MEETING

STATE OF CALIFORNIA

AIR RESOURCES BOARD

CALEPA HEADQUARTERS

BYRON SHER AUDITORIUM

SECOND FLOOR

1001 I STREET

SACRAMENTO, CALIFORNIA

THURSDAY, FEBRUARY 18, 2016

9:03 A.M.

JAMES F. PETERS, CSR
CERTIFIED SHORTHAND REPORTER
LICENSE NUMBER 10063

A P P E A R A N C E S

BOARD MEMBERS:

Ms. Mary Nichols, Chair

Ms. Sandra Berg, Vice Chair

Dr. John Balmes

Mr. Hector De La Torre

Supervisor John Gioia

Mr. John Eisenhut

Senator Dean Florez

Mrs. Barbara Riordan

Supervisor Ron Roberts

Supervisor Phil Serna

Dr. Alex Sherriffs

Professor Daniel Sperling

Ms. Diane Takvorian

STAFF:

Mr. Richard Corey, Executive Officer

Dr. Alberto Ayala, Deputy Executive Officer

Ms. Edie Chang, Deputy Executive Officer

Mr. Kurt Karperos, Deputy Executive Officer

Ms. Ellen Peter, Chief Counsel

Ms. La Ronda Bowen, Ombudsman

Ms. Emily Wimberger, Chief Economist

A P P E A R A N C E S C O N T I N U E D

STAFF:

Ms. Shirin Barfjani, Air Pollution Specialist, In-use Control Measures Section, Mobile Source Control Division(MSCD)

Mr. Michael Benjamin, Chief, MLD

Mr. Tony Brasil, Chief, Heavy-Duty Diesel Implementation Branch, MSCD

Mr. Pippin Brehler, Senior Attorney, Legal Office

Mr. Michael Carter, Assistant Chief, MSCD

Mr. Yachun Chow, Manager, Zero-Emission Truck and Bus Section, MSCD

Mr. Bart Croes, Chief, Research Division

Mr. Kyle Graham, Senior Attorney, Legal Office

Mr. Jorn Herner, Chief, Research Planning, Administration & Emissions Mitigation Branch, RD

Mr. Matthew Holmes, Air Resources Engineer, Monitoring and Lab Division(MLD)

Mr. Margret Kim, Senior Attorney, Legal Office

Mr. Jack Kitowski, Chief, MSCD

Mr. Toshihiro Kuwayama, Air Resources Engineer, Emission and Exposure Research Section, Research Division(RD)

Mr. Angus MacPherson, Manager, MLD

Mr. Michael Miguel, Branch Chief, MLD

Ms. Elizabeth Scheehle, Chief, Oil & Gas and GHG Mitigation Branch, Industrial Strategies Division

Mr. Abhilash Vijayan, Manager, Emission and Exposure Research Section, RD

A P P E A R A N C E S C O N T I N U E D

ALSO PRESENT:

Mr. Alan Abbs, California Air Pollution Control Officer's Association

Mr. Will Barrett, American Lung Association

Mr. Nathan Begtsson, Pacific, Gas and Electric

Ms. Hannah Goldsmith, CalETC

Mr. Brad Heavner, CalSEIA

Mr. James Holtz, BYD

Mr. Paul Jablonski, San Diego Metropolitan Transit System

Mr. Shrayas Jatkar, Coalition for Clean Air

Mr. Ryan Kenny, Clean Energy

Mr. Richard McCaskill, Recon Recycling

Mr. Jonathan Nelson, Antelope Valley Transit Authority

Mr. Tim O'Connor, Environmental Defense Fund

Mr. Jimmy O'Dea, Union of Concerned Scientists

Mr. Michael Pimentel, California Transit Association

Mr. Ray Pingle, Sierra Club, California

Ms. Diana Vazquez, Sierra Club, California

Dr. Barry Wallerstein, South Coast Air Quality Management District

Mr. Mike Wiley, Sacramento Regional Transit District

I N D E X

I N D E X C O N T I N U E D

P R O C E E D I N G S

CHAIR NICHOLS: The sound system is now working, which means we are about to go into session. Board Members are assembling. Staff is assembling. We are so close to being on time, we could just move the minute hand just a little bit over and it would be absolutely on time.

Good morning. Good morning. Welcome, everyone, to the February 18th, 2016 public meeting of the Air Resources Board. We will come to order. And before I stay anything more, we will begin, as is our custom, by saying the Pledge of Allegiance to the flag. So please rice

(Thereupon the Pledge of Allegiance was recited in unison.)

CHAIR NICHOLS: Madam Clerk, would you please call the roll

BOARD CLERK JENSEN: Dr. Balmes?

BOARD MEMBER BALMES: Here.

BOARD CLERK JENSEN: MR. De La Torre?

Mr. Eisenhut?

BOARD MEMBER EISENHUT: Here.

BOARD CLERK JENSEN: Senator Florez?

BOARD MEMBER FLOREZ: Here.

BOARD CLERK JENSEN: Supervisor Gioia?

BOARD MEMBER GIOIA: Here.

BOARD CLERK JENSEN: Ms. Mitchell?
Mrs. Riordan?
BOARD MEMBER RIORDAN: Here.
BOARD CLERK JENSEN: Supervisor Roberts?
BOARD MEMBER ROBERTS: Here.
BOARD CLERK JENSEN: Supervise Serna?
Dr. Sherriffs?
BOARD MEMBER SHERRIFFS: Here.
BOARD CLERK JENSEN: Professor Sperling?
BOARD MEMBER SPERLING: Here.
BOARD CLERK JENSEN: Ms. Takvorian?
BOARD MEMBER TAKVORIAN: Here.
BOARD CLERK JENSEN: Vice Chair Berg?
VICE CHAIR BERG: Here.
BOARD CLERK JENSEN: Chair Nichols?
CHAIR NICHOLS: Here.
BOARD CLERK JENSEN: Madam Chair, we have a quorum.
CHAIR NICHOLS: Thank you very much.
I have a couple of announcements before we start the agenda this morning.
You know some people in the course of their careers get to preside over institutions that are in the process of fading away or growing smaller in size. Others of us, however, have the privilege and good fortune to

preside over institutions that are growing and flourishing. And the Air Resources Board has grown thanks to a number of things, but primarily, at this point, because of the legislators -- legislature's desire to add additional members to our Board.

Last year, the legislature passed, and the Governor signed, Assembly Bill 1288 by Speaker Toni Atkins. And as a result of that action, two new positions were created on the Air Resources Board, both of which are intended to not only bring legislative representation -- legislatively-appointed representation to the Board, but in particular to strengthen and deepen our focus on the needs and concerns of disadvantaged communities within our State.

And so it's my pleasure this morning to introduce the two new Board members that are joining us today. They've both been sworn in within the last 24 hours, and are fully up to speed and ready to start work. So first, I want to introduce Diane Takvorian, who is the executive director and co-founder of the Environmental Health Coalition, an environmental justice organization based in the San Diego/Tijuana region. Diane has served on a variety of different international and State and regional boards. In 2009, President Obama appointed her to the Joint Public Advisory Committee for the Commission for

Environmental Cooperation. In 2008, she received the James Irvine Foundation's Leadership Award for her creative and inspirational leadership benefiting the people of California. She's also a co-founder of the California Environmental Justice Alliance. So with that, I am pleased to welcome Ms. Takvorian to the Board.

(Applause.)

CHAIR NICHOLS: And would you like to say a few words?

BOARD MEMBER TAKVORIAN: Thank you, Chair Nichols. I really appreciate your welcoming. Thank you to you and to Richard and the staff. I feel very welcomed. I wanted to just take a moment to thank Speaker Atkins for appointing me to this position and for her confidence in me, and in the environmental justice community, through her sponsorship of the bill 1288. I think it's a really important moment for all of us in California, and I take my responsibility really seriously that this is about air quality and climate change issues for all Californians, but especially to those that are the most impacted, and those that are suffering the most.

So I think this is a great opportunity for us all to work together for a high quality of life for everyone. So thank you very much, and I look forward to working with you all.

CHAIR NICHOLS: Thank you for those inspirational words.

So our second new Board member will always be known as the junior board member -- because that's the way they do it in the Senate, right, you know, if you're a few hours later so -- is the Honorable Dean Florez. Senator Florez served in the California Senate from 2002 to 2010, and before that in the California Assembly from 1998 to 2002 representing the Central Valley, including the cities of Bakersfield, and Shafter.

During his time in the Senate, he sponsored SB 700, which required farms for the first time ever to comply with the provisions of the federal Clean Air Act. And I had the opportunity to work with him and his office myself on issues relating to agricultural burning, and more broadly I know of his tremendous dedication and interest to air quality in the valley.

Senator Florez is now the President and CEO Balance Public Relations. So we welcome him and his expertise to the Board. And if you'd like to say a few you words, please do.

BOARD MEMBER FLOREZ: Thank you. Madam Chair, it's always dangerous to offer a microphone to a past politician.

(Laughter.)

BOARD MEMBER FLOREZ: But I would say thank you. I look forward to working more importantly with the staff. This is a super important Board. Obviously, spending time in the legislature legislating to this Board, it's now interesting to be on the Board. And so I really look forward from that perspective of working with staff and with you Madam Chair and the members of the Committee.

Just as Diane had mentioned, I want to thank the Senate Pro Tem Kevin de León. A very strong agenda on climate change, very strong voice for disadvantaged communities. I do know that during my time on the Board, I very much want to focus on about 2000 census tracts called disadvantaged in California. And I'm going to work pretty much every day, and along with my colleagues, to make sure that investments and priorities and things that center around pollution are the top of my agenda.

There's no doubt that those communities, and I think we all know where they're at, they're the hardest places to get to, in some cases, but I think hopefully now have a very strong voice with both Diane and I on this Board. And I look forward to working with my colleague to make sure that that perspective is brought to every meeting.

And Madam Chair, I really appreciate working with you again. You were very instrumental in our 700 series

that really changed the nature of how we looked at air quality in the Central Valley, particularly with farms. And I look forward to a much broader agenda now on this Board. So thank you much look. I look forward to working with all of and particularly staff.

CHAIR NICHOLS: Okay. So as you can see, we have a full house here, and that's with two members who are not yet with us. So it's going to be interesting. I'm going to do my best. I think I can see everybody from this configuration here. So Board members, I know you won't be shy when you feel the need or desire to speak on something. And I'll do my best to keep looking to both sides.

Now, to the more mundane aspects of our preliminary comments. Just a reminder to everybody that the Board imposes a three minute time limit on speakers. If you're interested in speaking, please fill out a request to speak form - they're available in the lobby or from the clerk - and turn it into the Board Assistant here prior to that particular item being called.

We'd appreciate it if people will summarize their written remarks when they're speaking to the Board, as opposed to reading your whole statement, because we can listen faster, and you'll make the point more effectively.

I'm also required to point out, for safety

purposes, the exits from this room at the rear and to the side. In the event of a fire alarm, which has happened, we're required to evacuate this room immediately going down the stairs, not using the elevators, and to go outside the building where we assemble across the street in Cesar Chavez Park, and then return when the all signal -- all-clear signal is given.

And with that, I think we are ready to begin this morning's agenda with a presentation from the staff on a matter, which has been consuming a lot of my time and the staff's time for a number of weeks now, which is the gas leak, the leak of natural gas, from the Aliso Canyon storage field in southern California.

So, Mr. Corey, would you please introduce this item?

EXECUTIVE OFFICER COREY: Yeah. We've got a request for two minutes due to technical problems.

CHAIR NICHOLS: Oh, there's a technical problem. Okay. Absolutely. You mean, we just have to be quiet?

(Laughter.)

CHAIR NICHOLS: Two minutes.

BOARD MEMBER GIOIA: Actually, you have to sing.

CHAIR NICHOLS: Oh, great. I can do that, you know.

MR. LLOYD: Talk amongst yourselves.

CHAIR NICHOLS: Yeah, talk amongst yourselves.

That's a first.

Are you all set?

MR. LLOYD: Yes.

CHAIR NICHOLS: Very good. Thank you. You know this is the first time ever. You guys do an amazing job. So thank you.

(Applause.)

CHAIR NICHOLS: All right. Mr. Corey, will you begin this item?

EXECUTIVE OFFICER COREY: I will. And thank you, Chair Nichols. So today, staff will present an informational update on the Aliso Canyon natural gas leak in southern California. As all of you know Aliso Canyon is the largest natural gas storage facility in California. The facility is a 3,600 acre complex managed by Southern California Gas Company. And ARB has been coordinating efforts to measure emissions from the leak as part of a multi-agency response.

We've also been providing on-the-ground support to monitor the impacts of the leak in the community, and you'll hear more about that in a moment. On January 6th, Governor Brown issued a proclamation that declared a State of Emergency in Los Angeles County due to the Aliso Canyon methane leak.

The proclamation directed several State agencies to continue or to undertake specific responses to stop the leak, to ensure accountability, and to strengthen oversight of the gas storage facilities. The proclamation also instructed ARB to prepare a climate impacts mitigation plan to fully mitigate the global warming consequences of the methane emissions from the leak.

In today's presentation, staff will provide an update on the leak and ARB's efforts to estimate the methane emissions. Staff will also provide an update on the mitigation program being prepared pursuant to the Governor's proclamation.

Dr. Toshihiro Kuwayama of the Research Division will give the first presentation or the first part of the presentation on emission measurements. He'll be followed by Kyle Graham of our Legal Office who will describe the development of a mitigation program.

Toshi.

(Thereupon an overhead presentation was presented as follows.)

AIR RESOURCES ENGINEER KUWAYAMA: Thank you, Mr. Corey. And good morning, Chair Nichols and members of the Board.

In today's update, I will provide information on the Aliso Canyon methane leak and ARB's role with a focus

on the environmental and public health concerns that derived as a result of this incident.

I will begin by providing background information on the Aliso Canyon Natural Gas Storage Facility and the events that took place throughout the stages of this incident. I will then present information on the State and local government efforts in addressing on the Aliso Canyon methane leak incident, and details regarding ARB's extensive efforts related to this event.

Lastly, Kyle Graham from the legal office will provide an update on the development of climate impact mitigation program for the Aliso Canyon incident as a part of this presentation.

--o0o--

AIR RESOURCES ENGINEER KUWAYAMA: Aliso Canyon Natural Gas Storage Facility is the largest storage facility in California, and accounts for 23 percent of the total working natural gas storage capacity in the State. The storage facility spans over 3,600 acres, and has a working storage capacity of 86 billion cubic feet, which is enough to provide natural gas roughly two million average California households for an entire year. The facility is owned and operated by Southern California Gas Company, or SoCalGas.

--o0o--

AIR RESOURCES ENGINEER KUWAYAMA: The facility is used primarily to provide natural gas for home heating and power generation. Typically, the storage facility is filled between the months of April and October, and the store natural gas is withdrawn between the months of November and March during the winter season.

The storage facility is an old oil field with approximately 115 injection and withdrawal wells operated and managed by SoCalGas. Each well is connected through a seven-inch well pipe casing to a reservoir located approximately 8,500 feet below ground level.

--o0o--

AIR RESOURCES ENGINEER KUWAYAMA: The methane leak was first discovered on this natural gas storage facility on October 23rd, 2015 during an odor inspection of Well SS-25. At the time, in late October, the storage facility was approximately 90 percent of its working storage capacity. Preliminary investigation was performed using sounding data, and experts from Department of Oil Gas and Geothermal Resources, or DOGGR, and other outside entities believed that the source of the natural gas leak was damaged well casing segment approximately 500 feet below the surface.

--o0o--

AIR RESOURCES ENGINEER KUWAYAMA: SoCalGas first

attempted to stop the leak on October 24th, 2015 by injecting a brine solution into the well pipe to prevent the gas from reaching the leak route. The attempt was unsuccessful.

SoCalGas made six subsequent attempts to control of the flow of the gas from the storage reservoir by pumping heavy brine and even heavier barite mud into the well. The combination of these compounds is designed to counteract the pressure from the gas storage zone and is standard procedure followed by the industry.

All six kill attempts were unsuccessful. This incident command, DOGGR, halted the kill operation due to unsafe working conditions near the leaking well and out of concern for the integrity of the wellhead itself after the last kill attempt on December 22nd, 2015.

--o0o--

AIR RESOURCES ENGINEER KUWAYAMA: In parallel, at DOGGR's direction, SoCalGas also initiated steps to gain control of the leak by drilling a relief well to intercept the well 8,500 feet below the ground. This procedure includes drilling a relief well to the base of the leaking well, injecting mud to kill the well, followed by cement injection to permanently plug the well.

Work on the first relief well started on December 4th, 2015. On February 11th, SoCalGas intercepted the

Well SS-25 and initiated steps to control the leak. Later that day, SoCalGas reported that the effort was successful, and the leak was temporarily under control. Over the weekend, SoCalGas worked to permanently seal the well below ground with cement.

