Total Cost**	**Total Avg. annual Cost/Entity**
Large Entities				
4	$960	9	$34,560	$1,056
Medium Entities				
25	$480	9	$108,000	$528
Small Entities				
46	$240	9	$99,360	$264
Total Subsequent Year Costs			**$242,000**	
Total Recordkeeping and Reporting Costs			**$296,000**	
Recordkeeping and Reporting Cost Effectiveness of Proposed Regulation				
Total Cost of Measure	**Projected Reductions (MTCO2e)**	**Cost/ton CO2e Reduced**		
$296,000	253,000	**$1.17**		

Table D-2A: Total Projected Annual Costs (2008$) of SF6 Emission Reduction Activities to Comply with Proposed Annual Emission Rates, Low End of Estimates

Entity Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
City of Lompoc	-$7	$1	$3	$6	$8	$10	$18	$26	$34	$41
Merced Irrigation District	-$4	$1	$2	$4	$5	$6	$11	$16	$21	$26
City of Alameda	-$10	$2	$5	$8	$11	$14	$26	$38	$49	$60
Pacificorp	-$97	$89	$279	$461	$635	$803	$1,486	$2,142	$2,771	$3,374
City of Redding	-$159	$25	$79	$130	$180	$227	$420	$605	$783	$953
City of Glendale	-$229	$36	$114	$188	$259	$327	$606	$873	$1,129	$1,375
City of Pasadena	-$54	$9	$27	$44	$61	$77	$143	$206	$266	$324
City of Roseville	-$46	$7	$23	$38	$52	$65	$121	$174	$226	$275
City of Burbank	-$1,530	$243	$759	$1,254	$1,729	$2,185	$4,045	$5,829	$7,541	$9,181
City of Riverside	-$75	$12	$37	$62	$85	$108	$199	$287	$371	$452
City of Anaheim	-$741	$118	$367	$607	$837	$1,057	$1,957	$2,821	$3,649	$4,443
Chevron	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Imperial Irrigation District	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Central Valley Project & Boulder City/Pkr Dvs	-$625	$99	$310	$513	$707	$893	$1,653	$2,383	$3,082	$3,753
Department of Water Resources	-$831	$132	$412	$681	$939	$1,186	$2,196	$3,166	$4,095	$4,986
Sacramento Municipal Utility District	$0	$0	$0	$0	$0	$0	$8,502	$12,254	$15,851	$19,300
San Diego Gas & Electric	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Los Angeles Department of Water and Power	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Pacific Gas and Electric Company	$0	$0	$0	$0	$0	$0	$0	$0	$0	$706,514
Southern California Edison Company	$0	$0	$0	$0	$0	$0	$0	$221,177	$1,174,171	$1,429,654
Extrapolation For Unreported Entities	-$26,229	$4,165	$13,008	$21,495	$29,638	$37,447	$69,323	$99,909	$129,244	$157,366
Total Cost	**$30,638**	**$4,939**	**$15,425**	**$25,490**	**$35,146**	**$44,405**	**$90,707**	**$352,905**	**$1,343,284**	**$2,342,077**

Listed entity information derived from CARB Mandatory Reporting Regulations data.

TOTAL PROJECTED COST (2008$) $4,200,000

Table D-2B: Total Projected Annual Costs (2008$) of SF6 Emission Reduction Activities to Comply with Proposed Annual Emission Rates, High End of Estimates

Entity Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
City of Lompoc	-$7	$1	$3	$6	$8	$10	$25	$40	$54	$67
Merced Irrigation District	-$4	$1	$2	$4	$5	$6	$16	$25	$34	$42
City of Alameda	-$10	$2	$5	$8	$11	$14	$36	$58	$78	$98
Pacificorp	-$97	$89	$279	$461	$635	$803	$2,059	$3,264	$4,421	$5,530
City of Redding	-$159	$25	$79	$130	$180	$227	$582	$922	$1,249	$1,562
City of Glendale	-$229	$36	$114	$188	$259	$327	$839	$1,330	$1,801	$2,253
City of Pasadena	-$54	$9	$27	$44	$61	$77	$198	$314	$425	$531
City of Roseville	-$46	$7	$23	$38	$52	$65	$168	$266	$360	$450
City of Burbank	-$1,530	$243	$759	$1,254	$1,729	$2,185	$5,603	$8,883	$12,030	$15,048
City of Riverside	-$75	$12	$37	$62	$85	$108	$276	$438	$593	$741
City of Anaheim	-$741	$118	$367	$607	$837	$1,057	$2,711	$4,299	$5,822	$7,282
Chevron	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Imperial Irrigation District	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Central Valley Project& Boulder City/Pkr Dvs	-$625	$99	$310	$513	$707	$893	$2,290	$3,631	$4,917	$6,150
Department of Water Resources	-$831	$132	$412	$681	$939	$1,186	$3,043	$4,824	$6,533	$8,172
Sacramento Municipal Utility District	$0	$0	$0	$0	$0	$0	$11,778	$18,674	$25,289	$31,632
San Diego Gas & Electric	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Los Angeles Department of Water and Power	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Pacific Gas and Electric Company	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,157,921
Southern California Edison Company	$0	$0	$0	$0	$0	$0	$0	$338,581	$1,873,229	$2,343,089
Extrapolation For Unreported Entities	-$26,229	$4,165	$13,008	$21,495	$29,638	$37,447	$96,030	$152,254	$206,191	$257,910
Total Cost	**$30,638**	**$4,939**	**$15,425**	**$25,490**	**$35,146**	**$44,405**	**$125,652**	**$537,801**	**$2,143,025**	**$3,838,478**

TOTAL PROJECTED COST (2008$)

$6,700,000

Listed entity information derived from CARB Mandatory Reporting Regulations data

Table D-3 Average, Annual Increase In Electricity Rates Passed To Consumer	
Total cost of proposed regulation	$4,500,000 to $7,000,000
Annual cost	$450,000 to $700,000
2007 CA electricity consumption in kilowatt-hours (kWh)[1]	283,000,000,000
Increased cost per kWh	$0.000016 to $0.000025

[1] California Energy Commission, Energy Consumption Data Management System, Electricity Consumption by Utility (2007), http://ecdms.energy.ca.gov/elecbyutil.aspx

TABLE D-4: Total & Annual Measure Cost/Percentage of Measure Cost by Category		
Category	**Total Category Cost**	**Percentage of Total Measure Cost**
Investor Owned Utilities	$4,300,000 – 6,900,000	79 – 82%
Publically Owned Utilities (Local Government)	$940,000 – 1,300,000	18 – 21%
State Government	$17,000 – 26,000	<1%
Federal Government	$14,000 – $20,000	<1%
Industrial Self-Generators	$1,000	<1%
TOTAL	$4,500,000 – $7,000,000	100%

TABLE D-5: Fiscal Impact: Local and State Government Projected Annual Cost (2008$) of SF_6 Reductions Activities for Reporting Entities FY 2011, 2012, and 2013			
Reporting Utility Name	**FY 2011**	**FY 2012**	**FY 2013**
City of Lompoc	-$7	$1	$3
Merced Irrigation District	-$4	$1	$2
City of Alameda	-$10	$2	$5
City of Redding	-$159	$25	$79
City of Glendale	-$229	$36	$114
City of Pasadena	-$54	$9	$27
City of Roseville	-$46	$7	$23
City of Burbank	-$1,530	$243	$759
City of Riverside	-$75	$12	$37
City of Anaheim	-$7,401	$118	$367
Imperial Irrigation District	$0	$0	$0
Sacramento Municipal Utility District	$0	$0	$0
Los Angeles Department of Water and Power	$0	$0	$0
Total local government/FY	$-9,515	$454	$1,416
Avg per local government	$-732	$35	$109
State Government Costs			
CA Dept. of Water Resources	$-831	$132	$412

TITLE 13. CALIFORNIA AIR RESOURCES BOARD

NOTICE OF PUBLIC HEARING TO CONSIDER PROPOSED AMENDMENTS TO NEW PASSENGER MOTOR VEHICLE GREENHOUSE GAS EMISSION STANDARDS FOR MODEL YEARS 2012-2016 TO PERMIT COMPLIANCE BASED ON FEDERAL GREENHOUSE GAS EMISSION STANDARDS

The Air Resources Board (ARB or Board) will conduct a public hearing at the time and place noted below to consider proposed amendments to California's greenhouse gas emission standards that the Board approved in September 2004 pursuant to Assembly Bill 1493 (Pavley) (Stats. 2002, ch. 200.). These standards apply on a fleetwide basis to large-volume manufacturers of 2009 through 2016 model year new passenger motor vehicles certified for sale in California. The proposed amendments would allow manufacturer compliance with United States Environmental Protection Agency (U.S. EPA) standards to be deemed as compliant with California's standards for the 2012 through 2016 model years.

DATE: February 25, 2010

TIME: 9:00 a.m.

PLACE: California Environmental Protection Agency
Air Resources Board
Byron Sher Auditorium
1001 I Street
Sacramento, California 95814

This item will be considered at a two-day meeting of the Board, which will commence at 9:00 a.m., February 25, 2010, and may continue at 8:30 a.m., on February 26, 2010. This item may not be considered until February 26, 2010. Please consult the agenda for the meeting, which will be available at least 10 days before February 25, 2010, to determine the day on which this item will be considered.

INFORMATIVE DIGEST OF PROPOSED ACTION AND POLICY STATEMENT OVERVIEW

Sections Affected: Proposed amendments to California Code of Regulations (CCR), title 13, sections 1961 and 1961.1, and to the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" incorporated by reference in CCR, title 13, section 1961(d) (as last amended May 2, 2008). Note: There are three other pending ARB rulemakings that also amend the incorporated test procedures; the text proposed with this notice identifies these other pending amendments.

Background:

Citing compelling and extraordinary air quality and other impacts California faces from global warming, in 2002 the Legislature passed and the Governor signed Assembly Bill (AB) 1493. This bill required ARB to develop and adopt regulations to achieve the maximum feasible and cost-effective reduction of heat-trapping greenhouse gas emissions from passenger motor vehicles, beginning with the 2009 model year. The Board approved those regulations at its September 2004 hearing, and they were adopted in their final form in August 2005.

The AB 1493 regulations set separate greenhouse gas emission levels for both passenger cars and light-duty trucks (PC/LDT1) and heavier light-duty trucks and medium-duty passenger vehicles (LDT2/MDPV). The standards are effective beginning in the 2009 model year and become more stringent each year through 2016. The levels are measured in grams per mile of carbon dioxide-equivalent emissions, targeting carbon dioxide (CO_2) as the main greenhouse pollutant and other greenhouse gases including refrigerants used in automotive air conditioners. Compliance is determined on a fleetwide basis, meaning that while each individual model can be above or below the standard, the average of a manufacturers' fleet must meet the standard or else the manufacturer incurs debits that must be equalized within five model years. Manufacturers can also accrue and trade credits between their PC/LDT1 and LDT2/MDPV segments, bank credits from over compliance for use in later model years, and trade credits with other manufacturers. Manufacturers may also obtain additional credit for selling vehicles fueled by other than conventional gasoline or diesel and demonstrating use of that fuel.

The greenhouse gas emission reductions to be achieved by the Pavley regulations are substantial. By 2016, the regulations require a 30% reduction in greenhouse gas emissions compared to 2009 model year vehicles. The AB 1493 regulations provide about 27.7 million metric tons in greenhouse gas reductions, or about 16 % of the 174 million metric ton CO_2-equivalent reductions needed to meet 1990 levels by 2020. They are the single largest emission reduction measure identified in the Scoping Plan adopted by the Board in December 2008 to chart ARB's course toward meeting AB 32, the Global Warming Solutions Act of 2006 (Stats. 2006, ch. 488).

Since Board approval in 2004, motor vehicle manufacturers and their trade associations have challenged the regulations in numerous federal and State court proceedings and have opposed California's request for an U.S. EPA waiver of preemption under the federal Clean Air Act to allow California to enforce its adopted standards. On May 19, 2009, challenging parties, individual automakers, California, and the federal government committed to a series of actions that would resolve these current and potential future disputes over the California standards through model year 2016. A summary of those actions is contained in a document published in the Federal Register at 74 Fed. Reg. 24007 (May 22, 2009) and in commitment letters by California and other parties that are available at www.epa.gov/otaq/climate/regulations.htm. On June 30, 2009, U.S. EPA granted California's waiver request for all model years 2009 through 2016. 74 Fed. Reg. 32744 (July 8, 2009).