State and local agencies have been performing additional investigations to evaluate the integrity of the control operations. ARB has been providing information on the changes and measured methane since control of the well. There is a press conference scheduled for 10:00 a.m. today to officially report on the status of the well. ARB staff are part of that press conference.

--o0o--

AIR RESOURCES ENGINEER KUWAYAMA: In order to ascertain the success of the well intercept and initial control attempt on February 11th, ARB staff set up an infrared camera to record the plume as the control attempt occurred. This 24-second clip is an accelerated infrared video of the leak kill event.

(Thereupon a video was played.)

AIR RESOURCES ENGINEER KUWAYAMA: The methane plume depicted as the gray smoke is clearly visible over Well SS-25 prior to the kill event, and evidently diminishes as the temporary control operations are completed.

--o0o--

AIR RESOURCES ENGINEER KUWAYAMA: The Aliso Canyon methane leak is not only a concern for the local environment and the global climate, but also for the public's health. As of February 10th, 2016, South Coast Air Quality Management District, or South Coast AQMD, has received over 2,300 complaints about the odor, including incident reports on dizziness, headaches, nausea, and nose bleeds. These are symptoms associated with mercaptans which are the sulfur-smelling compounds added to natural gas, so that leaks can be easily detected.

There have been additional community concerns over benzene, hydrogen sulfide, and radon exposures in the neighboring communities. However, continuous and instantaneous air samples collected during the methane leak incident suggest that the air contaminants at the community sites did not reach its level of concern. The incident reports resulted in relocation of over 5,000 households in two local schools.

--o0o--

AIR RESOURCES ENGINEER KUWAYAMA: The State and local response to this incident has included an array of entities. Agencies, such as Governor's Office of Emergency Services, DOGGR, California Public Utilities Commission, or CPUC, and California Department of Forestry

and Fire Protection, or CalFire, are all playing a critical role. Division of Occupational Safety and Health, Office of Environmental Hazard Assessment, and Los Angeles Department of Public Health have been working to ensure worker safety and work towards protecting the public's health.

ARB and South Coast AQMD, in collaboration with research partners, have worked closely to further address the environmental impacts, exposures, and public health concerns within the neighboring communities.

--o0o--

AIR RESOURCES ENGINEER KUWAYAMA: ARB has played an active role in characterizing the methane leak, and in providing impact -- important information on the neighboring community members throughout the leak incident. Over the period, ARB has provided guidance on indoor air filtration to residents. Staff have also implemented a comprehensive ambient air monitoring effort to understand the air quality in the community.

One of the most significant contributions are the real-time methane and benzene monitors currently installed throughout the neighboring community. In addition, we are currently coordinating several efforts to estimate the total leaked methane emissions from the incident and to develop a Climate Impact Mitigation Program. These topics

will be discussed later in the presentation.

--o0o--

AIR RESOURCES ENGINEER KUWAYAMA: The on-line air cleaner guidance published by ARB provides information on air cleaners that can effectively remove odorous sulfur compounds, as well as benzene and other potentially harmful volatile organic compounds. Staff worked closely with the community and SoCalGas to ensure that only these advanced air cleaners were used.

To date, over 10,000 air filtration units have been installed in the community with close to 6,000 homes installed with air cleaners and 4,000 homes provided with plug-in air cleaners.

--o0o--

AIR RESOURCES ENGINEER KUWAYAMA: The ARB and South Coast AQMD has implemented a number of monitoring resources to evaluate the leak incident. During the early phase of the leak, ARB utilized its statewide greenhouse gas monitoring network, as well as other local partner sites to monitor the leak and evaluate the methane enhancements in the region.

Currently, ARB and South Coast AQMD have installed a total of eight methane and two benzene monitors throughout the community. We have also utilized canister measurements and a mobile platform to assess the

air quality in and around the storage facility.

ARB, and collaborating agencies, are also coordinating airborne measurements and collecting infrared images to evaluate the emissions from Well SS-25.

--o0o--

AIR RESOURCES ENGINEER KUWAYAMA: The community monitoring efforts were initiated as a proactive step to provide real-time notification to the public and to assess the impact of a natural gas plume in the community over time. The data from these ambient air monitors are uploaded to ARB website on an hourly basis to inform the public of their level of exposure to both air contaminants.

This data will also aid in estimating the magnitude of the total leaked methane. This is a chart that shows hourly methane concentration measured in the community since late last year. You can see at the end the clear reduction in the maximum hourly concentration in the community, since the leak was reportedly controlled on February 11th, 2016.

Additional measurements are taken to sample oil droplets that have been reported by many community residents.

--o0o--

AIR RESOURCES ENGINEER KUWAYAMA: Going forward,

ARB and South Coast AQMD have established specific numerical criteria to determine when the air quality in the nearby communities have returned to typical levels expected in the community before the leak. The ambient measurements of methane, benzene, hydrogen sulfide, and mercaptans will be compared to the criteria, and the results reported on the ARB and South Coast AQMD websites.

The guiding principles of air quality criteria includes a comprehensive monitoring effort by both ARB and South Coast AQMD, and numerical threshold to ensure that emissions from the facility are under control and are not posing adverse effects on the community residents.

--o0o--

AIR RESOURCES ENGINEER KUWAYAMA: In order to provide a rough initial estimate of the leak rate, ARB has coordinated over 13 downwind flights with small airplanes equipped with instruments that measure methane. These downwind measurements can be used to calculate an emission rate and will be used for developing and implementing a climate impact mitigation program.

Our current emissions estimate using State coordinated airborne measurements suggests that the highest leak rate was approximately 58,000 kilograms per hour of methane in late November 2015. Subsequent measurements have shown a gradual decrease in emissions

correlated with an aggressive drawdown of the natural gas in the field.

The most recent data suggests that the control of the methane leak have reduced the emission's rate by over 98 percent. The current facility-wide emissions are only two percent of the highest leak rate observed in November. We are monitoring this closely to confirm the emissions we are seeing now as the residual methane trapped in the soil is being released.

--o0o--

AIR RESOURCES ENGINEER KUWAYAMA: The data implies that Aliso Canyon methane leak has released a total of 5.4 billion cubic feet, or 94 million kilograms, of natural gas into the atmosphere. These emissions were over three times the statewide fugitive methane emissions from oil and gas production, and over twice the statewide fugitive methane emissions from pipelines.

This represents approximately 20 percent increase in the statewide methane emissions for the duration of the leak, and a six percent increase in the annual statewide methane emissions in 2015.

--o0o--

AIR RESOURCES ENGINEER KUWAYAMA: This estimate is preliminary and may be a lower estimate of the total methane leaked. ARB will continue to refine these

emission estimates through our active collaborators and the leading research partners in the State. We have dedicated several ongoing efforts and resources to study the emissions, including ARB's statewide greenhouse gas monitoring network, partnership with the Megacities Carbon Project, remote sensing, aircraft measurements, satellite measurements, mobile platform, and canister measurements. We expect to have the refined emissions estimate by summer of 2016.

--o0o--

AIR RESOURCES ENGINEER KUWAYAMA: At the press conference today, we can expect that DOGGR will provide a statement as to whether or not Well SS-25 have been properly sealed. Going forward, the ARB and South Coast AQMD will coordinate additional measurements using infrared imagers, aircraft measurements, and mobile platforms to assess the emissions and air quality conditions in and around the facility.

The two agencies will also continue the monitoring effort to ensure reduction of methane and benzene at the community sites. ARB is also considering additional fence line monitoring requirements for facilities in the regulatory framework for early detection and mitigation to manage such incidents in the future.

--o0o--

AIR RESOURCES ENGINEER KUWAYAMA: ARB has several ongoing efforts dedicated to study emissions of methane and other greenhouse gases beyond Aliso Canyon.

ARB initiated a first-of-its-kind statewide greenhouse gas monitoring network in 2010. Over the years, ARB has also supported several in-house research efforts, as well as extramural research studies to understand the greenhouse gas emissions sources throughout the State to meet the goals of AB 32. These efforts have been critical in informing our scoping plan and short lived climate pollutant strategy, and have formed the backbone of our Aliso Canyon response.

ARB will continue to measure and evaluate methane emissions from all statewide natural gas storage facilities through additional flight measurements in the near term. ARB is also required by AB 1496 to focus on identifying methane hot spots throughout the State and will be conducting an extensive statewide methane survey to identify emissions from oil and gas infrastructures late in the year.

Finally, we are also undertaking several additional efforts for statewide greenhouse gas inventory evaluation, including advanced computational modeling, as well as collaboration with Megacities Carbon Project to better understand the source and emissions of greenhouse

gases throughout the State.

--o0o--

AIR RESOURCES ENGINEER KUWAYAMA: Several agencies are working on rule-making efforts related to natural gas storage facilities to provide early detection and to help prevent future incidents. DOGGR released emergency regulations to address well-related issues. The regulations, which are now in effect, covers topics such as well integrity, mandatory air monitoring, and risk management plans.

ARB has an ongoing rule-making to reduce methane emissions at oil and gas upstream operations. The process has been underway for over a year and will include leak detection and repair requirements. In response to the Aliso Canyon event, staff is coordinating with DOGGR on provisions for air monitoring and has proposed a new provision for emissions reduction measures in the event of large leaks in the future.

In addition to the these two measures, the CPUC is in the middle of a proceeding to reduce emissions from natural gas transmission and distribution and is working closely with ARB to ensure comprehensive and consistent requirements.

This completes the technical update on the Aliso Canyon leak incident. In the next section, Kyle Graham,

from the Legal Office will provide an update on the development of a climate impact mitigation program for the Aliso Canyon incidents.

CHAIR NICHOLS: Thank you very much.

Kyle.

SENIOR ATTORNEY GRAHAM: Thank you very much.

--o0o--

SENIOR ATTORNEY GRAHAM: Chair Nichols, members of the Board, last month Governor Brown directed ARB to produce a climate impacts mitigation program in connection with the Aliso Canyon methane leak. ARB has begun its work toward defining such a program. This Board meeting represents an important step in this process.

In this portion of the Aliso Canyon presentation, I will describe the background to, and substance of, the Governor's directive, key issues that ARB is assessing in connection with ARB's development of a mitigation program, and the path ahead in the program's development and its subsequent implementation.

--o0o--

SENIOR ATTORNEY GRAHAM: First, some background.

In December of 2015, almost two months after the Aliso Canyon methane leak was discovered, Dennis Arriola, the chief executive officer of SoCalGas wrote Governor Brown a letter. In this letter, Mr. Arriola committed, on

behalf of SoCalGas, to work with the Governor and his staff on mitigating the environmental impact of the leak.

A few weeks later, Governor Brown issued a proclamation that declared a state of emergency in Los Angeles County due to the Aliso Canyon methane leak. This proclamation recognized the work that ARB had done and continues to do in measuring emissions from the leak and providing information about the leak to the public, and ordered that ARB continue and expand these efforts.

Furthermore, the proclamation directed ARB to prepare a program to fully mitigate the methane emissions from the leak. Consistent with the earlier letter from SoCalGas, the proclamation stated that SoCalGas will fund this program.

--o0o--

SENIOR ATTORNEY GRAHAM: As just stated, the program that ARB will prepare must, "...fully mitigate the leak's emissions of methane". In orders, ARB must prepare a mitigation program focused on the climate change impacts of the Aliso Canyon methane leak. ARB understands that the leak has had other significant harmful impacts that require careful review and full redress in other contexts, and ARB appreciates that State, regional, and local authorities have already taken and will continue to take significant steps to moderate and respond to these

impacts, and the leak's other effects on the environment and public health and safety.

The proclamation also relates other necessary elements of the mitigation program to be developed by ARB, namely the program is to be developed in consultation with other State agencies, a process that ARB already has begun, it must be limited to projects located in California, and it must prioritize projects that reduce short-lived climate pollutants, such as methane.

Finally, the program shall be developed, if not necessarily fully implemented, by March 31st 2016.

--o0o--

SENIOR ATTORNEY GRAHAM: This slide and the following slides will discuss ARB staff's current approach toward a framework for the mitigation program, the development of which remains a work in progress. ARB staff welcomes public input on each of the topics that will be discussed. First, ARB must define full mitigation in this context. ARB staff believes that full mitigation requires, at a minimum, ton-for-ton carbon dioxide equivalent emission reductions commensurate with leak emissions.

To ascertain the necessary mitigation, of course, ARB must quantify the actual amount of methane emissions from the leak. As you heard from Dr. Kuwayama, ARB has

developed a preliminary estimate of methane emissions from the leak, but a final figure remains some months away.

With its due date of March 31st, ARB's mitigation program must acknowledge and accommodate the fact that the overall volume of methane emissions to be mitigated will be ascertained finally at a future date.

It is also important to recognize what mitigation does not entail. Mitigation cannot be achieved through the surrender of a cap-and-trade compliance instruments commensurate with emissions from the leak. The Cap-and-Trade Program was not designed to cover fugitive emissions, and these emissions were not included when the cap was set.

Somewhat more technically, the global warming potential for methane used in calculating SoCalGas's mitigation commitment, in other words the global warming impact described to methane in the mitigation context, which will bear upon what is required for full mitigation, is not necessarily the same as the global warming potential figure used for methane in some other contexts.

In its public postings regarding its measurements of methane emissions, ARB has used methane's 100-year global warming potential. ARB staff's present view is that in the context of a mitigation program to be accomplished over a relatively compact time frame over the

years immediately to come, it is preferable to rely upon methane's 20-year global warming potential, which is different than the 100-year figure.

Additional issues relevant to defining full mitigation that are undergoing evaluation by ARB staff include the time frame for the emission reductions produced by a mitigation program, in other words, whether there should be a deadline for achieving the necessary emission reductions, and if so when would that be, and whether future emission reductions will require some discounting to account for uncertainty. These timing issues may involve trade-offs.

For example, while there is an obvious interest in attaining prompt mitigation, it is also true that certain mitigation projects that may yield significant transformative benefits over the long term may take some time to get off the ground.

Finally, there may exist other dimensions to full mitigation that could flesh out the meaning of this term in the context of a mitigation program. For example, full mitigation could mean that SoCalGas demonstrate corporate leadership in achieving greenhouse gas reductions through the adoption and implementation of industry-leading best practices and emission controls, as well as policies that will encourage and facilitate emission reductions by its

customers and contractors.

--o0o--

SENIOR ATTORNEY GRAHAM: Next, ARB will ascertain governing principles for the mitigation program. ARB staff believes that certain core principles should guide the choice of projects to be included within the mitigation program, and that the mitigation program as a whole should work towards several fundamental objectives.

Viewing the program as a whole, as just mentioned the program shall achieve full mitigation accomplished in an equitable and transparent manner. More specifically, ARB believes that the projects that comprise the program must satisfy certain principles. As described, the set of projects within the program must prioritize reductions of short-lived climate pollutants.

Furthermore, each project within the program must: Possess a substantial nexus with the global warming impacts of the Aliso Canyon methane leak; complement the existing and anticipated efforts of federal, State, and local agencies to combat global warming and protect the environment; and, yield greenhouse gas emission reductions additional to those that would be achieved under a conservative business-as-usual scenario, including actions that SoCalGas already is or will be otherwise legally obligated to undertake or voluntarily agree to prior to

the natural gas leak at Aliso Canyon.

ARB also believes that other considerations should inform, if not necessarily direct, the selection of specific projects for the program. Additional factors under consideration by ARB staff include whether the project will: Provide environmental and economic co-benefits; be transformational, in other words, contribute to significant additional emission reductions outside of the project's immediate scope, and confer benefits upon disadvantaged California communities or communities directly impacted by the leak.

--o0o--

SENIOR ATTORNEY GRAHAM: While ARB staff believes that individual emission reduction projects must comport with defined principles to be included within the mitigation program, ARB does not at present presently anticipate that the mitigation program it will propose on March 31st will direct the funding of specific mitigation projects. Instead, the program will focus primarily on developing a coherent framework and process for subsequently identifying suitable mitigation projects, implementing those projects, monitoring their progress, and certifying full mitigation.

The mitigation program may, however, recognize certain types or categories of emission mitigation

opportunities that should receive emphasis within the program upon its implementation. For example, through its ongoing development of the short-lived climate pollutant reduction strategy, ARB has identified several promising mitigation opportunities for methane and other short-lived climate pollutants, including those that appear on this slide.

The program may recognize some or all of these categories, and others besides, as especially attractive areas of program concentration. Many of these mitigation opportunities relate to the agriculture and landfill sectors, which, when combined, produce more than 75 percents of the State's methane emissions.

--o0o--

SENIOR ATTORNEY GRAHAM: The prior slides lead to the question of how the mitigation program will be implemented. Here again, ARB is considering several alternative approaches and welcomes public input. The slide here reflects one possible implementation model, preferably described, at this point, as a straw person. This avenue for implementation would involve the identification of a portfolio of distinct categories of projects that would entail different but complementary focuses. Individual projects would be chosen from some or all of these categories, project bins as it were, funded

by SoCalGas, and when put together, these projects would constitute a robust mitigation portfolio that will achieve the program's overall objectives.

In addition, if deemed necessary and appropriate, a supplemental financial backstop could be put in place to ensure that the program will achieve full mitigation. A third-party administrator, chosen by ARB, would be primarily responsible for day-to-day oversight of program implementation with ARB nevertheless maintaining a significant role in this respect. In this model, no money would flow through the State.

Any discussion of implementation furthermore must recognize that ARB, along with the attorney general and the city and county of Los Angeles, have lodged a civil complaint against SoCalGas in connection with the Aliso Canyon methane leak.

This lawsuit, People v Southern California Gas Company, alleges, among its other claims, that the Aliso Canyon methane leak constitutes a nuisance insofar as, among other theories, its methane emissions are contributing to global warming. This action could conceivably provide a mechanism for implementing a mitigation program and ensuring SoCalGas's compliance with the program.

--o0o--

SENIOR ATTORNEY GRAHAM: Finally, going forward, ARB will continue to consult with other State agencies in its preparation of the mitigation program. As shown in this slide, ARB has opened an additional channel for public input through its website through which stakeholders can post and view comments regarding the mitigation program.

ARB staff anticipates that a draft version of the mitigation program will be posted on its website during the week of March 7th, 2016. When the draft is posted, a second comment period will begin in which stakeholders can offer comments upon the draft. These comments then will be reviewed by ARB staff as it prepares a final version of the mitigation program by March 31st, 2016.

Thank you very much. This concludes that portion of the presentation.

CHAIR NICHOLS: Thank you. I'm sure that Board members will have questions and comments, but I think we should probably just hear from our four witnesses who have signed up to briefly address us on this topic.

So beginning with Dr. Wallerstein from the South Coast Air Quality Management District

DR. WALLERSTEIN: Good morning, Chairman Nichols, members of the Board. First, our good wishes to Senator Florez and Board Member Takvorian on their appointment to

this Board. I've worked with them over the years and I know they'll be a strong voice for clean air here at the CARB Board.

I'm here primarily just to offer preliminary comments in response to the staff presentation. And hopefully you've received from the clerk of the Board a letter that Dr. Burke Sent to Chairman Nichols in January regarding the mitigation funds and how they should be spent. And attached to that letter is a resolution from our governing board requesting that the monies be spent in the area of direct impact, that being the Porter Ranch and surrounding area, and if not there, in Southern California.

And we hope very much that that will be the decision of this Board. There's precedent for that in other mitigation programs and we'll submit that in writing.

Secondly I want to highlight something mentioned in the staff presentation. They talked about the 100-year assumption versus the 20-year assumption about the lifetime of methane and its impacts. And that has a dramatic, dramatic impact on how much mitigation is required. And by going to what we believe, and I believe your staff believes, is the more current science, that will actually triple the number that would otherwise be

calculated. So to fully mitigate this, it's critical that we use the most current science.

Third is an issue that we've talked about many times between our agencies and a theme that has been in many of our planning documents and that's comprehensive integrated planning. And so co-benefits was highlighted by your staff, but we would argue in selecting mitigation projects, we really need to make that a primary criteria, and there are strategies such as reducing carbon black that could give us multiple air quality and environmental benefits.

And so in our future comments regarding this item, we will propose to you a set of items that we think should be high priority in your selection and criteria for soliciting projects.

And I thank you for the opportunity to appear before you today.

CHAIR NICHOLS: Thank you. And thanks for the good partnership on monitoring and public information. I think this is a really good example for everybody

DR. WALLERSTEIN: This is being truly comprehensively monitored, so that the public and both our policy boards know exactly what the quality of the air is.

CHAIR NICHOLS: Thank you.

Brad Heavner from CalSEIA.

MR. HEAVNER: Good morning, Madam Chair and members of the Board. Brad Heavner with CalSEIA, California Solar Energy Industries Association. And thank you very much for all of your hard work on this very important issue.

Just very quickly. It's taken us a long time to reach this level of dependence on natural gas, and it's going to take us a long time to develop alternatives to natural gas usage. And I appreciate the staff's comments that some of the mitigation strategies are transformative and will take time.

Solar water heating is an important way to reduce our dependence on natural gas. Most people, when they think of solar, think about electricity production from PV panels, but there is, of course, the other white meat with using the heat from the sun to heat water.

And looking at residential natural gas usage, CEC reports that 44 percent of residential natural gas usage is used to heat water, and also it is used in businesses as well. So it's a very significant usage that we need to develop alternatives for. And one reason I want to come here this morning is to present some research by NREL, National Renewable Energy Laboratories, that recently compared different technological approaches to reducing greenhouse gas emissions from heating water in homes and

businesses, comparing electrification with heat pumps to solar water heating systems and other technologies.

And it found that solar water heating with a backup of tankless hot water gas heating systems is the most effective approach towards reducing greenhouse gas emissions from water heating. And it is probably -- that's from a national perspective, and it probably differs a bit location by location. We've asked them to follow up and produce some actual numbers for some sample cities around California. And they promise to do that very shortly. So we will present that in further comments.

I won't take the Board's time this morning to describe why the CPUC-administered CSI thermal program has been much less effective than it was intended to be by the legislature. But we can follow up with staff and then further comments to describe that, and the real opportunity for action as part of this mitigation program to really prove this industry.

Thank you very much.

CHAIR NICHOLS: Thank you very much.

Tim I'Connor from the Environmental Defense Fund.

MR. O'CONNOR: Good morning, Chair Nichols and members of the Board. My name is Tim O'Connor. I'm the California Director for Environmental Defense Fund's oil

and gas program.

Let me start by just putting a little bit of context behind the magnitude and size of the issue before you today. I think that the staff presentation did a great job in setting the framework. But when we look at the unprecedented nature of this emission, you can look at it in terms of equivalencies. Essentially, it's the same as burning a billion gallons of gasoline. Over the course of four months, this one facility, this one leak put out more climate change pollution on a short-term basis than California's largest facility. It's put out climate change pollution, which has resonated with people from across the nation and from across the world waking up the idea that oil and gas infrastructure, as it ages, does have and can have a tremendous disbenefit to our climate and undermine many of our progressive and very important environmental programs.

I'd also like to put in context the work that the State has done, in particular your agency, in addressing and responding to this leak. Starting from the very top from the Executive Officer Richard Corey's actions and to get those airplanes in the area and to do those flyovers and to develop initial estimates, it was the work of this Board and the staff of this agency that really started the process of a significant and serious engagement to address

this problem. And I don't think we'd be here today without the quick thinking and action of the members of your staff. And so for that, we thank you.

On the mitigation side is we hope to hear eminently that the leak itself is permanently stemmed, and we move into that mitigation, how to make this right, how to make the atmosphere whole. There's a couple things that really jump out to us. Number one is we have an amount of methane that's been put into the air that is going to be causing some very significant impacts, as Dr. Wallerstein said, and as the staff report and the staff presentation suggested, looking at this on a 20-year basis is the right way to go.

However, if you look at it based on the AR-4, the assessment report -- the fourth assessment report from the IPCC, you see 20 percent lower emissions than actually with the newest science, with the best science from AR-5 would demonstrate. The methane has a climate change potency more than 84 times that of carbon dioxide, not the 72 number that the AR-4 estimate provides. And we recommend that the staff use this opportunity to update that estimate to go for full mitigation of the damages.

And secondly, look at the amount of methane that's been put into the air, we think and we think that the environmental community at large sees methane

pollution as needing to come out of the air. We have a multitude of sources in California that contribute to our methane burden.

The short-lived climate forestry plan says we need to reduce about 20 million metric tons of carbon dioxide equivalent pollution from methane sources. And I would recommend that the Board go after methane and include oil and gas production and sources in California amongst the list of those that are considered.

Thank you very much.

CHAIR NICHOLS: Thanks, Tim.

Lastly, we have Nathan Begtsson PG&E.

MR. BEGTSSON: Good morning, Board members. It is a pleasure to introduce myself to you all for the first time in place of Matt Plummer who has gone on to focus primarily on the bioenergy and tree mortality issue. Good morning.

I'll just say that we appreciate staff's presentation today, and that PG&E is working closely with the ARB on the revised oil and gas regulation, and also working with DOGGR to comply with the emergency regs. We already are -- have complied with four of the six, and will be in compliance with the additional two very shortly.

And with that, I'll cede the rest of my time.

Thank you.

CHAIR NICHOLS: Thank you. Well, we can bring this back to the Board then. As you all know, there's no action to be taken today, but I know that Board members have been following this episode with great interest, and will have some thoughts that they want to contribute. I would just start out by saying in the -- particularly because of the focus on the future, which has characterized a lot of our efforts here to date that I had an opportunity to meet with the DOE, Department of Energy Secretary Ernie Moniz in Los Angeles earlier this week, and to also participate in a round table with Mayor Garcetti and local members of Congress and the legislature, et cetera, who are all intensely interested.

And there is certainly no shortage of ideas or approaches to -- how to mitigate or, frankly, how to take advantage of the potential for having a significant amount of money to spend to do something about methane. And there's nothing at all inappropriate about that. It's, I think, important that we look upon this in a sense as an opportunity to do as much good as we can and to demonstrate our ability to handle it.

But the point that Secretary Moniz made, which I just want to leave with people as kind of a part of their thinking is that what at Aliso Canyon is a result of aging

infrastructure. To date, we have no reason to believe that anybody did anything wrong. The site had been evaluated. They were doing their monitoring on the basis that it had been approved by agencies that are responsible for overseeing these things. Clearly, we know we have a deficit in terms of regulatory oversight of these kinds of facilities, and that is being addressed and will be addressed for the future.

But the bottom line is that this kind of leak or fracture or episode, whatever you want to call it could happen at any time, essentially in any place where we have similarly aged infrastructure in the State. And there is no known methodology for going out and surveying and saying something is about to happen. In other words, you can detect a leak once it starts, you can see a fracture, you can see something broken if you're monitoring in a regular way, but the idea that you can anticipate it with any precision at all, that in any one place something like this will happen once things start to go wrong is at least, as far as we know at the moment, has no validity to it.

So in thinking ahead, the point about reducing reliance, but also about how we -- how we do a better job in the future of addressing this aging infrastructure and the need to invest in it is going to be very important. I

just want to -- that may help to put things a little bit in perspective.

I'm just going to start down at this end, and move from one end to the other. So I'll start with Dr. Balmes.

BOARD MEMBER BALMES: Thank you, Chair Nichols.

Well, I appreciate -- well, first off, I appreciate everything that the multiple agencies have done to try to monitor and mitigate this environmental disaster.

So that said, I totally agree with you about the aging infrastructure issue. But given that there's no way to tell whether underground storage of natural gas facilities are intact or not, that would question whether we're even, you know, using these facilities in the first place. And so we're obviously going to be using natural gas for the foreseeable future as a cleaner type of fuel source than many others.

So I think we really have to consider a better way to store natural gas than old oil wells, where we don't know if they're going tro leak or not.

So that's number one.

Number two, I appreciate Dr. Wallerstein's concern about the Porter Ranch community, which has been heavily impacted by this disaster. And I've been

interviewed several times by reporters about the health consequences of the exposure. But the -- his statement about trying to have the mitigation efforts be in the Porter Ranch community, I just think it's too small of an area for us to be concentrating mitigations, that really the problem is mostly an environmental one, rather than a health one. Not to minimize the health concerns of the population. I fully agree with efforts being made to study the long-term effects of the compounds that have been released, but the community -- and the community, you know, has legitimate concerns. I'm not trying to minimize that. But I think that mitigation efforts have to be at a broader scale than the Porter Ranch area.

CHAIR NICHOLS: Thank you.

Mr. De La Torre.

BOARD MEMBER DE LA TORRE: I just wanted to clarify something. There was a press conference last week by one of our elected officials who was demanding ongoing independent monitoring of the facilities. And to my mind, we're the ones who are doing the monitoring. It isn't DOGGR. It isn't any other entity. Am I missing something with regard to that claim or that demand? I mean, we are the independent authority that's doing the monitoring. Am I wrong on that?

CHAIR NICHOLS: We are an independent authority.

We don't -- you know, we don't deal with this facility on a day-to-day basis. We're certainly not part of their operation. I believe that was a comment that was made in response to a meeting with the residents of the area who were expressing their profound lack of trust in all agencies, all authorities, and everybody else because of what they've been through, and understandably was looking for some solutions.

BOARD MEMBER DE LA TORRE: Well, her claim was specifically that DOGGR should not. And DOGGR may or may not have been doing monitoring, but we've been doing it.

CHAIR NICHOLS: Yeah.

BOARD MEMBER DE LA TORRE: And so we are the independent authority in that context.

CHAIR NICHOLS: We're the independent monitors. Yes, that's right. I don't -- I certainly didn't take that as a request that we should be removed our replaced. We've talked with U.S. EPA and we've talked with the Senator's office since then. And I think -- I think things are fine now.

BOARD MEMBER DE LA TORRE: Clear now?

CHAIR NICHOLS: Things are fine.

BOARD MEMBER DE LA TORRE: Good.

CHAIR NICHOLS: Any other comments on this side? Ms. Riordan.

BOARD MEMBER RIORDAN: Yes. Madam Chair, just to underscore the points that you raised, I think our focus certainly ought to be that we prevent this from happening again. And there are obviously interests in mitigation. But the first and most important thing in my mind is let's just not have this happen again. What can we do to try to -- you know, the community that was affected has suffered terribly, but -- and the community State as a whole will suffer as well. But if we can prevent it from happening again, we've gone a long way. So that's --

CHAIR NICHOLS: Thank you.

Supervisor Gioia.

BOARD MEMBER GIOIA: Thanks for the report. And I want to start by saying, I understand, and I think Director De La Torre made a comment about distrust. And I think as we all know, I think distrust is a natural sort of reaction people have when something like this happens. And living and representing a community like Richmond, that has a refinery, whenever there is an accident at that refinery, I think there's often concern about agencies that regulate. Sometimes that concern is legitimate, sometimes that concern is maybe not as legitimate. But I think we always respect and understand that folks respond that way, so -- and I think we appreciate that.

And I agree, I think that -- I know in the South

Coast letter that -- you know, the proposal is to try to spend all -- to do all the mitigation near Porter Ranch or in the South Coast. I agree with other's comments that this is while I think projects will be identified in that area, it's a statewide concern. It affects climate change, so that the mitigation projects should be statewide in scope.

However, I think it would make sense to think about maybe applying the same kind of, you know, minimum expenditure that -- for cap-and-trade, at least 25 percent of the -- of cap-and-trade monies need to be -- need to benefit disadvantaged communities. We can think about how maybe we identify a minimum number dollar amount associated with mitigation projects that also achieve these co-benefits, and benefit disadvantaged communities. I'd like us to think about that and for maybe you to come back on that.

And I think your slide 25 sort of identified the other relevant factors of co-benefits, transformational qualities, and the benefits here, but maybe formalizing that more so it's understood who's eligible and how the money will get distributed. I'm not even sure the scale of what we're talking about.

And on the last point of prevention, you know, having gone through years of sort of dealing with the

cause of the Chevron fire in Richmond and the U.S. Chemical Safety Board, you know -- you know, we have our own regulation in Contra Costa that regulates safety at the four refineries there. We've learned that preventative maintenance, you know, is successful at avoiding or minimizing accidents down the road. In the case of the Chevron fire, it was -- right, it was some -- it was piping that maybe had not been replaced when it should have been replaced based on an inspection schedule.

I don't know if this is well beyond that. I don't know this field, but does it make sense to think about that issue that, you know, there are practices in safety culture in companies that look at how we identify maintenance schedules, and therefore minimize again the accidents that happen. I think the U.S. Chemical Safety Board concluded in the Chevron fire that, gee, had there been -- had Chevron followed some practices and replaced the pipe earlier that that fire most likely would not have happened. So I think can we equate that to looking at that issue? I'd be interested to learn more about that.

CHAIR NICHOLS: Mr. Corey, you might want to comment on what the rule-making process is actually looking at.

EXECUTIVE OFFICER COREY: Yeah, I think I'm going to -- and I think it will be useful, there's a few other

elements in the Governor's declaration that would be important to point out that I'm going to cover.

The first is that the declaration required that a root cause analysis be done by an independent contractor that has been selected, and by DOGGR, I think the few recommended by a gas company and one was selected. That analysis, as well as additional data provided by the gas company, are also going to be independently reviewed by a panel of the National Labs that have been established. So Lawrence Berkeley, Lawrence Livermore, and Sandia have been pulled into this process to do this evaluation, because as Supervisor Gioia points out, it's beyond the questions that this Board is posing or beyond just Aliso Canyon. They're the other natural gas storage facilities in the State, as well, and having a clear understanding of what happened and why and from an oversight mitigation standpoint and what those actions can be is important.