For its part, California committed to: (1) revise its standards to allow manufacturers to demonstrate compliance with the fleet average greenhouse gas emission standard by "pooling" California and Section 177 State vehicle sales; (2) revise its standards for the 2012 through 2016 model year vehicles such that compliance with U.S. EPA-adopted greenhouse gas standards would serve as compliance with California's standards; and (3) revise its standards as necessary to allow manufacturers to use emission data from the federal Corporate Average Fuel Economy (CAFE) program to demonstrate compliance with the Pavley regulations. Regulatory changes that implement the first and third commitments made by California as part of our May 2009 commitment letter were approved by the Board at a public hearing on September 24, 2009. The current proposed amendments to California's passenger motor vehicle regulations implement our second commitment.

It is important to note that U.S. EPA has not yet issued a final rule for the 2012 through 2016 model year passenger vehicles. Consequently, these amendments are being proposed based on staff's understanding of the September 28, 2009, Notice of Proposed Rulemaking (NPRM) for a joint rulemaking by U.S. EPA and the federal Department of Transportation that proposes a coordinated federal greenhouse gas and fuel economy program for light-duty vehicles, referred to as the National Program. 74 Fed. Reg. 49454 (September 28, 2009). This national rule is expected to be finalized by the end of March 2010. The subject proposed amendments to California's regulations will be finalized by means of a 15-day notice once the national rule has been finalized.

California's commitment to accept compliance with U.S. EPA-adopted greenhouse gas standards as compliance with California's standards in the 2012 through 2016 model years has been and remains contingent on U.S. EPA adopting a final rule that preserves the benefits of the Pavley regulations. This will require that U.S. EPA adopt greenhouse gas standards that will achieve on average 250 grams/mile of CO_2 in model year 2016 across the light-duty fleet, as currently proposed in the NPRM. ARB believes that this fleet average would provide roughly equivalent greenhouse gas reductions in the 2016 model year from the California fleet currently subject to the AB 1493 (Pavley) regulations. Furthermore, while ARB understands the need for U.S. EPA to include compliance flexibilities in the final rule, it is important that such flexibilities do not significantly and demonstrably diminish the emission benefits of the National Program.

COMPARABLE FEDERAL REGULATIONS

There are currently no federal greenhouse gas emission standards for the subject new motor vehicles. However, as noted above, on September 28, 2009, an NPRM was issued by U.S. EPA and the federal Department of Transportation for a joint rulemaking that proposes a coordinated federal greenhouse gas emission reduction and fuel economy program for light-duty vehicles, beginning in the 2012 model year. This national rule is expected to be finalized by the end of March 2010.

AVAILABILITY OF DOCUMENTS AND AGENCY CONTACT PERSONS

ARB staff has prepared a Staff Report: Initial Statement of Reasons (ISOR) for the proposed regulatory action, which includes a summary of the economic and environmental impacts of the proposal. The report is entitled: "Notice of Public Hearing to Consider Proposed Amendments to New Passenger Motor Vehicle Greenhouse Gas Emission Standards for Model Years 2012-2016 to Permit Compliance Based on Federal Greenhouse Gas Emission Standards."

Copies of the ISOR and the full text of the proposed regulatory language, in underline and strikeout format to allow for comparison with the existing regulations, may be accessed on ARB's website listed below, or may be obtained from the Public Information Office, Air Resources Board, 1001 I Street, Visitors and Environmental Services Center, First Floor, Sacramento, California, 95814, (916) 322-2990, at least 45 days prior to the scheduled hearing on February 25, 2010.

Upon its completion, the Final Statement of Reasons (FSOR) will be available and copies may be requested from the agency contact persons in this notice, or may be accessed on ARB's website listed below.

Inquiries concerning the substance of the proposed regulation may be directed to the designated agency contact persons, Mr. Paul Hughes, Manager, Low-Emission Vehicle Implementation Section, at (626) 575-6977, or Ms. Sarah Carter, Staff Air Pollution Specialist, at (626) 575-6845.

Further, the agency representative and designated back-up contact persons, to whom nonsubstantive inquiries concerning the proposed administrative action may be directed, are Ms. Lori Andreoni, Manager, Board Administration and Regulatory Coordination Unit, (916) 322-4011, or Ms. Trini Balcazar, Regulations Coordinator, (916) 445-9564. The Board has compiled a record for this rulemaking action, which includes all the information upon which the proposal is based. This material is available for inspection upon request to the contact persons.

This notice, the ISOR and all subsequent regulatory documents, including the FSOR, when completed, are available on ARB's website for this rulemaking at http://www.arb.ca.gov/regact/2010/ghgpv10/ghgpv10.htm

COSTS TO PUBLIC AGENCIES AND TO BUSINESSES AND PERSONS AFFECTED

The determinations of the Board's Executive Officer concerning the costs or savings necessarily incurred by public agencies and private persons and businesses in reasonable compliance with the proposed regulations are presented below.

Pursuant to Government Code sections 11346.5(a)(5) and 11346.5(a)(6), the Executive Officer has determined that the proposed regulatory action would not create costs or savings to any State agency or in federal funding to the State, costs or mandate to any

local agency or school district, whether or not reimbursable by the State pursuant to Government Code, title 2, division 4, part 7 (commencing with section 17500), or other nondiscretionary cost or savings to State or local agencies.

In developing this regulatory proposal, ARB staff evaluated the potential economic impacts on representative private persons or businesses. The proposal is not expected to negatively affect the cost of compliance for vehicle manufacturers that are subject to the requirements of the Pavley regulations. The proposed amendments provide manufacturers with the option of demonstrating compliance with California's regulations by demonstrating compliance with the National Program in the 2012 through 2016 model years. According to previous manufacturer statements, providing this National Program compliance option would reduce manufacturers' overall compliance costs. Manufacturers retain the option to comply with the regulations as they are currently written (i.e., manufacturers may elect to comply with the Pavley regulations in the 2012 through 2016 model years), in which case these amendments would produce no economic impacts.

The Executive Officer has made an initial determination that the proposed regulatory action would not have a significant statewide adverse economic impact directly affecting businesses, including the ability of California businesses to compete with businesses in other states, or on representative private persons.

In accordance with Government Code section 11346.3, the Executive Officer has determined that the proposed regulatory action would not affect the creation or elimination of jobs within the State of California, the creation of new businesses or elimination of existing businesses within the State of California, or the expansion of businesses currently doing business within the State of California. A detailed assessment of the economic impacts of the proposed regulatory action can be found in the ISOR.

The Executive Officer has also determined, pursuant to California Code of Regulations, title 1, section 4, that the proposed regulatory action would not affect small businesses, because it does not apply to any businesses that fall under the definition of "small business."

In accordance with Government Code sections 11346.3(c) and 11346.5(a)(11), the Executive Officer has found that the reporting requirements of the regulation which apply to businesses are necessary for the health, safety, and welfare of the people of the State of California.

Before taking final action on the proposed regulatory action, the Board must determine that no reasonable alternative considered by the Board or that has otherwise been identified and brought to the attention of the Board, would be more effective in carrying out the purpose for which the action is proposed, or would be as effective and less burdensome to affected private persons than the proposed action.

SUBMITTAL OF COMMENTS

Interested members of the public may also present comments orally or in writing at the meeting, and may be submitted by postal mail or by electronic submittal before the meeting. The public comment period for this regulatory action will begin on January 11, 2010. To be considered by the Board, written comments, not physically submitted at the meeting, must be submitted on or after January 11, 2010 and received **no later than 12:00 noon, February 24, 2010**, and must be addressed to the following:

Postal mail: Clerk of the Board, Air Resources Board
1001 I Street, Sacramento, California 95814

Electronic submittal: http://www.arb.ca.gov/lispub/comm/bclist.php

Please note that under the California Public Records Act (Gov. Code, § 6250 et seq.), your written and oral comments, attachments, and associated contact information (e.g., your address, phone, email, etc.) become part of the public record and can be released to the public upon request. Additionally, this information may become available via Google, Yahoo, and other search engines.

The Board requests, but does not require, that 20 copies of any written statement be submitted and that all written statements be filed at least 10 days prior to the hearing so that ARB staff and Board Members have time to fully consider each comment. The Board encourages members of the public to bring to the attention of staff in advance of the hearing any suggestions for modification of the proposed regulatory action.

STATUTORY AUTHORITY AND REFERENCES

This regulatory action is proposed under that authority granted in sections 38510, 38560, 38562, 38563, 39500, 39600, 39601, 43013, 43018, 43018.5, 43101, 43104, and 43105, Health and Safety Code. This action is proposed to implement, interpret and make specific sections 38501, 38510, 38560, 38562, 38563, 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43018.5, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43204, 43205, and 43211, Health and Safety Code.

HEARING PROCEDURES

The public hearing will be conducted in accordance with the California Administrative Procedure Act, Government Code, title 2, division 3, part 1, chapter 3.5 (commencing with section 11340).

Following the public hearing, the Board may adopt the regulatory language as originally proposed, or with non substantial or grammatical modifications. The Board may also adopt the proposed regulatory language with other modifications if the text as modified is sufficiently related to the originally proposed text that the public was adequately placed on notice and that the regulatory language as modified could result from the proposed regulatory action; in such event, the full regulatory text, with the modifications clearly indicated, will be made available to the public, for written comment, at least 15-days before it is adopted.

The public may request a copy of the modified regulatory text from ARB's Public Information Office, Air Resources Board, 1001 I Street, Visitors and Environmental Services Center, First Floor, Sacramento, California, 95814, (916) 322-2990.

SPECIAL ACCOMMODATION REQUEST

To request a special accommodation or language needs for any of the following:

- An interpreter to be available at the hearing.
- Have documents available in an alternate format (i.e. Braille, large print) or another language.
- A disability-related reasonable accommodation.

Please contact the Clerk of the Board at (916) 322-5594 or by facsimile at (916) 322-3928 as soon as possible, but no later than 10 business days before the scheduled Board hearing. TTY/TDD/Speech to Speech users may dial 711 for the California Relay Service.

Para solicitar alguna comodidade especial o si por su idioma necesita cualquiera de los siguientes:

- Un intérprete que esté disponible en la audiencia.
- Documentos disponibles en un formato alternativo (es decir, sistema Braille, letra grande) u otro idioma.
- Una acomodación razonable relacionados con una incapacidad.

Porfavor llame a la officina del Consejo a (916) 322-5594 o envie un fax a (916) 322-3928 lo mas pronto possible, pero no menos de 10 dias de trabajo antes del el dia programado para la audencia del Consejo. TTY/TDD/ Personas que nesessitan este servicion pueden marcar el 711 para el Servicio de Retransmisión de Mensajes de California.

CALIFORNIA AIR RESOURCES BOARD

for James N. Goldstene
Executive Officer

Date: December 29, 2009

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 at www.arb.ca.gov.

State of California
AIR RESOURCES BOARD

STAFF REPORT: INITIAL STATEMENT OF REASONS FOR RULEMAKING

NOTICE OF PUBLIC HEARING TO CONSIDER PROPOSED AMENDMENTS TO NEW PASSENGER MOTOR VEHICLE GREENHOUSE GAS EMISSION STANDARDS FOR MODEL YEARS 2012-2016 TO PERMIT COMPLIANCE BASED ON FEDERAL GREENHOUSE GAS EMISSION STANDARDS

Date of Release: January 7, 2010
Scheduled for Consideration: February 25, 2010

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State of California
AIR RESOURCES BOARD

Staff Report: Initial Statement of Reasons for Proposed Rulemaking

PUBLIC HEARING TO CONSIDER PROPOSED AMENDMENTS TO NEW PASSENGER MOTOR VEHICLE GREENHOUSE GAS EMISSION STANDARDS FOR MODEL YEARS 2012-2016 TO PERMIT COMPLIANCE BASED ON FEDERAL GREENHOUSE GAS EMISSION STANDARDS

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I. INTRODUCTION AND BACKGROUND

Climate change is critically important to California. If left unchecked, its far-reaching consequences will dramatically affect many aspects of our lives including public health, the economy, and the environment. In 2002, in response to the threat of global warming, California adopted AB 1493 (Pavley (Chap. 200, Stats.2002)), which directed the Air Resources Board (ARB) to develop regulations to reduce greenhouse gas emissions from the new passenger vehicle fleet (passenger vehicles are responsible for approximately 30 percent of the total greenhouse gas emissions in California).