SUPERVISOR GIOIA: Right.

EXECUTIVE OFFICER COREY: In addition, the emergency regulations that DOGGR was directed to establish required monitoring at each of the wellheads at all the storage facilities in the State. Those regulations are already effective now. In addition to that, it required each of the natural gas facilities in the State to prepare a risk mitigation plan, basically a risk assessment and

mitigation evacuation related plan that was triggered by DOGGR's regulations. So the clock has started for development of those plans by each of those agencies.

And DOGGR is working on its perm regulations, and we're also working very closely with DOGGR on our oil and gas regulations learning from what -- basically posing the questions what can we learn from this experience to even further strengthen the regulations that we were already working on.

CHAIR NICHOLS: Thank you. I think one of the things also that we learned -- this is not prevention per se, but in terms of dealing with concerns that are now obviously much broader than they were before -- we did post the monitoring information from our monitors on a real-time basis in a way that anyone could access it. And that's not common and it requires a little extra effort. And it may be that it will turn out that as time goes by very few people will care, but the fact that somebody can, if they want to, without having to write a letter or put in a Public Records Act request, or whatever, just go and get the raw data themselves and figure it out, I think is a very important element going forward as well.

Other members of the Board who would like -- Ms. Takvorian. Yes.

BOARD MEMBER TAKVORIAN: Thank you. And thank

you to the staff and to the agencies, South Coast, and everyone who has really addressed this, responded really, I think, in an impressive way. And I would agree with Chair Nichols that it's very important to have this monitoring data out there, both for the immediate information that people need as well as for long-term analysis.

So my perspective, and what I'd like to address, is both on Ms. Riordan's attention to prevention. And if I understood correctly, what I heard was that all kill attempts were unsuccessful, but these were standard industrial practices. So it brings into question what the permitting process is and how these practices were allowed to be part of the permit review, and were allowed to be accepted as those that would mitigate a leak.

So obviously, the time has passed for this particular facility, but it isn't passed for all the other facilities that are natural gas facilities out there, and taking it further for other industrial facilities. I think it really brings into question what we -- what we accept as standard industrial practice for mitigating any kind of an emergency like this one.

So I would love to see us look at that a little more carefully, because these are exactly the kinds of things that happen in many communities, but often in

environmental justice communities, because they're adjacent to industrial facilities and industrial fields. So I think it's really important to be looking at it, because this kind of accident, as you all know, can devastate a community.

The other question I have is what about long-term monitoring? We're talking about long-term air monitoring, what about the health monitoring? And I am interested in what the chronic health effects might be for this kind of exposure. And I hope that that's going to be something that we can look at over time.

Lastly, I guess I would just say in terms of mitigation, that I think this -- that we really do have to have a long view about this. Obviously, the impacted community needs to be made whole, and there's going to be a variety of ways that that will happen. But I also think that some of the prevention practices and other kinds of mitigation could go -- could be applied more broadly across California.

Thank you.

CHAIR NICHOLS: Dr. Sherriffs.

BOARD MEMBER SHERRIFFS: Thank you. I have laryngitis, so I'll be signing most of my comments today --

(Laughter.)

BOARD MEMBER SHERRIFFS: -- and be brief.

Just a question. So odor detection, what's the instrument for odor detection and how often is it done? And it certainly stands to reason that the older the infrastructure, the more frequently you have to do it. And I would certainly concur with the previous comments about, boy, how soon do you try a relief well when the kill effort hasn't worked and you have a leak of such magnitude.

CHAIR NICHOLS: Good question. Who is the best to respond to that? I mean, we know that the detection level for mercaptan is lower than any device that they can put out there to measure it. And that's why they use it in the first place is because it's so unpleasant that people respond very quickly. It's just because it's so awful.

RESEARCH PLANNING, ADMINISTRATION & EMISSION MITIGATION BRANCH CHIEF HERNER: Right, that is correct. The standard method detection limit using scientific equipment is about 5 ppb. And supposedly noses can smell Mercaptans at 0.1 ppb. So the nose really is the best indicator of whether or not you have --

BOARD MEMBER SHERRIFFS: So we're all equipped.

RESEARCH PLANNING, ADMINISTRATION & EMISSION MITIGATION BRANCH CHIEF HERNER: Yes, very much so.

BOARD MEMBER SHERRIFFS: And how often is it being inspected?

(Laughter.)

RESEARCH PLANNING, ADMINISTRATION & EMISSION MITIGATION BRANCH CHIEF HERNER: Well, every time any resident takes a breath, I suppose.

(Laughter.)

CHAIR NICHOLS: I think there are differences in sensitivity, but not that much.

RESEARCH PLANNING, ADMINISTRATION & EMISSION MITIGATION BRANCH CHIEF HERNER: There are.

CHAIR NICHOLS: Not too much.

BOARD MEMBER BALMES: And I just would point that --

CHAIR NICHOLS: Yes, Dr. Balmes.

BOARD MEMBER BALMES: -- what we don't know are the long-term --

CHAIR NICHOLS: Yes, correct.

BOARD MEMBER BALMES: -- health effects of mercaptan exposure, because it's so nasty, you know, in terms of an odorant that really nobody has ever bothered to really study long-term effects, because people aren't usually wanting to stick around for long-term exposures.

CHAIR NICHOLS: All right.

BOARD MEMBER SHERRIFFS: I'm sorry, how frequent

was the monitoring? Is this random testing like drug testing at the workplace or --

RESEARCH PLANNING, ADMINISTRATION & EMISSION MITIGATION BRANCH CHIEF HERNER: Well, at the site, I know that SoCalGas does a daily inspection on the field where people drive around the entire field and cover it. And indeed, that's also how the leak was initially determined or found.

CHAIR NICHOLS: Having visited the site myself, it's huge, and it's also very complicated. It's not a field in any kind of normal sense. It's folded and fractured, and, you know, parts of it are hidden away in the mountains. And so it's really the neighbors themselves I think were the ones whose complaints finally forced the company to go out there and find this leak. I don't believe that it was detected as a result of their routine evaluation. Although, they have people out there all the time, all the time.

I also want to say one thing about this local versus non-local issue, because I had an opportunity to have dinner last night with a group of legislators, one of whom represents the community that has been most impacted by another of our famous Southern California waste sites, the exide lead -- former lead battery site, who, you know, was expressing a fair amount of indignation about the

amount of attention that the Porter Ranch community had received relative to the community that lives around exide site.

And, you know, we were commenting on why. She wasn't -- she wasn't bitter about it. She, in fact, had been pushing hard to get some funding for remediation and attention to the community's concerns, and had been successful. So, in that sense, this is a -- it was a victory for an environmental justice concern.

But it is a fact that when you're dealing with a large regulated utility like the Southern California Gas Company, it's relatively easy to force them to do things, to put it bluntly. I mean, the State has many regulatory handles and they -- and they are using them, even if they haven't always used them as effectively as they could.

Whereas, you know, with this other facility, and there are plenty of industrial facilities out there, where it's a company that's not extensively regulated, not a public utility, maybe in certain instances, as was the case with Exide, not even financially liable, and that was part of the reason why they were engaging in some of the bad practices that they were, then we seemed to have a much harder time, you know, dealing with the community concerns.

So it's just -- it's an interesting lesson, I

guess. And hopefully, the attention and concern that were given to the Porter Ranch people, including, you know, voluntary relocation, and placing air filters in everybody's homes that wanted them, and so forth, could be a model in other situations as well. So that -- I think in that sense we may also learn something from this episode as well.

Without further ado, I think we should probably -- oh, I'm sorry. Excuse me, Mr. Florez, I didn't see you. Senator.

BOARD MEMBER FLOREZ: Thank you, Madam Chair. I'm new at the end, so I get it.

CHAIR NICHOLS: There you go.

BOARD MEMBER FLOREZ: Just a couple of comments, and maybe a couple of questions that have been mentioned. I think my view from this perspective would probably be, although the Secretary came out and we all talked about the aging infrastructure, I think if we fall into that line of reasoning, I think we're going to be here a lot, and a lot more often. And I don't have to -- I mean, obviously, you guys know about San Bruno, and we have the same argument in Flint, you know, aging infrastructure lead, aging infrastructure gas leaks, explosions.

And I think I agree with the Chair that we -- you know, you're never going to be able to hence be ahead of

that. However, I do think from the Board's perspective, as has been mentioned I think by Diane, in the permitting aspect of this, I think it's contingent on us to actually look at all of these items piece by piece. You know, and I -- maybe go back to just safety valves, right? Right now, you have to -- I think, it's 300 feet or something from a community. That's the rule, but I'm not sure whether or not we shouldn't have safety valves more places more often, and whether or not this shouldn't be checked more consistently.

You know, as part of the regulatory process, the overall thought for me, Madam Chair, is really the consequences of the damage done. And I think there's still an issue about the long-term mitigation. I was very interested, Mr. Graham, to hear you talk about the two paths. You know, the one is the trade-offs, I think, as you mentioned them. And I think I'm really interested and the Board hopefully can get more from you on what those trade-offs really are.

I know Mr. Wallerstein talked about the comprehensive aspect of this, the ongoing long-term consequences of the health effects after the fact. These consequences to me seem to point to the fact that we need more information on each of those paths. And more importantly, as you mentioned, Mr. Brown, some take longer

time frames to implement. And I think it would be important to know what are those time frames, how long will it take to actually get full mitigation for the consequence of the damage done?

And I am very interested in listening to Mr. Wallerstein, at some point in time, along with staff talk about, you know, the long-term aspect and the funding portions to make this whole for this community. I think it's -- obviously, we -- we're going to learn a lot from this, but I think as we're dealing with the aftermath, I think it's important for us to kind of set some standards, look at our regular -- you know, our permitting processes, how some of this stuff could actually be -- we could be ahead of it a bit. And obviously, there's a whole -- I think there's eight investigations, Madam Chair, right now ongoing into this issue.

Each are going to point to various aspects of where this should go. I think from CARB's perspective, it seems to me, you know, beyond the disclosure and the requirements of equipment, procedures, those types of things, we really -- long-term I think the question for most folks out there is, you know, when is it safe again, and ultimately, who measures that, and when can we feel comfortable in that answer?

And so I hope as we move forward -- I want to

congratulate staff for a very good thorough presentations. However, I'm still going to be more interested in listening to the two paths, the time frames for those paths, and what full mitigation really means as we move forward. So that's -- hopefully, we can continue to get those updates, Madam Chair.

CHAIR NICHOLS: Great. Thank you very much.

I think we will shift now to the second item on the agenda, which is the report from the Office of the Ombudsman. So we have a switch of personnel here.

I'll just start out briefly introducing this item. La Ronda Bowen who is our Ombudsman has been working very diligently to use her office, not only within California, but her recognition as a national and local leader on small business and environmental issues in a way that would make sure that the voices of California, small business owners, are heard early in our policy discussions to increase the opportunities for the Air Resources Board to provide the tools that small businesses need to reduce their emissions, and by making ARB, at all levels, more proactive on issues that affect small business, including looking for opportunities where small businesses can actually play a role in implementing regulations that will be economically beneficial for them and for us as well.

So in today's presentation, La Ronda is going to

talk about the priorities for 2016 for the ombudsman. And we are going to hear from also the co-chairs of her Small Business Opportunities Advisory Panel, which will be a first for us. So welcome to Mr. Abbs and to Mr. McCaskill. I should have remembered that name, because my daughter works for Senator McCaskill from Missouri, so it's a name that we hear a lot.

MR. McCASKILL: No relation, unfortunately.

CHAIR NICHOLS: Anyway, welcome to both of you, and -- but before we hear from you, we'll hear from Mr. Corey and then I believe La Ronda has a presentation as well.

Okay. Mr. Corey.

(Thereupon an overhead presentation was presented as follows.)

EXECUTIVE OFFICER COREY: Yes. Thank you, Chair. So very briefly, it's particularly important to engage small business given the broad and ambitious agenda I outlined before the Board last month. And today, as noted, La Ronda will introduce to you her co-chairs for the Small Business Advisory Panel, Alan Abbs, the Executive Director of the California Air Pollution Control Officers Association, and Richard McCaskill, President and CEO of Recon Recycling, a California small business in San Diego.

She'll also share highlights from 2015, and how she will in 2016 continue to focus on helping small business become even more effective at reducing air pollution and greenhouse gas emissions while thriving economically.

And with that, La Ronda.

OMBUDSMAN BOWEN: Thank you, Chair Nichols and Executive Officer Corey. I'd like to welcome the new Board members. Happy to meet you and look forward to working with you.

I want to thank the Board for your continued support of the ombudsman's work during 2015. Our office is a creation of the 1990 Clean Air Act Amendments and the California Government Code. It's a place where ARB policies and regulations intersect with a wide array of stakeholders, including other public entities and private citizens, students and small business owners, non-profit organizations and start-up companies.

In the course of a year, we hear questions, complaints, suggestions, and compliments about ARB programs. Where possible, we respond by connecting people with information and resources that address the issues and strengthen our ability to reduce emissions while maintaining a healthy economy.

In his January presentation, as Mr. Corey said,

he identified major ARB goals. He identified them in the areas of climate change, criteria emission reduction, and exposure -- reduced exposure to air toxics. But he also identified a golden key to meeting those challenges, and that was collaboration.

Today's report will focus on the year 2015 programs your ombudsman implemented to accelerate the attainment of ARB's goals through collaborative efforts, and we expect to continue and strengthen these in 2016.

In recognition of the critical role that California's 3.6 million small businesses have in our State environmental progress and economic strength, we will focus today on this sector.

--o0o--

OMBUDSMAN BOWEN: I will briefly review the ombudsman's mission and introduce the small business and CAPCOA co-chairs for the Small Business Opportunities Advisory Panel, and you'll hear brief remarks on the 2015 goals of SBOAP, and how they mesh with those of ARB and the air districts.

Next, I'll give you a quick overview of how the ombudsman team is aligned to serve California's stakeholders, then share examples of our work to support and implement ARB's policies and goals through compliance assistance, engagement, and customer service in ARB

priority areas.

I'll close with our goals for engaging stakeholders to support the Executive Officer's 2016 priorities.

--o0o--

OMBUDSMAN BOWEN: Our mission -- the mission of the Office of the Ombudsman is to support CARB staff in achieving federal and State clean air objectives, while fully engaging California's small business owners and entrepreneurs along with other stakeholders. These perspectives are invaluable to crafting efficient, effective, and enforceable regulations.

--o0o--

OMBUDSMAN BOWEN: Ombudsman has four main tools to support the ARB in achieving the 2016 program priorities. These are: Outreach to existing and new stakeholders, engagement with internal and external stakeholders, compliance assistance to help regulated entities implement programs and rules designed to achieve our goals to protect public health, and collaboration with through an ever-increasing resource network to help ensure effective communication and real knowledge transfer. With these tools, we can amass the knowledge and resources needed to meet the big challenges ahead.

--o0o--

OMBUDSMAN BOWEN: California's innovative small business owners are critical links to our continued environmental and public -- environmental and economic health, because many small businesses see the opportunity in environmental policies and regulations, and because ARB sees great opportunity to enhance our success by engaging small businesses along with air districts, we call the group the Small Business Opportunities Advisory Panel, or SBOAP. It's a small business panel that is required by the Clean Air Act.

It consists of 10 regulated small business owners and operators and three agency representatives. Businesses currently represented include food processing, automotive sales, trucking, furniture manufacturing, construction, traditional fuel distribution, and waste-to-energy consulting. Representatives are geographically dispersed from San Diego to Fort Bragg.

The SBOAP meets quarterly. Members may attend in-person, by phone, or through the web. Three co-chairs, Air Resources Board, small business, and the CAPCOA, represent policy, regulatory, and implementation perspectives.

The SBOAP is working with ARB to sure that small business owner perspectives and knowledge are more effectively communicated and integrated into ARB's

thinking. They have provided input on policies, regulations, compliance assistance, rule implementation, and enforcement effectiveness. ARB Board members, senior, and program staff have engaged in dialogue with the SBOAP on the scoping plan update, truck and bus, low-carbon fuel standard, enforcement, economic analysis, air toxics, and compliance initiatives.

--o0o--

OMBUDSMAN BOWEN: The 2015 SBOAP meeting at Hughson Nut Company included a tour of an almond processing facility. From these photos, you can see several ARB policies and programs in place along with those of other agencies. Board Member Eisenhut was with us for that tour. And I believe he counted several policies in this panel of five photos.

You want to identify them.

BOARD MEMBER EISENHUT: I take it that was an invitation to speak.

(Laughter.)

BOARD MEMBER EISENHUT: I'll just run through in order around the pictures. In the top left, I see a group with -- you wouldn't notice probably, unless you had a beard, but everybody has got a hairnet on, an indication to me of a well-run and implemented food safety program, not so much an air issue.