In September 2004, the ARB adopted regulations (known as the "Pavley regulations") requiring significant reductions in greenhouse gas emissions from passenger cars and light-duty trucks (i.e., vehicles less than 8,500 lbs. gross vehicle weight) and sport utility vehicles (i.e., medium-duty passenger vehicles). These requirements went into effect with the 2009 model year, and become increasingly stringent through 2016, at which time emissions from the new vehicle fleet will be reduced by 30 percent..

The Pavley regulations reduce greenhouse gas emissions from new passenger vehicles by requiring that each year between 2009 and 2016, manufacturers meet separate, increasingly stringent fleet average greenhouse gas levels based on the size of the vehicles – a numerically lower level for passenger cars and the smallest of the light-duty trucks (PC + LDT1), and a higher level for larger light-duty trucks and medium-duty passenger vehicles (LDT2 + MDPV). The greenhouse gas emissions included within the scope of the Pavley regulations include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). In addition, a manufacturer may earn credits toward complying with the requirements by equipping vehicles with an advanced "low-leak" air conditioning system or one that uses a refrigerant with a lower global-warming potential than HFC-134a, which is used today.

To demonstrate compliance with the fleet average greenhouse gas requirements, a manufacturer must first group the vehicles in its fleet based on similarities, such as engine, transmission type, or weight, that impact greenhouse gas emissions. A manufacturer must then conduct testing to determine the greenhouse gas emissions from each group of vehicles. Using these data, and applying any emission credits that may be earned for vehicles equipped with advanced air conditioning systems, the average grams per mile of "CO_2–equivalent" emissions is calculated for each vehicle group. A manufacturer must then calculate its overall fleet average greenhouse gas level by calculating the sales–weighted average CO_2–equivalent emissions from its PC + LDT1 fleet and from its LDT2 + MDPV fleet. Manufacturers are required to submit emission testing data and sales data in sufficient detail to allow staff to verify a manufacturer's fleet average greenhouse gas levels for each model year.

II. DESCRIPTION OF PUBLIC PROBLEM, ADMINISTRATIVE CIRCUMSTANCE PROPOSAL IS INTENDED TO ADDRESS; PROPOSED SOLUTIONS AND RATIONALE FOR EACH REGULATORY PROVISION

Since Board approval in 2004, motor vehicle manufacturers and their trade associations have challenged the Pavley regulations in numerous federal and state court proceedings and have opposed California's request to U.S. EPA (or EPA) for a required waiver of preemption under the federal Clean Air Act to allow California to enforce its adopted standards.

On May 19, 2009, challenging parties, automakers, California, and the federal government committed to a series of actions that would resolve these current and potential future disputes over the standards through model year 2016. In summary, the U. S. Environmental Protection Agency and the U. S. Department of

Transportation committed to adopt a federal program to reduce greenhouse gases and improve fuel economy, respectively, from passenger vehicles, to achieve equivalent or greater greenhouse gas benefits as the Pavley regulations for the 2012–2016 model years. (The Notice of Proposed Rulemaking (NPRM) on the national program was issued on September 28, 2009. 74 Fed.Reg. 49454 (September 28, 2009).) Manufacturers committed to ultimately drop current, and forego similar future legal challenges for the 2009 through 2016 model years, including challenging a waiver subsequently granted by EPA on June 30, 2009. 74 Fed.Reg. 32744 (July 8, 2009). For its part, California committed to: (1) revise its standards to allow manufacturers to demonstrate compliance with the fleet average greenhouse gas emission standard by "pooling" California and Section 177 State vehicle sales; (2) revise its regulations for 2012 through 2016 model year vehicles such that compliance with equivalent EPA-adopted greenhouse gas standards would serve as compliance with California's standards; and (3) revise its standards as necessary to allow manufacturers to use emission data from the federal Corporate Average Fuel Economy (CAFE) program to demonstrate compliance with the Pavley regulations. Regulatory changes that implement the first and third commitments made by California were approved by the Board at a public hearing on September 24, 2009. The current proposed amendments to California's passenger motor vehicle regulations, which are discussed in greater detail below, address the second commitment made by California.

III. SUMMARY OF RECOMMENDED ACTION

California committed to accept national program compliance for model years 2012 through 2016 with the understanding that it would provide equivalent or better overall greenhouse gas reductions nationwide than California's program (which has been adopted by 13 other states and the District of Columbia) standing alone. Consistent with this understanding, ARB submitted comments to EPA on the NPRM that express concerns that the proposed National Program might not meet these expectations. Specifically, two issues need to be addressed by U.S. EPA in the Final Rule to ensure California's continued support for the National Program. These concerns are discussed in greater detail below. It should also be noted that adoption of this proposal does not eliminate the reporting requirements for California that have already been adopted by the Board prior to this hearing. Specifically, a manufacturer will still be required to submit emission testing data and sales data for California each of the Section 177 states in sufficient detail to allow staff to verify the manufacturer's average greenhouse gas levels for each model year.

In this rulemaking, staff is proposing adoption of the proposed national passenger motor vehicle greenhouse gas regulations for the 2012 through 2016 model years, as an alternative compliance option to the Pavley regulations, on the assumption that U.S. EPA will address ARB's concerns in the Final Rule for the National Program, due to be released in March, 2010. Upon release of the Final Rule, Board staff will issue 15-day changes, which will finalize California's adoption of this rule. If U.S. EPA does not address ARB's concerns in their Final Rule, staff will return to the Board to ask direction as to how to proceed.

Issues of Concern with the Proposed National Greenhouse Gas Program

U.S. EPA Must Maintain the Stringency of the Greenhouse Gas Standards Proposed in the NPRM in the Final Rule

As previously mentioned, back in May, when California made a commitment to allow manufacturers to demonstrate compliance with the Pavley regulations for the 2012 through 2016 model years by demonstrating compliance with a national greenhouse gas program, it was with the full expectation that the emission benefits of our program would be maintained. This was part of the commitment made by EPA to California, otherwise, we would not have agreed to accept the National Program. The greenhouse gas emission standards currently contained in the NPRM are consistent with our understanding. Thus it is critical to the agreement that EPA upholds its commitment to California and does not weaken the proposed standards and the program's reduction in GHG emissions in the Final Rule.

National Advanced Technology Vehicle Credit Provisions for Electric Vehicles, Plug-in Hybrid Electric Vehicles, and Fuel Cell Vehicles

EPA believes that electric vehicles (EVs), plug-in hybrid electric vehicles (PHEVs), and fuel cell vehicles (FCVs) have the potential to reduce greenhouse gases more significantly than any commercially-available technologies, and ARB fully agrees with this. EPA is, therefore, proposing that additional credits be given to these advanced technologies in the 2012 through 2016 model years, in order to encourage their development.

These advanced technology credits would take the form of multipliers in the range of 1.2 to 2.0, allowing an EV, PHEV, or FCV to count as more than one vehicle during the calculation of a manufacturer's fleet average CO_2 level to determine compliance with the applicable footprint-based standard. These multipliers would not be applied when calculating the actual footprint-based CO_2 standard to which a manufacturer must comply. (Footprint is determined by multiplying the vehicle's wheelbase by the vehicle's average track width. The greenhouse gas standards being proposed by EPA are expressed as mathematical functions that depend on vehicle footprint.)

In addition, EPA is proposing to assign a value of zero grams per mile of CO_2 for EVs and for the electric portion of PHEV operation, when including these vehicles in a manufacturer's average. EPA acknowledges that there are upstream CO_2 emissions from electricity generation, which are produced during EV and PHEV charging. Similarly there are upstream emissions from hydrogen production for FCVs. However, EPA feels that the significant greenhouse gas emission reductions that may be achieved from this technology outweighs the dis-benefits of ignoring these emissions within this timeframe.

Staff agrees with EPA's goal of encouraging the early development and production of advanced technology vehicles. However, staff believes that the

approach proposed by EPA could allow manufacturers to earn unreasonably high numbers of credits, thereby potentially reducing the overall GHG reductions achieved by the national program and delaying the implementation of improved greenhouse gas technologies on conventional vehicles.

Consequently, staff believes that EPA's Final Rule must strike a better balance between advanced vehicle development and protecting greenhouse gas reductions by assigning average lifecycle emissions to these vehicles, and restricting credits to EVs and FCVs only.

Other Issues

Other issues of concern to ARB include our belief that it is important that EPA's Final Rule include a backstop measure to guarantee that emission reductions are achieved, regardless of any unforeseen changes in the fleet mix. Also, ARB does not support the provisions for allowing manufacturers to earn early credits prior to implementation of the National Program that are currently proposed in the NPRM unless such credits are accrued by exceeding California's requirements in California and the Section 177 states. Restricting a manufacturer's ability to earn early credits in this way will assure that credits earned in the early years do not provide a windfall for vehicle manufacturers and that the emission reductions envisioned for the National Program are realized. We expect that EPA will carefully consider California's concerns when they finalize their greenhouse gas rulemaking.

Offsetting Greenhouse Gas Debits from the California Program

Staff does not anticipate that any manufacturer will accumulate compliance debits from California's greenhouse gas regulations in the 2009 and 2010 model years, and for most manufacturers, none will be incurred in the 2011 model year either. However, in the unlikely event that debits are incurred they must be equalized within the five model years provided in the regulation, at which time we expect all or most manufacturers to participating in the federal program with its own scheme for the generation of credits and debits. In order to ensure that debits incurred in the 2009 through 2011 model years are equalized, staff is proposing that a manufacturer be required to either carry a zero greenhouse gas debit balance at the end of the 2011 model year or submit a plan for offsetting any greenhouse debits incurred in California, the Section 177 states, and the District of Columbia using credits earned under the National greenhouse gas program before it may opt into the federal program. Upon approval of the plan by the Executive Officer, the manufacturer will be allowed to opt into the National greenhouse gas program.

IV. AIR QUALITY, ENVIRONMENTAL, AND ECONOMIC IMPACTS

A. Air Quality

While the proposed national passenger motor vehicle greenhouse gas standards are of equal stringency to the Pavley regulations in the 2016 model year, they are less stringent than the Pavley standards in the 2011 through 2015 model years. Consequently, allowing manufacturers to comply with the Pavley regulations in the 2012 through 2015 model years by demonstrating compliance with the national regulations in these model years will result in slightly less reduction in greenhouse gas reductions within California and the individual states that have adopted California's program. However, staff believes that nationwide, greenhouse gas emission reductions from the proposed national GHG program – assuming California's comments on the proposed rulemaking are affirmatively addressed – will be greater than if the Pavley program were implemented without the national GHG program. This occurs because although the proposed national standards are less stringent than California's in model years 2012 through 2015, the national standards apply to more than twice as many vehicles than are subject to the Pavley regulations.

Staff calculated the comparative GHG benefits of the Pavley rules and the federal program in calendar years 2016 and 2020 relative to a baseline year of 2002. ARB's approach was to employ GHG emissions rates that are the basis of California's Pavley regulation and the proposed federal program. For the federal program, staff used the values from table 1.D.2-5, "Projected Fleet-wide Emission Levels Under the Proposed Footprint-Based Standards (g/mi)," in the NPRM. 74 FR at 49470 (September 28, 2009). This table lists the projected national fleet emission levels taking into account the impact of credits available under the national program for flex-fuel vehicles and the temporary lead time allowance standards. The estimated federal GHG emission rates could then be compared to those established by California's Pavley rules for new vehicles sold between 2012 and 2016. The effectiveness of the Pavley and the federal program was determined by calculating the percent reduction in GHGs achieved for each new model year relative to the 2002 baseline.

ARB staff then calculated the tons of greenhouse gases reduced in California under the proposed federal program compared to those that occur under the Pavley rules by applying the new vehicle model year-specific GHG reductions to CO_2 tons per day emission estimates output from the EMFAC on-road emissions inventory model. The EMFAC model reflects the current and projected vehicle fleet in California, based on data from the Department of Motor Vehicles, the Smog Check inspection and maintenance program, and local and regional transportation planning agencies. The emission rates in the EMFAC model are derived from testing of in-use vehicles. Documentation and downloadable copies of the EMFAC model are available at http://www.arb.ca.gov/msei/onroad/latest_version.htm.