In the top right picture, we've got a trailers, not so much an issue, but we also had a pile of byproduct, which is a -- technically almond hulls, which is used as cattle feed, but that -- there are a number of fugitive air issues surrounding the both the harvest of that crop and the off-farm -- the first off-farm, associated with that crop. Fugitive air is a major issue for the industry.

Bottom left, we've got an electric -- what appears to be an electric car, which is implemented by that company. Also, just by the way, we've got Cal/OSHA approved parking zones and cones.

Bottom center, what appears to be a port truck and a forklift, both of which are of interest to us. And bottom right, trailers which don't have the tractor with them, but are regulated -- the tractor that pulls that trailer are regulated under truck and bus. And the left-hand area there is, what we call -- it is part of the dust control operation for that enterprise.

So those are just some of the ways that that industry would be interfaced with that.

OMBUDSMAN BOWEN: I think you passed the test.

Thank you.

Next, I will --

CHAIR NICHOLS: It was clever of you to enlist a

Board member as part of your presentation. That's a new one.

(Laughter.)

OMBUDSMAN BOWEN: A lot of new things.

Next, I'll introduce the SBOAP co-chairs. This is also a new thing. I will introduce them individually. They'll take about three minutes or so to share their thoughts on how increased awareness and collaboration can effectively assist ARB in 2016. They will be available to respond to Board member comments after they both made their remarks.

On thing that did become clear in our discussions last year were the similar challenges facing small businesses, rural districts and disadvantaged communities, in terms of awareness of regulatory policies, knowledge, resources and capacity for effective engagement. An opportunity in 2016 is exploring common tools that might work for each of these stakeholder groups.

--o0o--

OMBUDSMAN BOWEN: I'm going to introduce Richard McCaskill. He is the small business co-chair. In 2012, when Mr. McCaskill and his wife Diana a CoolCalifornia small business award for their San Diego based recycling facility, Recon Recycling, Mr. McCaskill had three employees. How now has eight.

He is a former Gulf War Marine Special Forces Paratrooper. Mr. McCaskill is committed to protecting both people and the environment. He uses his sustainable businesses practices, including a natural gas forklift, energy efficient lighting, and electronic record keeping to reduce costs and minimize his environmental footprint. He is committed to educating small business owners about compliance and policymakers about small business.

Richard.

MR. McCASKILL: Good morning. I want to talk about some key areas of focus for 2016.

--o0o--

MR. McCASKILL: Mutual awareness is our primary banner, but under that, what agency challenges do we face, what actions will affect small business, how can small business expertise assist in the process of moving forward, how can burdens be reduced, what is the process of small business engagement overall?

The Small Business Opportunity Advisory Panel has its quarterly meeting -- had its first quarterly meeting in 2014. Since that time, I feel that the group has become a team. We are committed to serving the Air Resources Board, as well as California small businesses.

During 2015, after many hours of discussion and conversation about what we need from the agencies and why

there's a high level of disengagement in regulators, we concluded that our mutual lack of knowledge of each other was a significant barrier to constructive engagement.

At the end of 2015, we decided to focus on communication, outreach, and engagement. It was Alan's suggestion that we narrow the three down to one key concept, awareness. Awareness will be our focus for 2016. If there are areas of Air Resources Board's 2016 agenda where the Board would especially like small business input, please let us know. We'd be happy to serve in any way that we could.

As shown on this slide, some of the things we need to understand are: Again, what the agency challenges are, which agency actions will affect small businesses, what burdens those actions might impose and how we can recuse them. Other questions that I expect to come up include which programs are likely to have the most impact on California's small businesses, where in those programs can Small Business Opportunity Advisory Panel focus its energy to develop an initial process for small business engagement and mutual awareness, how do we promote the participation of small business in the development of regulations impacting small businesses, how do we build appropriate relationships with agency staff?

Fortunately, the Small Business Opportunity

Advisory Panel will not be starting from ground zero. Our dialogue with this Board, Ms. Bowen and your staff, has been constructive and fruitful. With Alan, as a CAPCOA co-chair, I'm sure we'll be able to continue to strengthen our connection with air districts. As we work from questions to answers, we will keep your ombudsman and staff informed.

Thank you again for the opportunity to share, and to serve with the Small Business Opportunity Advisory Panel and with the small business perspective.

La Ronda.

OMBUDSMAN BOWEN: Thank you, Richard. I know that he also wanted to thank and welcome the Board members and Chair Nichols, all who have participated along with our staff, our senior staff, for participating over the past two years in some of the meetings of the small business panel.

--o0o--

OMBUDSMAN BOWEN: It's a pleasure to welcome Alan Abbs as the CAPCOA co-chair for the SBOAP. But before introducing him, I'd like to thank former CAPCOA co-chair Larry Greene, the Air Pollution Control Officer for the Sacramento Metropolitan Air District.

At the end of 2015, Larry Greene relinquished his co-chair responsibilities to Alan, the new Executive

Director of CAPCOA. The entire SBOAP appreciates Larry's support during the first two years and welcomes Alan as our new CAPCOA representative. Larry helped really lay a solid foundation.

Before becoming the new executive director for the California Air Pollution Control Officers Association, Alan Abbs served as the air director for Tehama County Air Pollution Control District. Alan will share his perspectives on rural air districts, small business, and addressing the climate and other challenges ahead.

Alan.

CAPCOA EXECUTIVE DIRECTOR ABBS: Thank you, La Ronda and thank you, Chair Nichols, for allowing me the opportunity to be here today. And before I get started, I'd like to also acknowledge Larry Greene for the work that he did as a member of the advisory panel in the past. I'm a relatively new member to the panel, but I'm looking forward to serving. And I think Richard and I are going to get along great, because not only -- not only do I have a little bit of waste management experience in my background, but I was also in the Amphibious Navy, so we've got a lot to share.

(Laughter.)

CAPCOA EXECUTIVE DIRECTOR ABBS: Who knows, maybe I delivered him to shore one day. I don't know.

(Laughter.)

CAPCOA EXECUTIVE DIRECTOR ABBS: So I sat down with La Ronda a couple months ago and -- to get my initiation into the advisory panel. And we talked a little bit about the small business perspective. And I talked with her a little bit about my perspective on rural air districts and work that I had done with the rural air districts. And La Ronda told me, you know, a lot of the problems that rural air districts have seem to be similar to issues that small businesses have.

And so that sort of generated this presentation that I made to the panel. And La Ronda suggested that I provide a brief introduction to the Board as well.

Operation of small businesses and air districts have many things in common. And when I talk about rural air districts, I'm talking about air districts that represent about half of the geographic area of California that have about -- a little over 100 employees to manage that entire area.

Because of this, I think that synergistic solutions can be developed especially in the area of awareness between air districts, small business owners, and the Air Resources Board. At a recent meeting of the SBOAP, I talked a little bit about the challenges of rural air districts and how an organization like CAPCOA can

provide support. And I'd like to briefly highlight some of the points I made during that meeting.

All air districts implement federal, State, and local air quality regulations. And the air districts are key to serving their local communities. They know the local players, they interface with local industries, they administer incentive programs, they assist local governments, and they conduct localized outreach.

Like businesses, large and small districts have varying levels of sophistication, sources of pollution, and personnel and fiscal resources. CAPCOA provides a resource for coordination and collaboration between air districts and tries to tie in the interests of all the air districts in a coherent way.

As examples, we developed white papers and guidance documents to help local air districts in areas such as air toxics and ways to address greenhouse gases at the local level. We coordinate efforts to request funds for statewide programs to reduce emissions. We apply for grant funding on behalf of districts and sometimes administer the funding on their behalf. We develop public outreach materials, and we provide a forum for collaboration where districts, regardless of their size, can provide service, have meetings for planning, legislation, outreach, and further support of rural

counties.

As I mentioned earlier, rural air districts have challenges. Typical rural districts have a responsibility for a large geographic area using only a small staff. Sometimes field activities and travel can occupy most of a task -- most of a day for a single person or an entire air district.

And examples of this, you think about some of the wildfires that happened in the past couple of years, a lot of those happened in rural air districts, Lake County, Calaveras County, the North Coast Air District. When something like this happens, it takes an entire staff -- until the fire is done and put out, the entire staff of that air district can be focused on nothing but that wild fire and its impacts to the public and providing information.

Staff have to learn about everything, different types of stationary and portable sources, incentive programs, burn programs, they act as a local resource for information on statewide regulations, and they're familiar with the local methods of outreach. Their funding relies on many small permits like ag engines, rather than large sources with the -- resulting in a larger workload and less stable sources of funding.

And that, in turn, means more small sources

equals more customers and no economies of scale to do the daily job of the district. Not only does the daily work include compliance checking of permitted sources, but there's also other tasks that rural air districts that a single person might do on any given day, engineering reviews, air toxic reduction efforts, public outreach on impact to public health, climate change activities, operation and maintenance of air quality monitors, participating in the local planning process, working with public officials, and helping local emission reduction projects with grant funding.

For small districts, this can be particularly challenging. And when districts do get extra sources of funding, a lot of times it only funds a fraction of an employee, and so districts end up cobbling together many sources of funding just to get that one person to do all the extra work of the district.

Dispersed audience communication is challenging. When you look at some of these districts, they might have one or two employees for several thousand square miles of territory. And so it's not as simple nowadays as -- for these districts as putting something in the local newspaper or being on the local TV station, because that might only get a fraction of the audience that the district needs to get as part of their program.

It can be difficult to keep track of local and State and federal issues, and developing comments that are reflective of your local constituents and sources. And so that's one of the things that CAPCOA tries to do is bridge the gap with information sharing, meeting attendance and development of comments to try to reflect local perspectives when possible.

Small districts spend a lot of time regulating small businesses, but many of these small businesses are actually big in their local communities. And so as an example, we're talking about four pump gas stations that might be the only gas station in 50 or 60 miles for that community. The mill with one boiler that the employs the majority of the town, or maybe a timber operator with a fleet of small older trucks that has -- that is a major source of employment in that area.

For many rural air districts, it helps if the regulatory process identifies small business concerns as a component as early as possible. And I think some of the good news in this area are the amendments to the truck and bus rule that the Board looked at several years ago. And to their credit, the Board listened to small districts and small businesses and made amendments to the rule that reflected areas that provided some relief in areas where there were NOx attainment on behalf of some of the smaller

districts.

Another good success story is the timber grant program that kicked off several years ago, where the Board was providing funding to local timber operators to upgrade their trucks in a Carl Moyer type format to provide cleaner logging trucks.

Receiving funding for emission reduction projects is challenging. And while there are major emission reductions in urban areas, rural areas and rural air districts can play a role too. But because of population size, density and demographics, and limited numbers of large sources of pollution, it can be difficult for rural areas to compete for funding opportunities.

One of the bright areas that I have to report on this, the recent budget by Governor Brown proposed for this upcoming fiscal year does have some significant funds proposed for a wood stove change-out program, which will be very important, not only to rural areas of the State, but also to other urban disadvantaged communities as a way of providing some significant reductions of short-lived climate pollutants.

And so even though there's a lot of programs that rural districts have a tough time getting in to funding for emission reductions, there are ways that they can do that, and we look forward to trying to find out those ways

as well.

So I'll wrap it up here real quick. In the future, what are rural air districts doing? Well, we have the new federal ozone standard that's going to be going into effect that's going to result in several new nonattainment areas that previously were in attainment. And so this is going to be some extra planning efforts for some of these rural staffs.

We have a rural school bus pilot program that we hope to kick off in the next year, which will look at electric or renewable fuel buses for rural areas. We're participating in the oil and gas regulations through ARB, as well as updates to portable equipment and PERP changes. The Governor's emergency order on tree mortality is going to have some significant effects on operations in rural areas due to tree removal. And last but not least, the SB 513 Carl Moyer update process, we're also thankful that SB 513 passed last year and we're looking forward to working with ARB on changes to the Moyer process.

So in closing, what am I getting when I'm talking up here? Small air districts and the communities they represent continue to look for ways to advocate for their needs. They need to participate in the process, but they also need to be given information that allows them to participate in the process. And that's similar to the

challenge of assisting small businesses, and that's what the SBOAP is tasked with.

You want to give small businesses the information that let's them know how they need to get involved and you need to give them a forum that allows them to advocate for their needs, and then you need to figure out how you're going to use their input in the regulatory process. And so I'm looking forward to participating in that and trying to come up with some answers.

And with that, I will end my presentation. Thank you again for letting me sit up here and give that.

CHAIR NICHOLS: Well, thank you for being here and thank you for seizing this initiative and the opportunity to provide mutual reinforcement, I would say, for the small business advisory committee, because I agree with your assessment that you face some similar challenges. I think it'seven more impressive to me in a lot of ways to see CAPCOA really stepping up to this task, because as the local air regulators, as you've indicated, you also have a lot of other things on your plate. And so the fact that you're able and willing to take the time to be part of this, I think, is a tremendous step.

And I also particularly want to thank Richard for having accepted this assignment, because I understand that you put in a lot of time and have to really create

something from almost nothing. And you've got the support and the attention of our staff. And I just want you to know that the Board is delighted that you're taking on this task and open to suggestions about how we can improve, not just through the Office of the Ombudsman, but more generally, in terms of how we better communicate and incorporate the information that you have to bring to bear to us. So this is a great start, but don't be strangers. Come back.

I want to just briefly ask our Vice Chair, who is our -- I don't know that she's officially in the position as such, but she is, in fact, a representative of small business who serves on our Board, Sandy Berg, if you'd like to add a comment or two at this point.

VICE CHAIR BERG: Thank you, Chair Nichols.

First, I want to add my thanks both to Alan and Richard for your service. This is a critical committee that we have going. And I really also want to thank Chair Nichols. Chair, when you brought Ms. Bowen on, you had a vision for the Ombudsman's Office that was far different than what we had in the past. And I think that this is our fifth year -- our five year -- we're going into our six years -- sixth year.

And the way that this office has really grown has really met your vision. And I want to congratulate you on

the vision. But also, Ms. Bowen, for the way that you have built this department for us. It really has served ARB well. It is very difficult to run a small business in California.

There's just no question about it. Yet, small business is the backbone. If we look at where the employment increases are, we look at the opportunities, it really does sit in the hands of entrepreneurs that are not only small business, but grow into medium-sized business, and together with the large business in California, we have this incredible economic advantage really that is shared by none across our country.

And so with that, I really want to congratulate Mr. McCaskill for not only your successes, but thanking you again for serving. As I was listening to your goals, I also wanted to encourage the group to really help us understand the unintended consequences. I can't tell you how many great ideas I have had that look really, really good on paper. And when I go out to implement them in my own business, I really have people looking at me going do you really work here?

(Laughter.)

VICE CHAIR BERG: Because this doesn't work in the real world of what we do. And so understanding the unintended consequences is a huge benefit that you can

give this Board.

And then also don't be shy to give us solutions. There are really some great solutions that all business has, but small business and medium-sized businesses, because we have that entrepreneurial spirit, we're really very solution minded, and share those solutions, because as a policymaker and a regulator, we don't always see that. And so we would appreciate those eyes to be able to consider how else could we craft a policy that is a win-win, and even -- might even get us ahead.

So thank you very much, and I congratulate everyone.

CHAIR NICHOLS: Any other thoughts?

If not, I think we have a couple of other items to deal with. And we did not receive any public comments on this item.

So with that, thanks again. And look forward to hearing from you again.

Thank you.

Our next item is a regulatory item, so we will be calling for a Board vote on this one. It's a proposal to amend the Air Resources Board's existing regulation that controls evaporative emissions of volatile organic compounds from portable fuel containers, also referred to as gas cans, or PFCs. Portable fuel containers is one of

those bureaucratic terms. I must admit I -- the name is longer than the item.

(Laughter.)

CHAIR NICHOLS: But they're a significant source of reactive organic gas emissions, and controlling these emissions will aid California's efforts to meet our ambient air quality standards for ozone. So while the cans may not be very large, there are a lot of them, and they are a significant contributor to ozone.

The Board first adopted a regulation to control emissions from these items in September of 1999, and amended the regulation again in September of 2005. Since the last amendment, staff has identified three significant issues that need to be addressed. These issues include: Low compliance rates with existing standards, outdated certification fuel, and an opportunity to harmonize State and federal certification reporting. Seem to be three very good reasons to amend the regulation.

So today we will be addressing those three items. And, Mr. Corey, you will introduce this item please.

EXECUTIVE OFFICER COREY: Yes. Thank you, Chair.

PFCs are typically constructed of high density polyethylene and range in capacity from one to five gallons. And PFCs are used statewide to store and dispense fuel into, on, and off-road mobile sources in a

broad range of small off-road engines and equipment.

And as a result, PFCs are a significant source, as noted, of reactive organic gases in California. And ARB became the first State or federal agency to adopt a regulation controlling reactive organic gases PFCs in 1999.