To develop estimates of GHG reductions for the other 49 states, staff scaled California ton reductions from EMFAC using state-specific motor vehicle gasoline consumption data as a surrogate. For the federal fleet mix, staff used the fleet mix

shown for model years 2012-2016 in the spreadsheet EPA-HQ-OAR-2009-0472-0085 from the Public Docket for the national program. Table 1 compares the annual benefits of the Pavley program in California and California and the 177 states with the proposed national GHG program in these states for model years 2016 and 2020.

Table 2 compares the annual benefits of the Pavley program in California, California and the 177 states, and national fuel economy requirements for 2012 through 2016 in the rest of the states with the proposed national GHG program applied nationwide for model years 2016 and 2020. The national fuel economy requirements were derived from projecting a linear increase in fuel economy from 2011 to 2020 in order to meet the 35 miles per gallon requirement of H.R. 6, the Energy Independence and Security Act of 2007.

Table 3 compares the cumulative benefits of the Pavley program in California and California and the 177 states with the proposed national GHG program in these states for model years 2016 and 2020.

Table 4 compares the cumulative benefits of the Pavley program in California, California and the 177 states, and national fuel economy requirements for 2012 through 2016 in the rest of the states with the proposed national GHG program applied nationwide for model years 2016 and 2020. The national fuel economy requirements were derived from projecting a linear increase in fuel economy from 2011 to 2020 in order to meet the 35 miles per gallon requirement of H.R. 6, the Energy Independence and Security Act of 2007.

As expected, due to the slightly relaxed federal standards for model years 2012-2015, the benefits of the proposed national program are slightly lower in California and the other states that have adopted the Pavley program. However, as shown in Tables 2 and 4, when the proposed national GHG standards are applied nationwide, greater reductions are achieved.

Table 1 – Annual Greenhouse Gases Reduced (MMT[a])
California and 177 States

Region	Year	***Scenario 1*** CA + 13 177 States Pavley Standard	***Scenario 2*** Proposed National GHG Standard
California	2016	15	12
	2020	26	23
California and 13 177 States[b]	2016	45	36
	2020	79	68

[a] Million Metric Tons
[b] Includes states that have adopted California's standards (Arizona, Connecticut, Maine, Maryland, Massachusetts, New Jersey, New Mexico, New York, Oregon, Pennsylvania, Rhode Island, Vermont, Washington, and the District of Columbia).

Table 2 – Annual Greenhouse Gases Reduced (MMT[a])
Nationwide

Region	Year	***Scenario 1*** CA + 13 177 States:Pavley Standard Other States: National Fuel Economy Program	***Scenario 2*** Proposed National GHG Standard
Nationwide	2016	81	103
	2020	155	197

[a] Million Metric Tons

Table 3 – Cumulative Greenhouse Gases Reduced (MMT[a])
California and 177 States

Region	Year	***Scenario 1*** CA + 13 177 States: Pavley Standard	***Scenario 2*** Proposed National GHG Standard
California	2016	44	33
	2020	132	109
California and 13 177 States[b]	2016	133	99
	2020	401	325

[a] Million Metric Tons
[b] Includes states that have adopted California's standards (Arizona, Connecticut, Maine, Maryland, Massachusetts, New Jersey, New Mexico, New York, Oregon, Pennsylvania, Rhode Island, Vermont, Washington, and the District of Columbia).

Table 4 – Cumulative Greenhouse Gases Reduced (MMT[a])
Nationwide

Region	Year	***Scenario 1*** CA + 13 177 States:Pavley Standard Other States: National Fuel Economy Program	***Scenario 2*** Proposed National GHG Standard
Nationwide	2016	241	286
	2020	793	941

[a] Million Metric Tons

B. Economic Impact

There are no additional costs due to this amendment. The proposed amendments will provide the approximately thirty vehicle manufacturers subject to the Pavley regulations with an optional method for complying with them. Staff expects that the proposed amendments could reduce the cost of compliance for vehicle manufacturers that choose to meet the alternative requirements. A manufacturer may also choose to comply with the regulations as they currently are written, in which case there would still be no economic impact from these amendments on that manufacturer.

There will be no fiscal impacts to the State from the proposed amendments, either in terms of tax revenue or personnel requirements. These amendments are not expected to change vehicle prices in a way that would alter vehicle purchase decisions. The inclusion of alternative compliance options does not substantially increase the volume of data to review or the enforcement burden to the ARB that would justify hiring additional staff.

C. Alternatives

1. Evaluation of alternatives considered and reasons for rejecting them

Staff considered the following regulatory alternative to the proposed amendments.

Do not amend current Pavley regulations. This alternative would require vehicle manufacturers to produce lower emitting vehicles for California and its partner states, and could result in different, higher emitting vehicles being sold in the remaining states, depending on if or how the final EPA standards are adopted.

This alternative was rejected because California committed to making the proposed amendments as part of the commitments made by California, the federal government, and other parties on May 19, 2009, as discussed in Section II. These commitments were based on the belief that the national program would result in greater nationwide GHG emission reductions, and possibly lower compliance costs to vehicle manufacturers due to a single nationwide regulation.

2. Description of reasonable alternatives considered that would lessen impact on small business

No alternatives were considered to lessen the impact on small business, because small businesses will not be impacted by these proposed amendments.

3. Evidence relied upon to support initial determination in the notice that the regulation will not have a significant adverse economic impact on business

The proposed amendments will not significantly affect businesses, since vehicle purchase price and model availability will not be adversely impacted. Vehicle manufacturers will not be required to expend any money to comply with the new requirements. Rather, this proposal could save them money.

4. Justification for adoption of regulations different from federal regulations contained in the Code of Federal Regulations

The proposed amendments do not adopt regulations that are substantively different than federal regulations. Climate change threatens California's public health, water resources, agricultural industry, ecology, and economy. Due to these and other threats, AB 1493 (Chapter 200, Statutes of 2002 (Pavley)) specifically directed the Air Resources Board to adopt regulations to control greenhouse gas emissions from

motor vehicles. At that time, there were no federal regulations to reduce greenhouse gas emissions from passenger vehicles. In September, 2004, the ARB approved the nation's first passenger vehicle greenhouse gas regulations (Pavley regulations). While as discussed above EPA has proposed a National greenhouse gas program there currently is no federal GHG emission standard for motor vehicles.

These proposed amendments do not replace California's own passenger motor vehicle greenhouse gas regulations. (Historically, California has maintained a separate and distinct program for controlling emissions from motor vehicles, which is consistent with the intent of Congress in their adoption of the Clean Air Act.) Rather, these proposed amendments will allow a manufacturer to demonstrate compliance with our greenhouse gas regulations in the 2012 through 2016 model years by demonstrating compliance with the national passenger motor vehicle greenhouse gas regulations. (The final rule for the national program is expected to be released in March, 2010.) For any manufacturer that elects to comply with the national program within this timeframe, there are no substantive differences between the California requirements and the National Program. For any manufacturer that elects to comply with the original Pavley regulations within this timeframe, the proposed amendments will have no effect.

V. ENVIRONMENTAL JUSTICE

"Environmental Justice" is defined 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 (Government Code §65040.12(c).

Staff does not believe that this proposal will have any adverse environmental justice impacts because the stringency of California's passenger vehicle greenhouse gas requirements is not affected by the proposed changes to the regulations. Furthermore, since the criteria pollutant regulations must still be met on an individual state-by-state basis, there will be no increase in criteria pollutants in California due to mix shifting of vehicles between California and other states.

VI. LIST OF APPENDICES

Appendix A: Proposed Regulation Order

Appendix B: Proposed Amendments to the California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles

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13. General Motors Corporation, Letter from Frederick A. Henderson, Chief Executive Officer, General Motors Corporation, to The Honorable Lisa P. Jackson, Administrator, United States Environmental Protection Agency and The Honorable Ray LaHood, Secretary, United States Department of Transportation, May 17, 2009

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15. State of California, Air Resources Board, "Initial Statement of Reasons for proposed Rulemaking, Public Hearing to Consider Adoption of Regulations to Control Greenhouse Gas Emissions Form Motor Vehicles," August 6, 2004

16. State of California, Air Resources Board, spreadsheet "California_Benefits_SC1.xls"

17. State of California, Air Resources Board, spreadsheet "California_Benefits_SC2.xls"

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Appendix A

PROPOSED REGULATION ORDER

Set forth below are the proposed amendments to title 13 of the California Code of Regulations. Amendments proposed and subject to comment in this rulemaking are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions. Because there are three other pending ARB rulemakings that also amend the incorporated test procedures, the amendments proposed herein identify these other pending amendments as follows: 1)amendments to these regulations that were adopted by ARB on December 2, 2009 as part of the "Rulemaking to Consider Plug-In Hybrid Electric Vehicle Test Procedure Amendments and Aftermarket Parts Certification Requirements Adoption", which have not yet been approved by the Office of Administrative Law, are indicated in SMALL CAPITAL DOTTED UNDERLINE to indicate additions and ~~SMALL CAPITAL DOUBLE STRIKEOUT~~ to indicate deletions. That rulemaking was sent to California's Office of Administrative Law (OAL) for approval on December 3, 2009. OAL has until January 15, 2010 to make a determination; 2) amendments to these regulations that were approved by the Board in September 2009 as part of the "Rulemaking to Consider Proposed Amendments to New Passenger Motor Vehicle Greenhouse Gas Emission Standards" are shown in *italics with bold underline, but not bold text* to indicate additions and ~~*italics double strikeout*~~ to indicate deletions; and 3) those approved by the Board in November 2009 as part of the "Rulemaking to Consider the Repeal of the 2007 Amendments to California's Emission Warranty Information Reporting (EWIR) and Recall Regulations and Emission Test Procedures and Readopt the Prior EWIR Regulations and Emission Test Procedures" are shown in ***italics with dashed underline and bold text*** to indicate additions and ~~***bold italics double strikeout***~~ to indicate deletions.

Subsections for which no changes are proposed in this rulemaking are indicated with [No change] or "* * * *".

Amend the following Sections of Title 13, California Code of Regulations, to read:

§ 1961. Exhaust Emission Standards and Test Procedures - 2004 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.

Introduction. [No change.]

Sections (a) through (c). [No change.]

(d) *Test Procedures.* The certification requirements and test procedures for determining compliance with the emission standards in this section are set forth in the "California Exhaust Emission Standards and Test Procedures for 2001 and

Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as amended ~~MAY 2, 2008~~ ~~DECEMBER 2, 2009~~ ~~[insert date of the September 2009 greenhouse gas amendment for this rulemaking]~~ ~~[insert date of the November 2009 EWIR amendment for this rulemaking]~~ [insert date of this rulemaking], and the "California Non-Methane Organic Gas Test Procedures," as amended July 30, 2002, which are incorporated herein by reference. In the case of hybrid electric vehicles and on-board fuel-fired heaters, the certification requirements and test procedures for determining compliance with the emission standards in this section are set forth in the "California Exhaust Emission Standards and Test Procedures for 2005 ~~AND SUBSEQUENT~~ THROUGH 2008 Model Zero-Emission Vehicles, and 2001 ~~AND SUBSEQUENT~~ THROUGH 2008 Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," incorporated by reference in section 1962 AND THE "CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 2009 AND SUBSEQUENT MODEL ZERO-EMISSION VEHICLES AND HYBRID ELECTRIC VEHICLES, IN THE PASSENGER CAR, LIGHT-DUTY TRUCK AND MEDIUM-DUTY VEHICLE CLASSES," INCORPORATED BY REFERENCE IN SECTION 1962.1.

(e) *Abbreviations.* [No change.]

Note: Authority cited: Sections 39500, 39600, 39601, 43013, 43018, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43204, and 43205, Health and Safety Code.

§ 1961.1. Greenhouse Gas Exhaust Emission Standards and Test Procedures - 2009 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.

(a) *Greenhouse Gas Emission Requirements.* The greenhouse gas emission levels from new 2009 and subsequent model year passenger cars, light-duty trucks, and medium-duty passenger vehicles shall not exceed the following requirements. Light-duty trucks from 3751 lbs. LVW – 8500 lbs. GVW that are certified to the Option 1 LEV II NOx Standard in section 1961(a)(1) are exempt from these greenhouse gas emission requirements, however, passenger cars, light-duty trucks 0-3750 lbs. LVW, and medium-duty passenger vehicles are not eligible for this exemption.

(1) *Fleet Average Greenhouse Gas Requirements for Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles.*

(A)(i) The fleet average greenhouse gas exhaust mass emission values from passenger cars, light-duty trucks, and medium-duty passenger vehicles that are produced and delivered for sale in California each model year by a large volume manufacturer shall not exceed:

FLEET AVERAGE GREENHOUSE GAS EXHAUST MASS EMISSION REQUIREMENTS FOR PASSENGER CAR, LIGHT-DUTY TRUCK, AND MEDIUM-DUTY PASSENGER VEHICLE WEIGHT CLASSES[1] (4,000 mile Durability Vehicle Basis)		
Model Year	*Fleet Average Greenhouse Gas Emissions (grams per mile CO_2-equivalent)*	
	All PCs; LDTs 0-3750 lbs. LVW	*LDTs 3751 lbs. LVW - 8500 lbs. GVW; MDPVs*
2009	323	439
2010	301	420
2011	267	390
2012	233	361
2013	227	355
2014	222	350
2015	213	341
2016+	205	332

[1] Each manufacturer shall demonstrate compliance with these values in accordance with section 1961.1(a)(1)(B).

1. For each model year, a manufacturer must demonstrate compliance with the fleet average requirements in this section 1961.1(a)(1)(A) based on one of two options applicable throughout the model year, either:

Option 1: the total number of passenger cars, light-duty trucks, and medium-duty passenger vehicles that are certified to the California exhaust emission standards in this section 1961.1, and are produced and delivered for sale in California; or

Option 2: the total number of passenger cars, light-duty trucks, and medium-duty passenger vehicles that are certified to the California exhaust emission standards in this section 1961.1, and are produced and delivered for sale in California, the District of Columbia, and all states that have adopted California's greenhouse gas emission standards for that model year pursuant to Section 177 of the federal Clean Air Act (42 U.S.C. § 7507).

a. For the 2009 and 2010 model years, a manufacturer that selects compliance Option 2 must notify the Executive Officer of that selection, in writing, within 30 days of the effective date of the amendments to this section (a)(1)(A)1 or must comply with Option 1.

b. For the 2011 and later model years, a manufacturer that selects compliance Option 2 must notify the Executive Officer of that selection, in writing, prior to the start of the applicable model year or must comply with Option 1.

c. When a manufacturer is demonstrating compliance using Option 2 for a given model year, the term "in California" as used in subsections 1961.1(a)(1)(B)3. and 1961.1(b) means California, the District of Columbia, and all states that have adopted California's greenhouse gas emission standards for that model year pursuant to Section 177 of the federal Clean Air Act (42 U.S.C. § 7507).

d. A manufacturer that selects compliance Option 2 must provide to the Executive Officer separate values for the number of vehicles produced and delivered for sale in the District of Columbia and for each individual state within the average.

(A)(ii) For the 2012 through 2016 model years, a manufacturer may elect to demonstrate compliance with this section 1961.1 by demonstrating compliance with the National greenhouse gas program as follows:

a. A manufacturer that selects compliance with this option 1961.1(a)(1)(A)(ii) must notify the Executive Officer of that selection, in writing, prior to the start of the applicable model year or must comply with 1961.1(a)(1)(A)(i).

b. The manufacturer must submit to ARB a copy of the official report that it submitted to EPA as required under 40 CFR §86-1865-12 for demonstrating compliance with the National greenhouse gas program and the official EPA determination of compliance. These must be submitted no later than May 1 of the calendar year following the close of the model year, for each model year that a manufacturer selects compliance with this option 1961.1(a)(1)(A)(ii). and

c. If a manufacturer has outstanding greenhouse gas debits at the end of the 2011 model year, as calculated in accordance with 1961.1(b), the manufacturer must submit to the Executive Officer a plan for offsetting all outstanding greenhouse gas debits by using greenhouse gas credits earned under the National greenhouse gas program. Upon approval by the Executive Officer, the manufacturer may demonstrate compliance with this section 1961.1 by demonstrating compliance with the National greenhouse gas program.

Sections (a)(1)(B) through (d). [No change.]

(e) *Definitions Specific to this Section.* The following definitions apply to this section 1961.1:

(1) "A/C Direct Emissions" means any refrigerant released from a motor vehicle's air conditioning system.

(2) "A/C Indirect Emissions" means any increase in motor vehicle exhaust CO_2 emissions that can be attributed to the operation of the air conditioning system.

(3) "GHG Vehicle Test Group" means vehicles that have an identical test group, vehicle make and model, transmission class and driveline, aspiration method (e.g., naturally aspirated, turbocharged), camshaft configuration, valvetrain configuration, and inertia weight class.

(4) "Greenhouse Gas" means the following gases: carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons.

(5) "Grid-Connected Hybrid Electric Vehicle" means a hybrid electric vehicle that has the capacity for the battery to be recharged from an off-board source of electricity and has some all-electric range.

(6)"GWP" means the 100-year global warming potential specified in IPCC (Intergovernmental Panel on Climate Change) 2000: Emissions Scenarios. N. Nakicenovic et. al. editors, Special Report of Working Group III of the IPCC, Cambridge University Press, Cambridge UK, ISBN 0-521-80493-0.

(7) "National greenhouse gas program" means the national program that applies to new 2012 through 2016 model year passenger cars, light-duty trucks, and medium-duty passenger vehicles as promulgated by the U.S. Environmental Protection Agency on March XX, 2010 [Insert Reference in Federal Register for Final GHG Rule], as incorporated in and amended by the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles."

(8~~7~~) "Normal Operation" of an air conditioning system means typical everyday use of the A/C system to cool a vehicle. "Normal Operation" does not include car accidents, dismantling of an air conditioning system, or any other non-typical events.

(9~~8~~) "Optional GHG Test Vehicle Configuration" means any GHG vehicle configuration that is selected for testing by the manufacturer as allowed by section G.2.3 of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," other than the worst-case configuration.

(10~~9~~) "Renewable Energy Resource" means a facility that meets all of the criteria set forth in Public Resources Code section 25741(a), except that the facility is not required to be located in California or near the border of California.

(11~~0~~) "Variable Displacement Compressor" means a compressor in which the mass flow rate of refrigerant is adjusted independently of compressor speed by the control system in response to cooling load demand.

(12~~1~~) "Variable Speed Compressor" means a compressor in which the mass flow rate of refrigerant can be adjusted by control of the compressor input shaft speed, independent of vehicle engine speed. For example, a variable speed compressor can have electric drive, hydraulic drive, or mechanical drive through a variable speed transmission.

(13~~2~~) "Worst-Case" means the vehicle configuration within each test group that is expected to have the highest CO_2-equivalent value, as calculated in section 1961.1(a)(1)(B)1.

Sections (f) and (g). [No change.]

Note: Authority cited: Sections 39500, 39600, 39601, 43013, 43018, 43018.5, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43018.5, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43204, 43205, and 43211, Health and Safety Code.

Appendix B

California Environmental Protection Agency
AIR RESOURCES BOARD

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 2001 AND SUBSEQUENT MODEL PASSENGER CARS, LIGHT-DUTY TRUCKS, AND MEDIUM-DUTY VEHICLES

Adopted:	August 5, 1999
Amended:	December 27, 2000
Amended:	July 30, 2002
Amended:	September 5, 2003 (corrected February 20, 2004)
Amended:	May 28, 2004
Amended:	August 4, 2005
Amended:	June 22, 2006
Amended:	October 17, 2007
Amended:	May 2, 2008
AMENDED:	DECEMBER 2, 2009
Amended:	*[Insert Date of Sept 2009 GHG Amendments]*
Amended:	***[Insert Date of Nov 2009 Warranty Amendments]***
Amended:	[Insert Date of Feb 2010 GHG Amendments]

Note: The proposed amendments to this document are shown in single underline to indicate additions and ~~strikeout~~ to indicate deletions compared to the test procedures as last amended May 2, 2008. Because there are three other pending ARB rulemakings that also amend the incorporated test procedures, the amendments proposed herein identify these other pending amendments as follows: 1)amendments to these regulations that were adopted by ARB on December 2, 2009 as part of the "Rulemaking to Consider Plug-In Hybrid Electric Vehicle Test Procedure Amendments and Aftermarket Parts Certification Requirements Adoption", which have not yet been approved by the Office of Administrative Law, are indicated in SMALL CAPITAL DOTTED UNDERLINE to indicate additions and ~~SMALL CAPITAL DOUBLE STRIKEOUT~~ to indicate deletions. That rulemaking was sent to California's Office of Administrative Law (OAL) for approval on December 3, 2009. OAL has until January 15, 2010 to make a determination; 2) amendments to these regulations that were approved by the Board in September 2009 as part of the "Rulemaking to Consider Proposed Amendments to New Passenger Motor Vehicle

Date of Release: January 7, 2010; 45-Day Notice version
Hearing Date: February 25-26, 2010

Greenhouse Gas Emission Standards" are shown in *italics with bold underline, but not bold text* to indicate additions and ~~*italics double strikeout*~~ to indicate deletions; and 3) those approved by the Board in November 2009 as part of the "Rulemaking to Consider the Repeal of the 2007 Amendments to California's Emission Warranty Information Reporting (EWIR) and Recall Regulations and Emission Test Procedures and Readopt the Prior EWIR Regulations and Emission Test Procedures" are shown in ***italics with dashed underline and bold text*** to indicate additions and ~~***bold italics double strikeout***~~ to indicate deletions. Section numbering changes from these three other rulemakings are not indicated in this document. [n/a] indicated provisions of the proposed federal rule (74 Fed.Reg. 49454 (September 28, 2009)) that do not apply in California and are not proposed for incorporation. [No change] indicates proposed federal provisions that are also proposed for incorporation herein without change. Existing intervening text that is not amended in this rulemaking is indicated by "* * * *".

Amend "CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 2001 AND SUBSEQUENT MODEL PASSENGER CARS, LIGHT-DUTY TRUCKS AND MEDIUM-DUTY VEHICLES, " as incorporated by reference in Title 13, California Code of Regulations, Section 1961(d) to read:

* * * *

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 2001 AND SUBSEQUENT MODEL PASSENGER CARS, LIGHT-DUTY TRUCKS AND MEDIUM-DUTY VEHICLES

The provisions of Subparts B, C, and S, Part 86, Title 40, Code of Federal Regulations, as adopted or amended on May 4, 1999 or as last amended on such other date set forth next to the 40 CFR Part 86 section title listed below, and to the extent they pertain to exhaust emission standards and test procedures, are hereby adopted as the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," with the following exceptions and additions.

PART I: GENERAL PROVISIONS FOR CERTIFICATION AND IN-USE VERIFICATION OF EMISSIONS

A. General Applicability

1. §86.1801 Applicability.

* * * *

1.2 §86.1801-12. [Insert Federal Register for the National Greenhouse Gas Final Rule]. Amend as follows:

1.2.1 Amend subparagraph (a) as follows: Except as otherwise indicated, the provisions of this subpart apply to new passenger cars, light-duty trucks, and medium-duty vehicles, including multi-fueled, alternative fueled, hybrid electric, plug-in hybrid electric, and electric vehicles. In cases where a provision applies only to a certain vehicle group based on its model year, vehicle class, motor fuel, engine type, or other distinguishing characteristics, the limited applicability is cited in the appropriate section of this subpart.

1.2.2 Subparagraph (b) *Aftermarket conversions.* [n/a]

1.2.3 Amend subparagraph (c) *Optional Applicability* as follows:

(a) Amend subparagraph (c)(1) as follows: A manufacturer must certify any heavy-duty complete Otto-cycle vehicle of 14,000 pounds Gross Vehicle Weight Rating (GVWR) or less in accordance with the medium-duty chassis-standards of Section E.1 of these test procedures. A manufacturer must certify all heavy-duty diesel engines or vehicles of 14,000 pounds GVWR or less

to the medium-duty engine standards in title 13, CCR, section 1956.8(g) or (h). A manufacturer may request to certify heavy-duty complete diesel vehicles to the chassis-standards in Section E.1 of these test procedures; heavy-duty engine or heavy-duty vehicle provisions of 40 CFR Part 86 subpart A do not apply to such a vehicle or engine.

(b) Subparagraph (c)(2) [No change.]

(c) Subparagraph (c)(3) [No change.]