The emission reductions achieved from this category contribute to meeting our overall air quality goals for ozone and nonattainment areas, such as South Coast. Today, staff is proposing modifications to our existing regulation for PFC. Amendments include increasing the robustness of the certification process to improve compliance with ARB emission standards, updating the certification fuel to reflect commercially available gasoline containing 10 percent ethanol, and harmonizing certification and test procedures with those of U.S. EPA to reduce duplicative reporting requirements for manufacturers.

Now with that, I'll ask Matthew Holmes to begin the staff presentation.

Matthew.

(Thereupon an overhead presentation was presented as follows.)

AIR RESOURCES ENGINEER HOLMES: Thank you, Mr. Corey. Good morning, Chair Nichols and members of the

Board. Today it is my pleasure to present staff's proposed amendments to ARB's portable fuel container regulation. Throughout the presentation today, we will be using the term PFC as shorthand for portable fuel containers.

Today's presentation will include a review of the history of the regulation; the need for additional regulatory action resulting from data collected by ARB; the proposed regulatory solutions intended to mitigate issues identified by staff; outreach measures initiated with stakeholders and anticipated future actions; and finally, a summary of the proposed amendments and staff's recommendation.

--o0o--

AIR RESOURCES ENGINEER HOLMES: Staff has identified areas where the regulation is falling short of its projected goals, and believe these shortcomings are best addressed by amending the regulation. Recent in-house testing of PFCs by ARB indicates a significant number of containers introduced into the marketplace failed to meet the current diurnal emissions performance standard.

In addition, the formulation of gasoline dispensed at California service stations now contains 10 percent ethanol. While the fuel specified by the

regulation for PFC testing contains no ethanol.

Lastly, though ARB and U.S. EPA have similar certification test procedures for PFCs, the current regulatory structure requires manufacturers to perform separate certification tests for each agency. I will now present a brief summary of why ARB regulates PFC emissions.

--o0o--

AIR RESOURCES ENGINEER HOLMES: PFCs are used by both residential and commercial owners to store gasoline typically for use in lawn and garden equipment, small off-road engines, recreational boats and off-highway recreational vehicles. There are approximately 10 million PFCs uses in homes and businesses across California, which release reactive organic gases during the storage of gasoline or transfer of gasoline to and from the container.

Reactive organic gases, or ROG, are a concern, because they are ozone precursors and also include benzene, a known human carcinogen. Reactions between nitrogen oxides and reactive organic gases contribute to the formation of ground level ozone. Control of reactive organic gas emissions from PFCs reduces the health risk from exposure to benzene and other air toxics and helps meet the State's ambient air quality standard for ozone,

which is especially important in nonattainment areas, such as the South Coast.

--o0o--

AIR RESOURCES ENGINEER HOLMES: In order to determine the best approach for controlling ROG and other toxic air contaminant emissions from PFCs, it's important to understand how these emissions are generated. There are four major processes, which produce ROG emissions from PFCs.

First, is through diurnal emissions, which includes both evaporation and permeation. Evaporation occurs when gasoline vapor escapes the container through leaks or openings. Permeation is the diffusion of liquid or gas molecules through the container walls to the atmosphere. Spillage occurs when gasoline is spilled when dispensing fuel or filling the container.

Displaced vapors are generated when filling the PFC with fuel. Transport and storage emissions result from spillage or leaks that occur during the transportation or storage of PFCs.

--o0o--

AIR RESOURCES ENGINEER HOLMES: The emission reductions attained by the PFC regulation result primarily from adoption of a performance standard to control diurnal emissions. This performance standard has tightened over

time and has helped to improve California's overall air quality.

Prior to 2001, there were no performance standards limiting PFC emissions and uncontrolled containers emitted ROGs at a permeation rate of approximately 1.6 grams per gallon per day. September of 1999, ARB became the first agency in the nation to adopt a regulation to control PFC emissions.

The regulation became effective in 2001 and included a performance standard intended to reduce diurnal emissions 75 percent from the uncontrolled rate of 1.6 to 0.4 grams per gallon per day of ROG. The regulation also included performance standards for liquid leakage and spout closure.

In September 2005, ARB amended its PFC regulation to control emissions from kerosene fuel containers, and approved new evaporative test procedures. In addition, the amendments further lowered the diurnal emissions performance standard to 0.3 grams per gallon per day, which became effective in 2009, and reduced estimated PFC diurnal emissions by an additional 25 percent.

For comparison, a two and a half gallon PFC is allowed to emit 0.7 grams of ROG per day, which is equivalent to the total daily evaporative emissions from two 2016 model year light-duty passenger cars.

--o0o--

AIR RESOURCES ENGINEER HOLMES: In addition to the performance standard to control diurnal emissions, the PFC regulation also reduced spillage and transport and storage emissions by introducing a standard requiring nozzles to automatically close and seal after dispensing gasoline from the container.

Prior to the regulation's adoption in 1999, statewide uncontrolled ROGs from PFCs totaled approximately 100 tons per day, which consisted of approximately: 80 tons per day diurnal emissions represented in this chart by the blue bar, eight tons per day spillage represented by the red bar, 10 tons per day transport and storage represented by the green bar, and two tons per day displaced vapor, which is represented by the purple bar.

After the regulation's adoption, manufacturers responded to the ARB performance standards by introducing new PFC materials and surface treatments, designing spouts with the ability to automatically close and seal, and eliminating vents which produce uncontrolled emissions. As a result of these actions by manufacturers, staff estimated that after full implementation of the regulation in 2015, emissions from PFCs would be reduced by about 70 percent or 70 tons per day statewide.

--o0o--

AIR RESOURCES ENGINEER HOLMES: This picture shows PFCs being prepared for compliance testing by ARB's laboratory in Sacramento, California. ARB determines PFC compliance with performance standards by placing representative samples in an environmental chamber known as a SHED to measure diurnal emissions. SHED is an acronym for Sealed Housing for Evaporative Determination

The SHED is also used to perform evaporative emissions testing of other gasoline-powered equipment, such as small off-road engine equipment, off-highway recreational vehicles, portable outboard marine fuel tanks, and spark-ignited marine watercraft components.

ARB is the only State or federal agency currently using a facility of this kind to measure evaporative emissions from PFCs. Testing in Sacramento started in 2013 when staff identified the need to validate PFC certification testing, based on experience gained from other ARB certification programs.

In addition, ARB's new southern laboratory facility tentatively planned to open in 2020 will include expanded evaporative emissions testing capabilities.

--o0o--

AIR RESOURCES ENGINEER HOLMES: The first issue needing regulatory action is the low compliance rate for

many PFCs on the market. This chart highlights the disparity between manufacturer submitted certification test data and ARB compliance testing for the same products purchased from California retailers.

Green dots represent certification data submitted to ARB by manufacturers since the current certification standard of 0.3 grams per gallon per day took effect in 2009. Manufacturer results are clustered into groups of six, representing the six PFCs that must be tested to meet ARB certification requirements.

Manufacturer testing was conducted by a third-party laboratory selected by the manufacturer. The majority of manufacturer certification data was supplied to ARB in 2009 and 2010 in response to ARB's lowering of the certification standard. Additional certification data was provided to ARB in 2013 through 2015 from manufacturers seeking to certify new PFC products.

The manufacturer-submitted results indicate 100 percent compliance with the certification standard of 0.3 grams per gallon per day, which is represented by the red horizontal line.

ARB has performed diurnal testing of 47 PFCs since 2013, when compliance testing began at its Sacramento SHED facility. All PFCs tested were purchased off the shelf from California retailers. Results of ARB's

testing, represented by blue dots, will now be contrasted against the manufacturer supplied data. ARB determined passing results for 24 of 47 containers tested, and failing results for the remaining 23 or 49 percent of the containers testing.

Although approximately half of the containers tested failed to meet the performance standard, the results also show there are manufacturers capable of producing containers that emit far below the standard. ARB test data presented in the chart represent containers manufactured by seven of eight manufacturers currently certified to sell PFCs in California. These seven manufacturers combined produce over 90 percent of the PFCs introduced into California commerce.

--o0o--

AIR RESOURCES ENGINEER HOLMES: This chart summarizes the manufacturers submitted and ARB PFC test results presented in the previous slide. The chart shows that test results submitted by manufacturers are 100 percent compliant with a 0.3 gram per gallon per day diurnal performance standard. The ARB test results indicate that only about 50 percent of PFCs tested comply with the performance standard.

The average emission rate of manufacturer-submitted test results is approximately 0.2

grams per gallon per day, which is below the red line representing the performance standard. The average emission rate measured by ARB was approximately 0.8 grams per gallon per day, roughly two and a half times the performance standard and four times the manufacturer's submitted results.

ARB has engaged PFC manufacturers in an effort to investigate and identify the route causes of the substandard compliance rates, and will propose remedies later in this presentation intended to increase PFC compliance rates and reduce real-world emissions.

--o0o--

AIR RESOURCES ENGINEER HOLMES: This part shows the estimated market shares of the various containers tested, and their contribution to statewide PFC emissions determined from ARB test results. The passing containers represent approximately 76 percent of the PFC market, while the failing containers represent 24 percent.

Although failing containers represent only 24 percent of the market, these high emitters drive statewide PFC emissions by accounting for approximately 70 percent of all PFC emissions, while passing containers represent about 30 percent.

--o0o--

AIR RESOURCES ENGINEER HOLMES: There are

currently limited options for removing non-compliant PFCs from the market, short of taking enforcement action after a failing product has been identified. ARB's current PFC certification process requires manufacturers to demonstrate their product's compliance with ARB performance standards through testing performed by a third-party laboratory.

Upon completing this testing, the manufacturer submits a certification application to ARB containing the test data and other information specific to the PFC, for which certification is sought.

ARB then evaluates the application to ensure it contains the required elements. If the application is deemed acceptable, an Executive Order is issued certifying the PFC for sale in California. Currently, PFC Executive Orders have no expiration date. Therefore, the only means available to ARB to address non-compliant products is through enforcement action.

Prior to 2013, ARB did not perform in-house testing of PFCs. Since 2013, ARB has routinely performed compliance testing of PFCs as part of its enforcement activities. Passing results confirm that the products on the market are maintaining their certification standards, so no action is taken.

If a PFC fails ARB testing, Enforcement Division

and the Office of Legal Affairs are notified, and legal remedies are pursued, which may include, but are not limited to, fines and Executive Order revocation.

--o0o--

AIR RESOURCES ENGINEER HOLMES: The second issue requiring regulatory action is the current certification fuel being used by ARB, which no longer reflects actual pump fuel.

At the time the ARB regulation was adopted in 1999, phase I California reformulated gasoline dispensed at service stations contained no ethanol. From 2004 to 2009, phase II reformulated gasoline contained six percent ethanol. Since 2010, phase III reformulated gasoline has contained 10 percent ethanol.

Ethanol-based fuel has chemical properties that enable it to more aggressively permeate plastic materials. However, since the regulation went into effect, ARB's PFC certification fuel has contained no ethanol. As a result, the fuel currently used for ARB PFC certification testing is no longer representative of the current motor vehicle fuel stored PFCs statewide and prevents any alignment of ARB and U.S. EPA PFC certification test procedures because U.S. EPA requires use of certification fuel containing 10 percent ethanol.

--o0o--

AIR RESOURCES ENGINEER HOLMES: The third issue requiring regulatory action is that under the current regulatory structure, a PFC Manufacturer seeking certification must perform separate certification tests for both ARB and U.S. EPA. This condition requires manufacturers to perform twice as much testing as may be needed, with the additional costs ultimately passed on to consumers.

This existing U.S. EPA certification testing process requires three PFC samples, a SHED temperature profile ranging from 72 to 96 degrees Fahrenheit, certification fuel containing 10 percent ethanol with a volatility nine pounds per square inch, as well as durability tests for ultraviolet radiation exposure, fuel sloshing, and pressure cycling.

In contrast, the existing ARB certification testing process requires 6 PFC samples, a SHED temperature profile ranging from 65 to 105 degrees Fahrenheit, certification fuel containing no ethanol with a volatility of seven pounds per square inch, and no durability tests for ultraviolet radiation exposure, fuel sloshing, and pressure cycling.

--o0o--

AIR RESOURCES ENGINEER HOLMES: The previous slides have highlighted three areas where regulatory

action is needed to address deficiencies in ARB's current PFC regulation. In response, staff has performed an interlaboratory comparison study between ARB's SHED laboratory and an independent testing laboratory to identify potential laboratory bias.

Staff also proposes to increase compliance with ARB standards through ongoing compliance testing, amend the certification process to limit the terms of PFC certifications which currently have no expiration, ensure PFC emission's test data reflects real-world conditions by requiring the fuel used for PFC certification testing to contain 10 percent ethanol, and provide the option to manufacturers to obtain both ARB and U.S. EPA certification of their containers based on a common set of test data. I will now discuss each of these solutions in detail.

--o0o--

AIR RESOURCES ENGINEER HOLMES: ARB is currently conducting an interlaboratory comparison study between ARB's Sacramento SHED laboratory, and an independent lab to better understand the discrepancy in manufacturer and ARB test results. This study began in 2015 with cooperation from manufacturers and is using ARB's approved test methods. PFCs from the same manufacturing lot are being tested by ARB and the largest independent testing

laboratory. And the results are being compared to see if the discrepancy is related to testing facilities rather than PFCs themselves. Results, thus far, are inconclusive, but additional testing is planned.

--o0o--

AIR RESOURCES ENGINEER HOLMES: We are also taking vigorous enforcement action against all of the manufacturers, whose products have failed ARB compliance testing. To date, ARB has performed screening and Compliance testing of seven of the eight PFC manufacturers. These seven manufacturers collectively account for approximately 90 percent of PFC sales in California.

As a result of these tests, ARB has pursued legal remedies against all known non-compliant manufacturers, which are indicated by the compliance test results that were above the 0.3 gram per gallon per day standard line on slide eight.

ARB also intends to continue compliance testing, including retesting previously failed products that have been re-engineered by manufacturers.

--o0o--

AIR RESOURCES ENGINEER HOLMES: ARB's PFC regulation as currently structured grants Executive Order certifications with no expiration date. Today, we are

proposing a number of revisions to strengthen the PFC certification process, resulting in increased compliance rates, and ultimately recovering the PFC emission's benefits lost in non-compliant products.

These revisions follow:

First, in order to ensure compatibility with current motor vehicle fuel, all PFCs currently sold in California will be required to recertify to the amended certification procedure by December 31st, 2017.

Second, all future PFC Executive Order certifications will expire after a term of four years subject to renewal. The concept of Executive Order expiration and renewal has been successfully implemented in ARB's Enhance Gasoline Vapor Recovery Program, which requires certified vapor recovery systems and components to renew their Executive Orders every four years.

The four-year renewal frequency provides manufacturers a reasonable period of time to sell a certified product, while providing assurance that non-compliant products can be identified and corrected or removed from commerce. Manufacturers will submit a request for renewal prior to expiration of the executive order.

If no changes have been made to the manufacturing process and interim compliance testing yields passing

results, then recertification will be granted. However, additional testing or manufacturer declarations may be required based on the information available to ARB at the time of renewal. If changes have been made to the manufacturing process or interim testing yields failing results, the renewal process will be placed on hold pending the resolution of the outstanding issues.

If no resolution is attained, the Executive Order will expire. If interim compliance testing produces failing results, the Executive Order will be rescinded and the manufacturer could be subject to legal remedies. In either of these two scenarios, noncompliant containers will not be allowed to be sold in California, resulting in increased compliance rates for PFCs sold in the State.

Lastly, a sell-through date will be implemented requiring manufacturers to sell or dispose of PFCs not recertified using the updated fuel formulation by December 31st, 2018. Sell-through provisions have been included in previous ARB consumer product regulations to help ensure and adequate supply of products are available for purchase and minimize adverse economic impacts to manufacturers.

--o0o--

AIR RESOURCES ENGINEER HOLMES: In addition to amending the certification process to address high-emitting containers, staff has also identified the

need to update the fuel used for certification testing. Currently, PFC certification testing is performed using fuel containing no ethanol, and California pump fuel contains 10 percent ethanol. Therefore, staff proposes requiring the fuel used for PFC certification testing to contain 10 percent ethanol.

This requirement will ensure that PFC test results are representative of real world emissions by using fuel reflective of gasoline currently dispensed at California gasoline stations. The change will also align the ethanol content and ARB's certification test fuel with that currently used by U.S. EPA. The proposed change in fuel formulation should not require currently compliant manufacturers to reengineer their containers, since ARB in-house test results and U.S. EPA certification test results indicate many PFC manufacturers can currently meet the State and federal emission standards with E-10 fuel.

--o0o--

AIR RESOURCES ENGINEER HOLMES: As previously stated, the current structure of ARB and U.S. EPA PFC regulations requires manufacturers to submit separate applications to ARB and U.S. EPA for certification, even though both agency's certification requirements are similar.

Therefore, a PFC certification application

containing common test data that satisfies both ARB and U.S. EPA requirements is desirable not only for the two agencies, but PFC manufacturers.