(d) Subparagraph (c)(4) [n/a; aftermarket conversions]

(e) Subparagraph (c)(5) [n/a]

1.2.4 Amend subparagraph (d) as follows: Small volume manufacturers. Special certification procedures are available for any manufacturer whose projected or actual combined California sales of passenger cars, light-duty trucks, medium-duty vehicles, heavy-duty vehicles and heavy-duty engines in its product line are fewer than 4,500 units based on the average number of vehicles sold for the three previous consecutive model years for which a manufacturer seeks certification. For manufacturers certifying for the first time in California, model-year production volume shall be based on projected California sales. The small-volume manufacturer's light- and medium-duty vehicle and truck certification procedures are described in 40 CFR §86.1838, as modified in Section G.12 of these test procedures.

1.2.5 Subparagraph (e). [n/a; NLEVs.]

1.2.6 Subparagraph (f) [n/a; Tier 2 phase-in provisions]

1.2.7 Subparagraph (g) [n/a; Tier 2 phase-in provisions]

1.2.8 Subparagraph (h) [No change.]

1.2.9 Subparagraph (i) [No change, except that this subparagraph shall only apply to vehicles certifying to the National greenhouse gas program for the 2012 through 2016 model years, in accordance with section E of these test procedures.]

1.2.10 Subparagraph (j) [No change, except that this subparagraph shall only apply to vehicles certifying to the National greenhouse gas program for the 2012 through 2016 model years, in accordance with section E of these test procedures.]

* * * *

B. Definitions, Acronyms and Abbreviations

1. §86.1803 Definitions.

* * * *

1.2 §86.1803-01. [Insert Federal Register for the National Greenhouse Gas Final Rule]. [No change, except as otherwise noted below.] The version of §86.1803-01 as incorporated by this section B.1.2 shall only apply to vehicles certifying to the National greenhouse gas program for the 2012 through 2016 model years, in accordance with section E of these test procedures.

2. California Definitions.

* * * *

"National greenhouse gas program" or "National greenhouse gas final rule" means the national program that applies to new 2012 through 2016 model year passenger cars, light-duty trucks, and medium-duty passenger vehicles adopted by the U.S. Environmental Protection Agency on March XX, 2010 [Insert Federal Register for the National Greenhouse Gas Final Rule], as incorporated in and amended by these test procedures.

* * * *

C. General Requirements for Certification

1. §86.1805 Useful Life.

* * * *

1.3 §86.1805-12. [Insert Federal Register for the National Greenhouse Gas Final Rule]. [No change, except that this section §86.1805-12 shall only apply to vehicles certifying to the National greenhouse gas program for the 2012 through 2016 model years, in accordance with section E of these test procedures.]

2. §86.1806 On-Board Diagnostics.

2.1 §86.1806-01; §86.1806-05. Delete.

* * * *

5. §86.1809 Prohibition of Defeat Devices.

* * * *

5.2 §86-1809-10. [Insert Federal Register for the National Greenhouse Gas Final Rule]. [No change except that requirements applicable to the Air Conditioning Idle Test shall only apply to vehicles certifying to the National greenhouse gas program, and subparagraph (e) shall apply to vehicles subject to the California TLEV, LEV, ULEV and SULEV standards.]

D. §86.1810 General standards; increase in emissions; unsafe conditions; waivers

* * * *

3. §86.1810-09. ~~February 26, 2007~~[Insert Federal Register for the National Greenhouse Gas Final Rule]. *[No change, except that the amendments to §86.1810-01 set forth in D.1 and D.2 shall also apply.]*

E. California Exhaust Emission Standards.

Delete 40 CFR §§86.1811 through 86.1819, except that for model years 2012 through 2016, a manufacturer may demonstrate compliance with the requirements of sections E.2.5 and E.3.2 by demonstrating compliance with §86.1818.12 [Insert Federal Register for the National Greenhouse Gas Final Rule].

* * * *

2. Emission Standards Phase-In Requirements for Manufacturers

* * * *

2.5 Fleet Average Greenhouse Gas Requirements for Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles.

2.5.1(i) The fleet average greenhouse gas exhaust mass emission values from passenger cars, light-duty trucks, and medium-duty passenger vehicles that are produced and delivered for sale in California each model year by a large volume manufacturer shall not exceed:

FLEET AVERAGE GREENHOUSE GAS EXHAUST MASS EMISSION REQUIREMENTS FOR PASSENGER CAR, LIGHT-DUTY TRUCK, AND MEDIUM-DUTY PASSENGER VEHICLE WEIGHT CLASSES[1] (4,000 mile Durability Vehicle Basis)		
Model Year	*Fleet Average Greenhouse Gas Emissions (grams per mile CO_2-equivalent)*	
	All PCs; LDTs 0-3750 lbs. LVW	*LDTs 3751 lbs. LVW - 8500 lbs. GVW; MDPVs*
2009	323	439
2010	301	420
2011	267	390
2012	233	361
2013	227	355
2014	222	350
2015	213	341
2016+	205	332

[1] Each manufacturer shall demonstrate compliance with these values in accordance with Section E.2.5.2.

2.5.1.1 For each model year, a manufacturer must demonstrate compliance with the fleet average requirements in this section E.2.5.1 based on one of two options applicable throughout the model year , either:

Option 1: the total number of passenger cars, light-duty trucks, and medium-duty passenger vehicles that are certified to the California exhaust emission standards in section 1961.1, title 13, CCR, and are produced and delivered for sale in California; or

Option 2: the total number of passenger cars, light-duty trucks, and medium-duty passenger vehicles that are certified to the California exhaust emission standards in section 1961.1, title 13, CCR, and are produced and delivered for sale in California, the District of Columbia, and all states that have adopted California's greenhouse gas emission standards for that model year pursuant to Section 177 of the federal Clean Air Act (42 U.S.C. § 7507).

2.5.1.1.1 For the 2009 and 2010 model years, a manufacturer that selects compliance Option 2 must notify the Executive Officer of that selection in writing within 30 days of the effective date of the amendments to this section 2.5.1.1. or must comply with Option 1.

2.5.1.1.2 For the 2011 and later model years, a manufacturer that selects compliance Option 2 must notify the Executive Officer of that selection in writing prior to the start of the applicable model year or must comply with Option 1.

2.5.1.1.3 When a manufacturer is demonstrating compliance using Option 2 for a given model year, the term "in California" as used in subsections E.2.5.2.3 and E.3.2 means California, the District of Columbia, and all states that have adopted California's greenhouse gas emission standards for that model year pursuant to Section 177 of the federal Clean Air Act (42 U.S.C. § 7507).

2.5.1.1.4 A manufacturer that selects compliance Option 2 must provide to the Executive Officer separate values for the number of vehicles produced and delivered for sale in the District of Columbia and for each individual state within the average.

2.5.1(ii) For the 2012 through 2016 model years, a manufacturer may elect to demonstrate compliance with this section E.2.5 by demonstrating compliance with the National greenhouse gas program as follows:

(a) A manufacturer that selects compliance with this option E.2.5.1(ii) must notify the Executive Officer of that selection, in writing, prior to the start of the applicable model year or must comply with E.2.5.1(i).

(b) The manufacturer must submit to ARB a copy of the official report that it submitted to EPA as required under 40 CFR §86-1865-12 for demonstrating compliance with the National greenhouse gas program and the official EPA determination of compliance. These must be submitted no later than May 1 of the calendar year following the close of the model year, for each model year that a manufacturer selects compliance with this option E.2.5.1(ii). and

(c) If a manufacturer has outstanding greenhouse gas debits at the end of the 2011 model year, as calculated in accordance with E.3.2, the manufacturer must submit to the Executive Officer a plan for offsetting all outstanding greenhouse gas debits by using greenhouse gas credits earned under the National greenhouse gas program. Upon approval by the Executive Officer, the manufacturer may demonstrate compliance with this section E.2.5 by demonstrating compliance with the National greenhouse gas program.

* * * *

F. Requirements and Procedures for Durability Demonstration

* * * *

4.2 §86.1823-08 ~~January 17, 2006~~ [Insert Federal Register for the National Greenhouse Gas Final Rule]. *[No change, except that the amendments to §86.1823-01 set forth in F.4.1 shall apply*, and subparagraph (m) applies only to vehicles certifying to the National greenhouse gas program.*]*

* * * *

G. Procedures for Demonstration of Compliance with Emission Standards

1. §86.1827 Test Group Determination.

1.1 §86.1827-01. ~~*October 6, 2000*~~*February 26, 2007* [Insert Federal Register for the National Greenhouse Gas Final Rule]. [No change, except that subparagraphs (a)(5) and (f) shall only apply to vehicles certifying to the National greenhouse gas program.]

* * * *

3. §86.1829 Durability data and emission data testing requirements; waivers.

3.1 §86.1829-01. ~~*December 8, 2005*~~*February 26, 2007* [Insert Federal Register for the National Greenhouse Gas Final Rule]. Amend as follows:

3.1.1 Delete (b)(1)(ii) and replace with: For Otto-cycle vehicles or hybrid vehicles that use Otto-cycle engines, evidence shall be supplied showing that the air/fuel metering system or secondary air injection system is capable of providing sufficient oxygen to theoretically allow enough oxidation to attain the CO emission standards at barometric pressures equivalent to those expected at altitudes ranging from sea level to an elevation of 6000 feet. For fuel injected vehicles or hybrid electric vehicles that use fuel-injected engines, compliance may be demonstrated upon a showing by the manufacturer that the fuel injection system distributes fuel based on mass air flow, rather than volume flow, and is therefore self-compensating. All submitted test proposals will be evaluated on their acceptability by the Executive Officer. As an alternative to the demonstration described above, a manufacturer may demonstrate compliance by testing California vehicle configurations as part of its federal high altitude certification requirements. Engine families that meet all the applicable California low altitude emission standards when tested at the EPA test elevation are deemed to be in compliance. The SFTP standards do not apply to testing at high altitude.

3.1.2 (b)(1)(iii)(E) [No change, except that references to Tier 2 or interim non-Tier 2 vehicles shall mean California LEVs, ULEVs or SULEVs.]

3.1.3 Amend (b)(1)(iii)(G) as follows: For the 2012 model year only, in lieu of testing a vehicle for N_2O emissions, a manufacturer may provide a statement in its application for certification that such vehicles comply with the applicable standards. Such a statement must be based on previous emission tests, development tests, or other appropriate information and good engineering judgment. This subparagraph (b)(1)(iii)(G) only applies to vehicles certifying to the National greenhouse gas program.

3.1.~~4~~3 Amend (b)(4)(i) as follows: All 2001 and subsequent model-year emission-data vehicles shall be required to be tail-pipe tested at 4,000 miles or at the mileage at which the vehicle is stabilized as determined in §86.1827-01 and demonstrate compliance with the California Inspection and Maintenance ("I/M") emission standards

as specified in the "Mandatory Exhaust Emissions Inspection Standards and Test Procedures," title 16, California Code of Regulations, Section 3340.42. A manufacturer shall have the option of using the I/M test procedures in place at the time of certification or, if the I/M test procedures have been amended within two years of the time of certification, a manufacturer may use the preceding procedures. Test vehicles shall undergo preconditioning procedures prior to the tail-pipe test, which consist of idle conditions for a minimum period of ten minutes after the thermostat is open. Preconditioning and test procedures shall be conducted at an ambient temperature from 68° to 86° F. The manufacturer shall, in accordance with good engineering practices, attest that such test vehicles will meet the requirements of this section when preconditioned and tested at ambient temperatures from 35° to 68° F.

3.1.54 Amend (b)(4)(ii) as follows: In lieu of testing vehicles according to the provisions of §86.1829(b)(4)(i), a manufacturer may provide a statement in its application for certification that, based on the manufacturer's engineering evaluation of such I/M testing as the manufacturer deems appropriate, all light-duty vehicles and light-duty trucks comply with the I/M emission standards.

3.1.65 Delete (b)(5). Idle CO Testing.

* * * *

H. Certification, Information and Reporting Requirements.

1. §86.1841 Compliance with emission standards for the purpose of certification

* * * *

1.2 For 2012 through 2016 model year vehicles certifying to the National greenhouse gas program, §86.1841-01 [Insert Federal Register for the National Greenhouse Gas Final Rule] shall apply. Changes specified under section H.1.1 shall also apply for this section H.1.2.