ARB has engaged all stakeholders in an effort to identify the elements in each agency's certification test procedures that, when combined, permits manufacturers to generate a certification application containing test data that satisfies both ARB and U.S. EPA requirements.

The following slide will describe in more detail the proposed streamlining.

--o0o--

AIR RESOURCES ENGINEER HOLMES: In order to address the current situation, where a PFC manufacturer is seeking certification must submit separate test data to both ARB and U.S. EPA, staff is proposing an optional streamline pathway, allowing PFC manufacturers to generate a single set of certification test data that meets the requirements of both agencies. PFC manufacturers may still elect to perform separate tests to meet ARB and U.S. EPA certification requirements.

The new streamlined option combines the most conservative elements of both agencies' certification testing requirements related to sample size, diurnal temperature profile, certification of fuel formulation, and durability testing.

The streamlined certification testing option would contain test results for six samples to better represent the variability and the numerous molds from which PFCs are produced; use ARB's diurnal temperature profile, which is intended to emulate the ambient temperature range experienced in California's Central Valley during the summer months; use U.S. EPA's certification fuel formulation, which is more volatile than ARB fuel and subjects test containers to higher pressures during diurnal testing; and lastly, the streamlined certification testing option would contain test results generated using ultraviolet exposure, fuel sloshing, and pressure cycling durability tests.

--o0o--

AIR RESOURCES ENGINEER HOLMES: This regulatory proposal has been carefully developed to result in minimal economic impact to both consumers and PFC manufacturers by avoiding unnecessary costs, and even provide opportunities for cost savings from streamlining the certification process.

However, these cost savings are potentially offset by the cost of additional certification testing. The economic impact of the proposed PFC regulatory amendments before the inclusion of any potential 15-day changes are projected to result in a maximum price

increase of $0.36 per PFC, which is based on stakeholder estimates. This projection also assumes a 100 percent retailer markup.

The original regulation was projected to reduce emissions by 70 percent, and increase the cost of a PFC by $6 to $11. Relative to the costs of the original rule, the cost of these amendments is minor and does not significantly increase the original cost projections.

Assuming an average price of $20 per container, the additional $0.36 increases the cost per container by only 1.8 percent. The emissions benefit of the additional cost per PFC, is increased compliance rates due to the additional emissions testing PFCs will be subject to as part of the certification renewal process.

--o0o--

AIR RESOURCES ENGINEER HOLMES: I would now like to discuss the outreach measures taken by staff during the regulatory process and proposed future actions.

The proposed regulatory amendments were collaboratively developed with stakeholders. Staff held two public workshops and multiple individual meetings with stakeholders. PFC Manufacturers and retailers as well as local government representatives and U.S. EPA were involved in these discussions. As a result of the collaborative effort with stakeholders, staff made a

number of changes to the proposed amendments, and was able to address a number of manufacturer concerns without compromising the integrity of the proposal, including advising ARB's test procedures to align more closely with U.S. EPA's, sell-through provisions were clarified, and additionally other various -- various other stakeholder suggestions were incorporated into the regulation order in test procedure revisions.

--o0o--

AIR RESOURCES ENGINEER HOLMES: During the course of this regulatory process, we have become aware that some refinement of the PFC certification and test procedures is necessary to ensure compliance with ARB standards and address the discrepancy between ARB and manufacturer submitted test data.

Therefore, we are proposing 15-day changes that may include: Changes to the certification testing process. A potential revision could be to better -- to provide ARB with more control over sample selection, to ensure PFCs submitted for certification are representative of what is actually produced.

Increased manufacturer recordkeeping recording. A potential change to the record keeping an reporting process could include requiring manufacturers to submit additional information specific to the materials that

their PFCs are constructed from, the molding process, and type of surface treatment or barrier thickness. Information would help in screening out potentially defective PFCs prior to the issuance of an Executive Order, and would also assist in taking enforcement actions.

And revisions to the enforcement penalty practice. A potential change to the PFC penalty practice could include recouping ARB's costs for conducting compliance tests. We are also proposing minor editorial changes to the certification and test procedures to improve clarity for manufacturers.

Development of the 15-day changes will be a public process which would with include an opportunity for stakeholder comment.

--o0o--

AIR RESOURCES ENGINEER HOLMES: In this final segment, I would like to summarize the proposed amendments and present staff's recommendation for the regulatory proposal.

In summary, certification process changes like the sell-through date and limited-term certification will increase the robustness of the program, increasing PFC in-use compliance rates, and addressing excess PFC emissions resulting from non-compliant containers.

Requiring the fuel used for PFC certification testing to contain 10 percent ethanol will ensure that containers are compatible with the more aggressive fuel currently dispensed at California gas stations, and provide emissions test data that are more representative of real world emissions.

Streamlining the certification process will allow PFC manufacturers to submit a single certification application meeting the requirements of both ARB and U.S. EPA. We believe the proposal does not result in economic hardship to either PFC consumers or manufacturers based on the maximum estimated price increase of only $0.36 per container.

Therefore, staff recommends that the Board adopt the proposed regulation amendments with the 15-day changes. This concludes the PFC presentation. I'll be happy to answer any questions you may have.

CHAIR NICHOLS: Excuse me, we have no witness signed up on this item. So it goes directly to the Board. I take it that means that you've pretty much resolved all the outstanding issues with the affected stakeholders, which is great.

Just out of curiosity, I may have missed it, but do you have an estimate of the number of these canisters that are sold on an annual basis or the size of the market

overall.

MONITORING AND LAB DIVISION CHIEF BENJAMIN: The answer is actually no we did not. Our estimate of the population is based on a survey that we did back in 1999 for the original rule where we sent out a survey to residential and business owners and asked them how many cans they owned. We used the results of that survey to extrapolate what we thought the population was.

And so one of the amendments that we are actually considering, which would align with what we are currently requiring for small off-road engine certification is that PFC manufacturers report their quarterly and annual sales data. And that information be very helpful for us to better understand what the real population of these cans is, and then also what the impact of -- the emissions impact of non-compliant containers would be.

CHAIR NICHOLS: Obviously, my information on this is totally anecdotal, but I expect that there is a lot of people like me who have one that they purchased once, and which has been sitting in a garage or some other space ever since then, and has been off-gassing probably for years, you know, ever since that time.

Interesting.

Any -- yes, absolutely. Dr. Sherriffs, please spare your voice.

(Applause.)

BOARD MEMBER SHERRIFFS: A couple of thoughts. One, a reminder that we do things and then it turns out different things are happening in the real world. And the importance of trying to shorten that loop, because I think the regulation -- I don't know when it -- I can't remember when it first went into effect, but it's 2013 when we're realizing that what's really happening is not -- we're not getting the benefits that the regulation was supposed to get us.

The second issue, and along the lines of our Chair's ancient container in her garage -- I have at least 10. This is a great nexus with small business and with CAPCOA, because I wonder if we have enough data that would suggest that maybe we need to start one of these tune-in tune-up kind of programs in the Bay Area and the South Coast and the Central Valley, where people can bring their old containers, and either a free exchange or half price, to get rid of those old containers. Because I originally looking at this thought maybe I need to trade my nozzle in, but it's the container not the nozzle. The nozzle is about 10 percent, the container is 90 percent.

CHAIR NICHOLS: Yes, head nodding.

BOARD MEMBER SHERRIFFS: So it's a way of reaching --

CHAIR NICHOLS: It's a good point, but I don't think it -- I mean, I think it's sort of concurrent with adopting the rule as some kind of an outreach program.

BOARD MEMBER SHERRIFFS: Yes, this aside from the rule, but it's an opportunity reaching small businesses, environmental justice communities, reaching the folks doing the lawn care and so on that we've worried about.

CHAIR NICHOLS: The buyback programs seem to be very popular and certainly have been successful in the ones that I've followed.

Mr. De La Torre.

BOARD MEMBER DE LA TORRE: You nailed it. I was going to say that we need some proposals on a buyback program to get people to do that. I mean, you have the electric E-waste events all over the place. Those are really successful. Something like that, where you can engage the community to do it locally, as part of one of those other ones. I mean, if there's a -- these containers, you drop them off too, and then, you know, we figure out what to do with them after.

CHAIR NICHOLS: If there are no further questions, I would be happy to entertain a motion.

Oh, sorry.

VICE CHAIR BERG: I did want to just. Sorry. I know we want to push this one through, but I just wanted

to ask a quick question. You know, some of the people got it right. And so I'm curious if we identified the third-party people that were verifying these where did we -- where they get it wrong? Did we -- were we able to kind of nail that?

MONITORING AND LAB DIVISION CHIEF BENJAMIN: So almost all of the testing is done by one major lab. There aren't a lot of labs that do this third-party testing. We don't believe that the issue is with the lab itself. We believe that the issue is with the manufacturers, and more specifically very likely either engineering issues or manufacturing and quality assurance issues between the manufacturers.

I think you raise an excellent point, which is half of the manufacturers are meeting the standard and some are well below the standard. So there's some very good actors out there. We think that there are companies that are noncompliant have some significant issues with their quality assurance and manufacturing that needs to be addressed. And that's where the focus needs to be, and we are pursuing very vigorous action against those companies.

And this really loops back to some of the previous Board comments. I think what we can think about is as we agree on settlements that perhaps some of that could include buyback programs in certain communities, and

that that would -- we would not only address the non-compliant products, but provide for some mitigation and buyback program.

CHAIR NICHOLS: Supervisor Roberts.

VICE CHAIR BERG: Oh, I'm not done yet. I'm sorry.

CHAIR NICHOLS: Oh, sorry, you're still going.

VICE CHAIR BERG: So I'm very much in favor of making sure that 100 percent of the industry is complying, but I'd like to understand if the people that are in compliance are they going to have to go through this amended certification process, and therefore incur additional costs because of the bad actors?

MONITORING AND LAB DIVISION CHIEF BENJAMIN: They will, but the testing requirements there will be flexibility. So for those companies that have a demonstrated record of complying through their data that they provided, there will be less testing requirements than for those companies that are non-compliant. So even though the average cost is $0.36 per can, that will not -- it will be variable depending upon the manufacturer.

VICE CHAIR BERG: And why are we confident that through this new certification process that the -- we go out and buy the cans?

MONITORING AND LAB DIVISION CHIEF BENJAMIN: We do.

VICE CHAIR BERG: And that's how we're going to do the certification process? The manufacturers aren't going to send us their cans for certification?

MONITORING AND LAB DIVISION CHIEF BENJAMIN: So you're really touching on some of the refinements that we're considering. One of the things that we are now going to be thinking about for the 15-day changes is that what they currently do is they send us a sample of one of their cans, but it's not necessarily the can that they tested and gave us the results for.

What we are now going to do is ask for that exact can, and we will test the exact cans that they tested for their certification testing, and we will compare those exact cans, because one of the things that we're finding is that it doesn't take much in the manufacturing process to produce some different results. It could be -- these are -- generally, these cans are produced through rotational molding, where a plastic polymer a powder is injected into a mould, and that mould is rotated at a high temperature.

If they don't have those temperatures right or if they don't have good quality assurance, what we think may be happening is you're -- they're producing cans that are

more permeable than they should be. So we want to get the exact cans that they tested and certified, and we will test those exact same cans for our compliance testing. So it's those sort of very technical, but important subtle details that we want to get right in the 15-day changes.

VICE CHAIR BERG: And I appreciate that and would support the 15-day changes. I'd also support, within the 15-day changes, that staff have the ability to utilize third-party laboratories, that if the workload is better served there. And so within this regulation, does staff have the ability to look at our resources versus being able to utilize certified labs that you know and trust and you get the information?

You guys are brilliant, and this is low-hanging fruit that is a industry problem. And I want to make sure that we're not using our high caliber people to resolve a low-hanging fruit problem that the industry should be responsible for.

MONITORING AND LAB DIVISION CHIEF BENJAMIN:

That's an excellent question. There are two reasons why we might not want to do that, as tempting as it may be to outsource this testing. First, is that it makes it much more difficult for us to take enforcement action when the data are generated by a third party. We have better standing when the data are generated by ARB.

Second is that we have a number of other programs where we do outsourcing of testing. And what we found is that in some cases the workload involved in certification and auditing of those labs may end up being as much work as doing the testing ourselves.

So we're going to go back and think very seriously about that recommendation and that thought, and then we'll fold that into the 15-day changes.

VICE CHAIR BERG: As long as I know that you have the ability to handle the resources in the most effective way is really my desire for you, not for us to feel that ARB needs to create and manage -- obviously manage, but actually do the work for another certification program.

MONITORING AND LAB DIVISION CHIEF BENJAMIN:

Thank you. And I think what we want to do is be smart here -- and this is -- quite honestly this is the first time we've daylighted this data. And I think we're sending a very, very strong message to the manufacturers. We're taking active enforcement action against them. And our hope, and we will follow that up with testing, is that things will improve.

And if they don't, then we will certainly through settlements and other means figure out how to have them bear more of the cost and responsibility for this compliance testing.

VICE CHAIR BERG: And while we're also acknowledging those that are doing a great job --

MONITORING AND LAB DIVISION CHIEF BENJAMIN: Yes.

VICE CHAIR BERG: -- and well below the rule, that they don't get swept up in the net of a few bad actors.

MONITORING AND LAB DIVISION CHIEF BENJAMIN:

Exactly. And that is one of the messages we want to come out, is that there are many manufacturers who are doing a great job.

VICE CHAIR BERG: Thank you very much. It's great work.

CHAIR NICHOLS: Very helpful. Did you have your hand up, Mr. Eisenhut, or were you just trying to get me to pay attention to --

BOARD MEMBER EISENHUT: No, I did, but Member Berg has walked down that path. And so I think what I'm left to say is a compliment to staff, because at its most polite, there appears to be, in half of the industry, a disconnect between their sampling -- either their sampling technique or their measuring technique, and that that issue has been, as our lab has done with some other industries, that issue has been developed and remediation because that sort of behavior short circuits what we do, and it disadvantages those folks who do comply.

So I'm happy to see this result.

CHAIR NICHOLS: Yes. Thank you. Very well said.

Supervisor Roberts finally.

BOARD MEMBER ROBERTS: Thank you, Madam Chairwoman. First of all, I was puzzled, because it seems to me it would be better test a random product rather than the one that they've already tested. Why would -- you know, and especially given your -- that there's like -- there could be a discrepancy over production line.

MONITORING AND LAB DIVISION CHIEF BENJAMIN: So there's actually two types of testing. The testing that we showed you on slide eight, is compliance testing is where we actually go out and randomly select off the shelves of stores, products. We bring them in and we test those. Those are those blue dots.

BOARD MEMBER ROBERTS: Okay. So that is still going to be part of it?

MONITORING AND LAB DIVISION CHIEF BENJAMIN: We will continue to do that compliance testing. What we're talking about is when -- before they actually start mass producing a product --

BOARD MEMBER ROBERTS: Got it.

MONITORING AND LAB DIVISION CHIEF BENJAMIN:

-- the manufacturerS well generate those green dots. What we're going to do is before we issue the

Executive Order, we're going to say give us that exact can.

BOARD MEMBER ROBERTS: Okay.

MONITORING AND LAB DIVISION CHIEF BENJAMIN: We're going to test that can before we issue your Executive Order.

BOARD MEMBER ROBERTS: I got it.

MONITORING AND LAB DIVISION CHIEF BENJAMIN: And if it matches our test match what you've given us, then we'll go ahead and give you that Executive Order, because we don't want to be going and doing --

SUSTAINABLE COMMUNITIES POLICY & PLANNING SECTION MANAGER ROBERTS: I got it.

(Laughter.)

CHAIR NICHOLS: Okay. Good question.

BOARD MEMBER ROBERTS: It just occurred to me that we, and I, have been missing a real opportunity here, because we have our lawn mower trade-in program, we've never required them to trade in the gas cans. And I'm thinking this year that I'm going to have them bring their gas cans down.

CHAIR NICHOLS: Absolutely.

BOARD MEMBER ROBERTS: We might as well start getting rid of those, so -- because it's unlikely any of them are compliant. And I guess maybe there could be, but

it might be good to get them into --

CHAIR NICHOLS: Well, and if you don't need it, there's just no point having it sitting around really.

BOARD MEMBER ROBERTS: Well, maybe -- and maybe, yeah, they won't need it at all, but yeah, so -- but we've never taken the gas cans.

CHAIR NICHOLS: Right.

BOARD MEMBER ROBERTS: This year we're going to get the gas cans. Okay.

(Laughter.)

CHAIR NICHOLS: I sense a competitive opportunity brewing here.

Okay. Without any further questions then, may I have a motion to approve.

BOARD MEMBER RIORDAN: So moved.

BOARD MEMBER DE LA TORRE: Second.

CHAIR NICHOLS: Moved and seconded.

Would all in favor, please signify by saying aye?

(Unanimous aye vote.)