1.32 **Scope of Certification.** Certification, if granted, is effective only for the vehicle/test group described in the original manufacturer's certification application. Modifications by a secondary manufacturer to vehicles/engines shall be deemed not to increase emissions above the standards under which those vehicles/engines were certified and to be within the original certification if such modifications do not: (1) increase vehicle weight more than 10 percent above the curb weight, increase frontal area more than 10 percent, or result in a combination increase of weight plus frontal area of more than 14 percent; or (2) include changes in axle ratio, tire size, or tire type resulting in changes in the drive train ratio of more than 5 percent; or (3) include any modification to the emission control system. No originally certified vehicle/engine which is modified by a secondary manufacturer in a manner described in items (1) through (3) of the preceding sentence may be sold to an ultimate purchaser, offered or delivered for sale to an ultimate purchaser, or registered in California unless the modified vehicle/engine is certified by the state board in accordance with applicable test procedures to meet emission standards for the model year for which the vehicle/engine was originally certified. For the

purposes of this subsection, "secondary manufacturer" means any person, other than the original manufacturer, who modifies a new motor vehicle prior to sale to the ultimate purchaser.

1.~~4~~3 **SFTP.** For vehicles certified to the SFTP standards in Section E.1.2.2, full and intermediate useful life shall mean 4,000 miles.

1.5~~4~~ **Certification of a Federal Vehicle in California.** Whenever a manufacturer federally-certifies a 2004 or subsequent model-year passenger car, light-duty truck or medium-duty vehicle model to the standards for a particular emissions bin that are more stringent than the standards for an applicable California vehicle emissions category, the equivalent California model may only be certified to (i) the California standards for a vehicle emissions category that are at least as stringent as the standards for the corresponding federal emissions bin, or (ii) the exhaust emission standards to which the federal model is certified. However, where the federal exhaust emission standards for the particular emissions bin and the California standards for a vehicle emissions category are equally stringent, the California model may only be certified to either the California standards for that vehicle emissions category or more stringent California standards. The federal emission bins are those contained Tables S04-1 and S04-2 of 40 CFR section 86.1811-04(c) as adopted February 10, 2000. A California vehicle model is to be treated as equivalent to a federal vehicle model if all of the following characteristics are identical:

(a) Vehicle make and model;
(b) Cylinder block configuration (e.g., L-6, V-8);
(c) Displacement;
(d) Combustion cycle;
(e) Transmission class;
(f) Aspiration method (e.g., naturally aspirated, turbocharged); and
(g) Fuel (e.g., gasoline, natural gas, methanol).

The comparative stringency of the standards for the federal exhaust emissions bin and for the California vehicle emissions category shall be based on a comparison of the sum of the 100,000, 120,000, or 150,000 mile standards for NMOG and NOx.

1.5~~4~~.1 If a federally-certified vehicle model is certified in California in accordance with subparagraph 1.4, the model shall be subject to the federal requirements for exhaust emissions, SFTP emissions, cold CO emissions and highway NOx. The vehicle model shall be subject to all other California requirements including evaporative emissions, OBD II, greenhouse gas emissions, and emissions warranty, except that a 2004 or earlier model-year vehicle in the federal heavy light-duty truck or medium-duty passenger vehicle classes may at the manufacturer's option be subject to the federal requirements for evaporative emissions and OBD II.

1.5~~4~~.2 Prior to certification of a 2004 or subsequent model-year vehicle, a manufacturer must submit information sufficient to enable the Executive Officer to determine whether there is a federally-certified vehicle model for that model year that is equivalent to the California vehicle model based on the criteria listed in subparagraph 1.4.

1.5~~4~~.3 If the Executive Officer determines that there is a federally-certified vehicle model for that model year that is equivalent to the California vehicle model, the following information shall be submitted with the Part I or Part II Application for Certification as set forth below:

(a) Part I Application for Certification: (i) Evidence of federal certification including, but not limited to, federal certification exhaust emission levels and compliance with federal SFTP, cold CO and highway NOx emission levels; and (ii) evidence of compliance with California evaporative emission requirements, California OBD II requirements, and California greenhouse gas requirements or, where permitted under Section 1.4.1 for a 2004 or earlier model-year vehicle, evidence of federal certification evaporative emission levels and compliance with federal OBD II requirements.

(b) Part II Application for Certification: evidence of a warranty on emission-related parts in accordance with sections 2035 et seq., title 13 CCR as they apply to vehicles certified under the primary California standard.

1.54.4 For purposes of meeting the California NMOG fleet average phase-in requirements or for determining vehicle equivalent credits, the applicable California NMOG value for passenger cars and light-duty trucks or vehicle equivalent credits for medium-duty vehicles shall be determined as follows:

(a) The sum of the federal full useful life (100,000, 120,000 or 150,000) NMOG and NOx value shall be compared with the next less stringent California full useful life NMOG plus NOx value to determine which emission category (e.g., LEV, ULEV or SULEV) is to be used for the fleet average value or vehicle equivalent credit calculation.

(b) For passenger cars and light-duty trucks, once the equivalent California emission category is determined (e.g., whether the vehicle is considered a LEV, ULEV or SULEV), the applicable NMOG value to be used in the fleet average calculation is set forth in the table in section E.2.1.2 of these test procedures for passenger cars and light-duty trucks. For example, if the full useful life (120,000 miles) NMOG plus NOx standard to which the federal vehicle is certified is 0.110 grams per mile, that vehicle would be considered a LEV II ULEV for fleet average purposes because the combined LEV full useful life NMOG plus NOx value is 0.125 and is the next less stringent emission category. The applicable emission standard to be used in the fleet average calculation would therefore be 0.040 grams per mile.

1.54.5 The vehicle shall be subject to the federal in-use requirements and the emission standard applicable for in-use compliance purposes shall be the federal standard to which the vehicle was federally-certified.

1.5.6 The tune up label shall meet the federal requirements applicable to such a vehicle with an additional sentence which reads: "This vehicle conforms to federal regulations and is certified for sale in California." The value used in the smog index label shall be the California emission category to which the vehicle was deemed certified for fleet average NMOG purposes.

1.5.7 The requirements in Section H.1.4 do not apply in the case of a federally-certified vehicle model that is only marketed to fleet operators for applications that are subject to clean fuel fleet requirements established pursuant to section 246 of the federal Clean Air Act (42 U.S.C. sec. 7586). In addition, the Executive Officer shall exclude

from the requirements a federally-certified vehicle model where the manufacturer demonstrates to the Executive Officer's reasonable satisfaction that the model will primarily be sold or leased to clean fuel fleet operators for such applications, and that other sales or leases of the model will be incidental to marketing to those clean fuel fleet operators.

1.54.8 A manufacturer may certify a passenger car, light-duty truck or medium-duty vehicle to federal exhaust emission standards pursuant to Section H.1.4 prior to the 2004 model year.

* * * *

*4.5 **Greenhouse Gas Reporting Requirements.***

(a) For the purpose of demonstrating compliance with greenhouse gas requirements, the manufacturer shall provide by May 1 of the calendar year following the close of the model year:

(i) A manufacturer that demonstrates compliance under section E.2.5.2.1.1, Option A, must submit a comprehensive list of all emission test results, including the test vehicle description and identification number, CO_2, CH_4, and N_2O emission data, the data and/or justifications used to determine the "worst case" greenhouse gas test vehicle configuration, as required by G.2.34.2, for each greenhouse gas vehicle test group. A manufacturer that demonstrates compliance under section E.2.5.2.1.1, Option B, must submit a comprehensive list of all emission test results used to calculate its Corporate Average Fuel Economy, including the test vehicle description and identification number, for each subconfiguration and the number of vehicles produced and delivered for sale under Option 1 or Option 2 in section E.2.5.1.1, as applicable, that are represented by the subconfiguration. A manufacturer must not submit any emission test results from vehicles tested, or calculated results, as part of the Corporate Average Fuel Economy Program, unless those results have been judged acceptable by the U.S. Environmental Protection Agency, in accordance with §600.007-08. A manufacturer that submits data from the Corporate Average Fuel Economy Program must clearly indicate whether the data is derived from vehicle testing or whether it is calculated. A manufacturer that elects to use CAFE Program emissions data to demonstrate compliance with the greenhouse requirements must use all of the data that is used by the U.S. Environmental Protection Agency to determine a manufacturer's corporate average fuel economy for the applicable model year, and may forego testing of the "worst-case" configuration;

* * * *

(b) For the 2012 through 2016 model years, a manufacturer that elects to demonstrate compliance with the requirements of sections E.2.5 and E.3.2 by

demonstrating compliance with the National greenhouse gas program must submit all data to the Executive Officer in accordance with the reporting requirements as required under 40 CFR §86.1865-12.

(~~b~~c) All data submitted in accordance with this section H.4.5, must be submitted electronically and organized in a format specified by the Executive Officer to clearly demonstrate compliance with the fleet average greenhouse gas exhaust emission requirements in section E.2.5 or §86.1865-12, as applicable.

I. In-Use Compliance Requirements and Procedures

1. §86.1845 Manufacturer in-use verification testing requirements.

* * * *

1.2 §86.1845-04. *~~December 8, 2005~~December 28, 2006* [Insert Federal Register for the National Greenhouse Gas Final Rule]. Amend as follows:

* * * *

1.5 **Greenhouse Gas Requirements.**

For the 2009 through 2011 model years, t~~T~~he manufacturer in-use verification testing requirements shall not apply to the greenhouse gas emission requirements set forth in Section E.2.5 of these test procedures. For the 2012 through 2016 model years, the manufacturer in-use verification testing requirements shall apply to a manufacturer that certifies its California fleet under the National greenhouse gas program.

2. §86.1846 Manufacturer in-use confirmatory testing requirements.

2.1 §86.1846-01 *~~July 12, 2001~~December 28, 2006* [Insert Federal Register for the National Greenhouse Gas Final Rule]. [No Change.]

* * * *

2.4 **Greenhouse Gas Requirements.**

For the 2009 through 2011 model years, t~~T~~he manufacturer in-use compliance testing requirements shall not apply to the greenhouse gas emission requirements set forth in Section E.2.5 of these test procedures. For the 2012 through 2016 model years, the manufacturer in-use compliance testing requirements shall apply to a manufacturer that certifies its California fleet under the National greenhouse gas program.

* * * *

J. Procedural Requirements

1. §86.1848-01 Certification. October 6, 2000. [No change.]
2. *§86.1848-10 Certification. February 26, 2007. [No change.]*
3. §86.1848-10 Certification. [Insert Federal Register for the National Greenhouse Gas Final Rule]. [No change, except that this version of §86.1848-10 shall only apply to vehicles certifying under the National greenhouse gas program for the 2012 through 2016 model years.]
4. §86.1849-01 Right of entry. [No change.]
5. §86.1850-01 Denial, Suspension or Revocation of Certificate of Conformity. [No change.]
6. §86.1851 Application of good engineering judgment to manufacturers' decisions. [No change.]
7. §86.1852 Waivers for good in-use emission performance. [No change.]
8. §86.1853 Certification hearings. [No change.]
9. §86.1854-12 Prohibited acts. [Insert Federal Register for the National Greenhouse Gas Final Rule]. [No change.]
10. §§86.1854 - 86.1859. [Reserved]
11. §86.1860-04 How to comply with the Tier 2 and interim Tier 2 fleet average NOx standards. [n/a]
12. §86.1861-04 How do the Tier 2 and interim Tier 2 NOx averaging, banking and trading programs work? [n/a]
13. §86.1862-04 Maintenance of records and submittal of information relevant to compliance with fleet average NOx standards. [n/a]
14. §86.1863-07 Optional Chassis Certification for Diesel Vehicles. ~~*January 18, 2001*~~*June 17, 2003*. [No change]
15. §86.1865-12 How to comply with the fleet average CO_2 standards. [Insert Federal Register for the National Greenhouse Gas Final Rule]. [No change, except that this section shall only apply to vehicles certifying under the National greenhouse gas program for the 2012 through 2016 model years.]
16. §86.1866-12 CO_2 fleet average credit programs. [Insert Federal Register for the National Greenhouse Gas Final Rule]. [No change, except that this section shall only apply to vehicles certifying under the National greenhouse gas program for the 2012 through 2016 model years.]
17. §86.1867-12 Optional early CO_2 credit programs. [Insert Federal Register for the National Greenhouse Gas Final Rule]. [No change, except that this section shall only apply to vehicles certifying under the National greenhouse gas program for the 2012 through 2016 model years.]

PART II: CALIFORNIA EXHAUST AND PARTICULATE EMISSION TEST PROCEDURES FOR PASSENGER CARS, LIGHT-DUTY TRUCKS AND MEDIUM-DUTY VEHICLES

This part describes the equipment required and the procedures necessary to perform gaseous and particulate exhaust emission tests (40 CFR Part 86, Subpart B); cold temperature test procedures (40 CFR Part 86, Subpart C); the California 50°F test procedure; the development of reactivity adjustment factors; and the supplemental federal test procedure (40 CFR Part 86, Subpart B) on passenger cars, light-duty trucks and medium-duty vehicles.

A. 40 CFR Part 86, Subpart B - Emission Regulations for 1977 and Later Model Year New Light-Duty Vehicles and New Light-Duty Trucks; Test Procedures.

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100.2 Equipment and Facility Requirements.

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86.111-94 Exhaust gas analytical-system. ~~September 30, 1994~~ [Insert Federal Register for the National Greenhouse Gas Final Rule].

* * * *

100.5 Test Procedures and Data Requirements.

86.127-00 Test procedures; overview. ~~May 4, 1999~~ [Insert Federal Register for the National Greenhouse Gas Final Rule].

* * * *

100.5.3 California Vehicle Preconditioning Requirements.

* * * *

86.135-00 Dynamometer procedure. [Insert Federal Register for the National Greenhouse Gas Final Rule] [No change.]

* * * *

100.5.4 Calculations; exhaust emissions.

* * * *

86.165-12 Air Conditioning idle test procedure. [Insert Federal Register for the National Greenhouse Gas Final Rule]. [No change, except that this section shall only apply to vehicles certifying under the National greenhouse gas program for the 2012 through 2016 model years.]

86.166-12 Method for calculating emissions due to air conditioning leakage. [Insert Federal Register for the National Greenhouse Gas Final Rule]. [No change, except that this section shall only apply to vehicles certifying under the National greenhouse gas program for the 2012 through 2016 model years.]

86.167-12 N_2O measurement devices. [Insert Federal Register for the National Greenhouse Gas Final Rule]. [No change, except that this section shall only apply to vehicles certifying under the National greenhouse gas program for the 2012 through 2016 model years.]

86.168-12 Interference verification for N_2O analyzers. [Insert Federal Register for the National Greenhouse Gas Final Rule]. [No change, except that this section shall only apply to vehicles certifying under the National greenhouse gas program for the 2012 through 2016 model years.]

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CALIFORNIA AIR RESOURCES BOARD

NOTICE OF PUBLIC MEETING TO CONSIDER A PROCESS FOR ADOPTION OF GREENHOUSE GAS ACCOUNTING PROTOCOLS FOR COMPLIANCE PURPOSES, INCLUDING WITHDRAWAL OF BOARD ADOPTION OF VOLUNTARY PROTOCOLS

The Air Resources Board (ARB or Board) will conduct a public meeting at the time and place noted below to consider a process for adoption of greenhouse gas accounting protocols for compliance purposes, including withdrawal of Board adoption of voluntary greenhouse gas (GHG) accounting protocols. This item is a non-regulatory item.

DATE: February 25, 2010

TIME: 9:00 a.m.

PLACE: California Environmental Protection Agency
Air Resources Board
Byron Sher Auditorium, Second Floor
1001 I Street
Sacramento, California 95814

This item may be considered at a two-day meeting of the Board, which will commence at 9:00 a.m., February 25, 2010, and may continue at 8:30 a.m., on February 26, 2010. This item may not be considered until February 26, 2010. Please consult the agenda for the meeting, which will be available at least 10 days before February 25, 2010, to determine the day on which this item will be considered.

BACKGROUND

The Board has adopted four voluntary GHG accounting protocols to encourage voluntary early action to reduce GHG emissions. These protocols were developed by the Climate Action Reserve (CAR), and its predecessor the California Climate Action Registry. CAR has continued to update these protocols over time, and has used them for issuance of offset credits for the voluntary market.

In 2009, the Board adopted a Scoping Plan to achieve the emissions reduction target contained in the California Global Warming Solutions Act of 2006 (AB 32). One of the key measures included in the Scoping Plan is a cap-and-trade regulation which is now under development. As part of the cap-and-trade regulation that will be considered by the Board later this year, ARB will establish the requirements that will govern the use of offsets for compliance purposes. To support the proposed cap-and-trade regulation, ARB plans to initiate a process for the adoption of emission reduction protocols for compliance use. This process will include an environmental review.

ARB recognizes the importance of voluntary actions to reduce emissions based on rigorous greenhouse gas accounting methods such as those included in these offset protocols. Given that three of the four voluntary protocols previously adopted by the Board have been updated by the Climate Action Reserve and ARB is now focusing on the development of protocols for compliance purposes, staff is recommending that the Board consider withdrawal of Board adoption of voluntary GHG accounting protocols. As part of the cap-and-trade program, staff will develop regulatory requirements to implement Health and Safety Code section 38571, and begin the process for Board consideration of emission reduction protocols for compliance purposes. Staff plans to initiate this process by holding a public workshop in April 2010.

Withdrawal of Board adoption would apply to the following protocols:

- CAR Forestry Protocols Version 2.1
- CAR Manure Digester Protocol Version 2.1
- CAR Urban Forest Protocols Version 1.0
- CAR Forestry Protocols Version 3.0.

ARB staff will present a resolution at the meeting for the Board's consideration. Copies of the resolution will be available on the day of the Board meeting.

SUBMITTAL OF COMMENTS

Interested members of the public may also present comments orally or in writing at the meeting and may be submitted by postal mail or by electronic submittal before the meeting. To be considered by the Board, written comments not physically submitted at the meeting must be received **no later than 12:00 noon, February 24, 2010,** and addressed to the following:

Postal mail: Clerk of the Board, Air Resources Board
1001 I Street, Sacramento, California 95814

Electronic submittal: http://www.arb.ca.gov/lispub/comm/bclist.php

Please note that under the California Public Records Act (Government Code section 6250 et seq.), your written and oral comments, attachments, and associated contact information (e.g., your address, phone, email, etc.) become part of the public record and can be released to the public upon request. Additionally, this information may become available via Google, Yahoo, and any other search engines.

The Board requests, but does not require 20 copies of any written submission. Also, 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 Lucille van Ommering, 1001 I Street, Sacramento, California 95814, (916) 324-5931.

To request a special accommodation or language needs for any of the following:

- An interpreter to be available at the hearing.
- Have documents available in an alternate format (i.e. Braille, Large print) or another language.
- A disability-related reasonable accommodation.

Please contact the Clerk of the Board at (916) 322-5594 or by facsimile at (916) 322-3928 as soon as possible, but no later than 10 business days before the scheduled Board hearing. TTY/TDD/Speech to Speech users may dial 711 for the California Relay Service.

Para solicitar alguna comodidad especial o necesidad de otro idioma para alguna de las siguientes:

- Un intérprete que esté disponible en la audiencia
- Tener documentos disponibles en un formato alterno (por decir, sistema Braille, o en impresión grande) u otro idioma.
- Una acomodación razonable relacionados con una incapacidad.

Por favor llame a la oficina del Secretario del Consejo de Recursos Atmosféricos al (916) 322-5594 o envíe un fax al (916) 322-3928 no menos de diez (10) días laborales antes del día programado para la audiencia. Para el Servicio Telefónico de California para Personas con Problemas Auditivos, ó de teléfonos TDD pueden marcar al 711.

CALIFORNIA AIR RESOURCES BOARD

James N. Goldstene
Executive Officer

Date: February 11, 2010

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 at www.arb.ca.gov.

2009 Haagen-Smit Clean Air Awards

Timothy V. Johnson, Sc.D. –Emission Control Technologies

Tim Johnson is the Director of Emerging Regulations and Technologies for Corning Environmental Technologies, Corning Incorporated. Dr. Johnson is responsible for tracking emerging mobile emissions regulations and technologies, and helps develop strategic positioning via new products. He has been with Corning for 20 years, with 10 years in the current position. He is an acknowledged expert and frequent speaker on diesel emission control technology and trends. Dr. Johnson was recognized for his technical accomplishments in 2008 by being made a Society of Automotive Engineers (SAE) Fellow. He was instrumental in the development of the National Clean Diesel Program which is successfully controlling pollutants from millions of legacy diesel vehicles that continue to operate across the U.S. Dr. Johnson is quite active in various advisory committee roles. He is currently the co-chair for the US EPA's Advisory Working Group on Diesel Emission Control Retrofits. He is also a member of the US EPA Clean Air Act Advisory Committee, and the US EPA Mobile Source Technical Review Subcommittee. Formerly he served on the US EPA Clean Diesel Independent Review Panel, and California Air Resources Board International Diesel Retrofit Advisory Committee. He is a member of the Northeast Center for a Clean Air Future (NESCCAF/NESCAUM) board of directors, and he is on the Board of Advisors for the Center of Environmental Research and Technology at the University of California, Riverside. Finally, he recently edited the book, "Diesel Filter Technology", published by SAE. He earned his BS and MS Engineering Degrees from the University of Minnesota in 1978 and 1979, and his Doctor of Science from MIT in 1987.

Margo Tsirigotis Oge – Environmental Policy

Margo Oge is the Director of the Office of Transportation and Air Quality for the US Environmental Protection Agency. Ms. Oge has been with the US EPA since 1980 and has held various management positions in the Agency. She also served as Legislative Aide to Senator John Chafee of Rhode Island, the minority ranking member of the Senate Environment and Public Works Committee supporting various programs and bills relating to environmental issues. Under Ms. Oge's leadership the US EPA finalized three of the nation's most significant environmental accomplishments; the clean Tier 2 motor vehicle and Gasoline Sulfur Program, the historic 2007 diesel truck, buses and diesel fuel rule and the recently finalized clean off road diesel program. These programs set more than a 90% reduction in harmful pollutants emitted from cars, trucks, busses, construction, farming and industrial equipment and gasoline and diesel fuel. As a result these three rules alone are estimated to prevent more than 22,000 premature deaths and thousands of respiratory illnesses. In 2004, Ms. Oge was a recipient of the Presidential Distinguished Executive Rank Award for her outstanding leadership on environmental transportation issues. She is also a previous winner of the Presidential Meritorious Award. In 2002, the Women's Council on Energy and the Environment (WCEE) honored Ms. Oge with its Woman of Achievement Award. The award recognized her for leadership in shepherding the Tier 2 and heavy duty diesel rules to fruition. She was the first nonpolitical appointee to receive this award. Ms. Oge earned her Master's Degree in Engineering from University of Massachusetts in Lowell. She

attended George Washington University and the John F. Kennedy School of Government at Harvard University.

John M. Peters, M.D., Sc.D. –Environmental Health Research

Dr. John M. Peters is the Hastings Professor of Preventive Medicine in the University of Southern California's Keck School of Medicine and Director of the Division of Environmental Health in the Department of Preventive Medicine. He is also an Adjunct Professor of Epidemiology in UCLA's School of Public Health. In his over 40 year career, Dr. Peters has published over 150 research papers, reports and chapters on subjects such as the health effects of air pollution, magnetic fields, asbestos, vinyl chloride and other chemicals in both the work and general environment. He is the principal investigator of the Children's Health Study, a landmark epidemiologic investigation to identify chronic health effects from exposure to air pollution in Southern California communities, which has followed 11,000 children, for periods as long as 13 years. The study has led to broader public awareness and public health actions to protect children's health. He is also the principal investigator of a National Institute of Environmental Health Sciences (NIEHS) funded program project to continue to follow these children into adulthood. Dr. Peters directed the Southern California Environmental Health Sciences Center for 10 years, a NIEHS-supported center based at the University of Southern California, including faculty members from both UCLA and USC. The Center focuses on the full range of environmental health problems that humans face and trying to understand how host factors and environmental exposures interact to produce human disease. Dr. Peters has received many awards and recognition throughout his career, most recently he was the first recipient of the John Peters Award, "in appreciation of a lifetime of leadership, research, and devoted service to the pursuit of respiratory health," in 2009 from the American Thoracic Society. In June 2009, Dr. Peters received the Harvard School of Public Health Alumni Award of Merit. This award, the highest honor presented to alumni by the Harvard School of Public Health, recognizes leaders who advance the science of public health, improve its community practice, provide exceptional leadership of public health institutions, or contribute significantly to the training and accomplishments of the field's future professionals. He was inducted into the Johns Hopkins Society of Scholars in 2004.