CHAIR NICHOLS: Any opposed?

Any abstentions?

If not, thank you and congratulations. This is a very nicely done.

We have one more item and we are going to be taking a lunch break, during which we will have an

executive session. We will be discussing several major litigation items that are before the Board, and -- that the Board is involved with, I should say. And then after that is over, I or someone else will come out and announce if any action has been taken during that executive session. But I think we have only this one more item, so we should really be able to take it before we take a lunch break.

So without further ado, the next item, our last item on our agenda, is an update on the status of the advance clean transit rule. This is something that is occupying a lot of staff time and attention right now.

We know that in order to move forward on both our air and climate goals, as well as our broader petroleum reduction goals as a State, we have to continue finding innovative ways to reduce emissions from all sources, including heavy-duty vehicles, which are increasingly a larger share of our inventory, and that we will need advanced technologies to get us there.

In November 2015, the staff provided an update on the status of technologies for trucks and buses, and concluded that zero emission buses are in the early commercialization phase with similar performance and reliability as conventional buses, and that low NOx engines will be commercially available in the near future.

The leadership of a number of fleets around this State, transit fleets, that have been willing and done a terrific job of demonstrating and evaluating and operating advanced technology buses in normal service has been key to allowing for the commercialization of technologies.

Transit fleets have also been our partners in reducing emissions from passenger transportation and are well suited to adopting new technologies. Staff has been working with transit fleets for several years to achieve our overarching goals, but also to better understand the operating requirements and the need for flexibility among the different transit agencies, so that whatever we do on this front will enhance and not hinder the growth of transit services.

So, Mr. Corey, would you please introduce this item?

EXECUTIVE OFFICER COREY: Yes. Thanks, Chair Nichols.

Accelerating the deployment of zero and near zero emission technologies in the transit sector is a key part of our overall heavy-duty vehicle strategy in meeting federal air quality standards, State climate change goals, petroleum reduction goals and protecting public health.

One of the first areas of focus is on transit buses, where early commercialization of zero emission

buses is already happening. Several transit fleets are already operating zero emission buses that have performance comparable to conventional diesel or natural gas buses. The State is making significant investments in deploying zero and near zero emission technologies to accelerate the market for cleaner technologies for trucks and buses.

Some of the Board members and I have recently visited several of the transit agencies to learn more about their experiences with zero emission buses. Today, staff will provide you with an update on the state of technology for buses and will highlight the steps that they have been taking to work with transit agencies.

The update will include summaries of a technology symposium held earlier this month, and an update on two new work groups focused on addressing transit fleet concerns, and making information more transparent to interested parties.

Shirin Barfjani of the Mobile Source Control Division will provide an update on the status of technologies for zero and near zero emission buses, and progress staff has been making in working with the transit agencies.

And with that Shirin.

(Thereupon an overhead presentation was

presented as follows.)

AIR POLLUTION SPECIALIST BARFJANI: Thank you, Mr. Corey.

California faces very challenging mandates to reduce air pollutants in order to meet the federal air quality standards and the State climate --

CHAIR NICHOLS: Could you speak a little bit louder or move the mic closer.

Thank you.

AIR POLLUTION SPECIALIST BARFJANI: Better now?

CHAIR NICHOLS: Better. Thank you.

AIR POLLUTION SPECIALIST BARFJANI: Okay. Thank you.

California faces very challenging mandates to reduce air pollutants in order to meet the federal air quality standards and the State climate change goals. California has made significant progress and we are on track to meet the AB 32 goals of reducing greenhouse gas emissions to 1990 levels by 2020. To continue making progress beyond 2020, we will need significant additional reductions that require nothing short of a bold transformation in all sectors.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: To delineate the long-term transformation for the mobile source

sectors, we refer to discretion document released from sustainable freight in April last year called, "Pathways to Zero and Near Zero Emissions". This document identifies the long-term need for California to transform from the conventional combustion technologies to zero emission everywhere feasible and near zero emission powered by clean low carbon renewable fuels everywhere else.

In addition, the mobile source strategy document released last October lays out policies to continue to increase the stringency of tailpipe emission standards for heavy-duty applications, while zero emission vehicle technologies suitable for certain heavy-duty applications are developed.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: As we look to set long-term goals for emission reductions from transit buses or any sector for that matter, it's vital to understand their functions and operations.

Public transit agencies have played, and will continue to play, an important role in helping California meet air quality standards and greenhouse gas emission reduction goals, namely by employing the cleanest technologies, providing safe and reliable public transit -- public transit services to reduce light-duty

passenger vehicle miles traveled, and single occupancy trips, and reducing congestion on roadways.

Transit fleets operate in local communities have a crucial role, not only in helping transit-dependent riders, but also in helping to share -- to shape transportation and land use around our communities.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: There are more than 150 individual transit agencies in California with almost 11,000 urban buses. They include a wide spectrum of operations and governance. And budget issues are a primary concern for most of them, as they piece together funding with fares, local sales taxes, and a variety of federal and State funding.

Looking at the complexity of transit system operations, we understand there's clearly not a one-size-fits-all approach.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: Before staff update the Board on the status of our current rule development, we would like to provide brief information about the background of this regulation. Transit agencies have long been partners in the State's effort to achieve greenhouse gas emission reductions and air quality improvements goals. The existing fleet rule for transit

agencies were first adopted in 2000 and had focus on reductions in diesel particulate matter and oxide of nitrogen emissions from urban buses and transit fleet vehicles. Transit agencies were required to select either the diesel path or the alternative fuel path.

Large transit agencies with 200 buses and more were required to demonstrate zero emission buses with an earlier schedule for diesel and a later schedule for the alternative fuel path. In 2009, the Board, through Resolution 09-49, directed the staff to hold off the implementation of the purchase requirement, search develop commercial readiness metrics to be used as criteria to initiate the zero emission bus purchase requirement and to conduct technology assessment on the readiness of zero emission bus technologies.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: Transit fleets are one of the most suitable heavy-duty categories for deploying zero emission technologies. They are generally centrally fueled, have fixed routes, and return to home-base every day. They operate in the heart of our communities, increasing the need for the lowest emissions; however, they have to remain affordable for the general public. The State and federal government has invested heavily in securing zero emission bus technology's market

position in commercialization stage, thereby reducing the need for transit agencies to cover R&D costs.

Lastly, transit fleets also have the potential to pave the way for zero emission technology implementation in heavy-duty trucks and more. The technology assessment provided in November indicates both battery and fuel cell electric buses are commercially available for transit applications today.

In addition, significant technology advancements have occurred since 2009 when the purchase requirement was put on hold. These improvements include increased reliability, declining cost, improved performance, extended mileage range and increasing number of bus manufacturers in the market. NREL recently evaluated the Foothill Transit battery electric bus demonstration project showing that the 12 battery electric buses had a 90 percent vehicle availability on average. The industry target is normally 85 percent.

This report also identifies the fast declining cost from $1 million in 2009 for a 35-foot fast charging battery electric bus to $789,000 in 2015 for a large battery electric bus. This reduced price is approaching that of a diesel hybrid bus. Range for battery electric buses is increasing and can meet a good portion of transit agency's daily demand. Range for fuel cell electric buses

has not been an issue. Staff continues to monitor technology advancement progress.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: Future transit buses will continue to play an important role in providing efficient and safe transportation to Californians. The Californian Transit Association indicates that transit could be highly desired by California's changing demographics with a projected bigger increase in senior ridership over commuter ridership.

In addition, transit agencies, as part of the broader scope of the entire transportation system helps support the millennials that prefer to live in communities featuring multi-modal transportation options. Therefore, seamless integration between different transportation modes and transport systems will be essential to increase ridership, help increase -- help relieve congestion, and reduce transportation sector emission.

We hope to help incentivize the most efficient transportation technologies that help shape these future transit needs, while also continuing to focus on enhancing transit service and availability in disadvantaged communities.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: To fulfill

this vision for future transit, we need a mixture of cleaner combustion engines and zero emission buses. Therefore, advanced clean transit proposal may include:

Transition to zero emission buses starting smoothly with a small percentage and increasing gradually over time to achieve a complete transition by the 2040 time frame; the purchase of low NOx engine buses, once they are available; and use of renewable fuels, when fuel contracts are renewed.

In addition, all purchase requirements will follow natural fleet replacement rate and no accelerated purchases will be required. Staff is committed to work with transit agencies on providing flexibility for regional collaboration and opportunity for greater efficiencies in transporting passengers.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: Staff has been working closely with transit agencies and held or participated in numerous individual or group meetings. Through communication with transit agencies, staff understands transit agencies are interested in providing clean buses for their customers, but they're also still concerned about the challenges and risk associated with the transition to the advanced technology.

Issues like range, reliability, and capital costs

have been raised by transit agencies and others. Some transit agencies also wonder if a transition to zero emission technologies will cause reduction in transit service. These questions, along with other issues, were also raised at the mobile sources strategy Board hearing last October. At that Board hearing, some stakeholders recommended a performance based approach, and also requested staff to provide more communication channels in addition to statewide workshops and individual or group meetings. We will provide a current status of these concerns in the following slides.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: Let's start with the technology. For near zero technology, the Cummins Westport's 8.9 liter natural gas engine was recently certified by ARB with 90 percent lower NOx emissions compared to current standards and will be commercially available this spring. Staff expects other natural gas engines meeting one of the optional NOx standards to become available within a year or two. ARB is optimistic diesel engines will be able to meet these levels as well, but their commercial production is a few years away at this point.

Low NOx engines, combined with renewable fuels, can gain significant GHG benefits. However, these

benefits of using renewable fuel may already be claimed through the Low Carbon Fuel Standard program, or LCFS. When LCFS credits are issued, there are no additional benefits available. In addition, data has indicated the supply of -- the supply of renewable fuels in the long term will not be sufficient for all heavy-duty sectors.

For further -- this further demonstrates that zero emission technologies play a pivotal role in leading the on-road heavy-duty sector to meet our immediate and long-term GHG reduction goals. Concurrently, renewable fuels will be needed for off-road vehicles, marine, aviation, that are not likely to transform to zero emission technologies.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: For zero emission technologies, there are three main categories utilized by transit agencies today: Fuel cell electric buses, battery electric buses with the slow charging option, and battery electric buses with fast charging option.

In contrast to conventional diesel engine buses, every zero emission bus has quiet operation, better acceleration, and the ability to recover braking energy by a regenerative brake.

Fuel cell electric buses' range and fueling time

are comparable to conventional technologies. Transit agencies, including AC Transit and Sunline Transit use them in the same way as their conventional diesel and CNG buses without having a dedicated special route.

Fuel cell electric buses' daily fueling and cleaning can be incorporated into the rest of the fleet seamlessly, as shown in the top picture in this slide. The price of fuel cell electric buses remains higher than the other technologies. However, large orders can demonstrate a significant price reduction.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: Battery electric urban buses powered by large battery packs provide a range of up to 160 miles on one single charge under urban road conditions. Such buses, as made by BYD, are being operated by multiple transit agencies. The charging infrastructure for these types of buses is inexpensive but the charging time is longer. Battery electric buses with slow charging could meet a good portion of transit needs today and not confined with a certain route

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: On the other hand, battery electric buses with fast charging have smaller battery packs, such as those made by Proterra, and

operated by Foothill Transit and San Joaquin Regional Transit Districts. The charging is on route and takes three to 10 minutes. Charging can be at a bus stop via overhead terminals connected to a charging station. The on-route charging systems provide unlimited range, but they are more expensive compared to slow charging option and may need to operate on dedicated routes.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: To date, several transit agencies in California are providing their daily services with zero emission buses and are expanding their existing zero emission bus fleets. There are also other agencies that are adding zero emission buses to their fleets for the first time.

As of last year, there were 77 zero emission battery electric and fuel cell electric buses operating in California by transit agencies and universities, and 96 more were ordered with delivery expected this year. The number of zero emission buses operating in California will be more than double next year. And there are multiple bus models and manufacturers available in the market. Of the 10 zero emission bus manufacturers, five have manufacturer facilities in California providing high quality jobs.

We are also starting to see a large expansion of zero emission buses outside of California, both

naturally -- nationally and internationally.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: Nearly all transit bus manufacturers have now entered the zero emission bus market with one or more commercial zero emission models. The largest bus manufacturer in North America, New Flyer, is offering both battery electric and fuel cell electric options. Only one major manufacturer is still in the demonstration phase for their battery electric bus. However, they have a successful hybrid electric platform that can be integrated and used by a zero emission bus.

California manufacturers, including BYD, GreenPower, El Dorado, EBus, Motiv, and U.S. Hybrid are also offering various models. Proterra will soon be open -- sorry. Proterra will soon open a plant in California. We also expect Gillig, which is based in Hayward, to have a commercial product soon.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: The economic analysis will be a critical part of the staff proposals. Staff is currently working with transit agencies to identify the best data for cost analysis. Staff believes that the cost analysis must be comprehensive and include capital, operational, and maintenance costs of vehicle as

well as buying, operational, and maintenance cost of charging infrastructure or fueling infrastructure.

Although the upfront capital cost of zero emission buses are higher than conventional buses, staff believes that there are potential cost savings for maintenance and fuels. The cost savings for maintenance mainly come from simplified powertrain with fewer components to maintain and replace, while the saving for fueling will depend on current fuel costs and electricity rates.

Electricity rates throughout California could be highly variable. The procurement costs of fuel cell electric buses are still high, but they are also declining, especially if large volumes are considered. Some zero emission bus manufacturers also share a myriad of financing options that bring the capital costs below those of conventional vehicles.

Staff understand there are also other start-up costs associated with technology transformation. For a thorough cost analysis, staff continues working with transit agencies and other stakeholders to refine the existing data and collect additional necessary data.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: This slide shows preliminary information we collected last year and

have been discussing with transit agencies demonstrating that the total cost of ownership for battery electric buses is in the same ballpark as conventional buses. We will work with transit agencies, bus manufacturers, and others stakeholders to improve this analysis in the coming months.

This preliminary analysis shows how they LCFS program can offset a substantial part of the fuel costs. This preliminary analysis does not include the benefit of incentives or the additional costs associated with the new technology transformation, such as potential operational changes and training.

We also need to do a similar analysis for CNG buses and for fuel cell electric buses, and we will also -- and we will -- we will do case studies for selected fleets to understand the differences that reflect their individual situations, such as high electricity costs or long bus route needs.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: As staff mentioned in the last slide, the preliminary lifecycle cost analysis did not include the role of additional incentives or grants to lower the cost of advanced technology. Bus manufacturers are offering financing options to lower or eliminate the upfront cost differences

that is paid back in battery lease payments.

Low Carbon Fuel Standard program allow transit agencies to monetize the value of using certain low carbon fuels. HVIP program currently offers rebate up to $110,000 per zero emission buses, if in a disadvantaged community, and slightly less, if in other parts of the State. Other grant programs can be used to offset the cost of advanced technologies as well.

Again, staff will be working with transit agencies to understand the best way that incentives can complement their funding and play a role in advancing zero emission technologies in their fleets.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: While technology is expected to continue to improve, it is important to ARB that the proposal will not reduce transit service. Staff is assessing zero emission bus performance and its potential and limitation to fully integrating into transit operations.

Staff is also proposing a phased-in schedule to reduce operational risk. With this phased-in schedule, transit agencies can maximize the useful life of the existing fueling infrastructure. It is important to note that large deployments are possible. The Board of the Antelope Valley Transit Authority has approved a contract

to purchase 85 battery electric buses and set a goal of becoming the nation's first fully electrified fleet by the end of fiscal year 2018.

Antelope Valley may not be large enough to change market dynamics by themselves. However, it has a high daily average mileage, and hilly routes that presents a more challenging driving and duty cycle than a lot of other transit agencies.

We look forward to working with Antelope Valley transit on data collecting and further technology validation. Because we know not every transit agency is the same, we will also evaluate off-ramp provisions to address operational concerns.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: Transit operation is important to disadvantaged communities. Many transit -- many transit buses operate in congested and disadvantaged areas, where urban and localized pollution is a major health concern.

ARB's recent solicitation for zero emission truck and bus pilot projects provides up to $24 million. The response to this competitive solicitation was sizable with about $290 million in grant funding requested. The priority for disadvantaged community benefits and emission reductions is reflected in ARB's application scoring

criteria, which includes a requirement that projects provide benefits to disadvantaged communities and a preference for projects that address common economics needs of disadvantaged communities.

Staff is focused on ensuring the regulation provides benefits to disadvantaged communities as we transition to clean transportation options.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: Questions have been raised to ARB about the potential role of the performance based standard. As the staff evaluates this option, it is important to keep in mind that our purpose of pursuing an ultimate goal of widespread zero emission technologies extends beyond just a tailpipe or even the lifecycle emission for the air pollutants and GHG emissions. A number of other factors come into play and must be balanced as laid out here. Staff will continue to work with the stakeholders and receive input as we analyze this option.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: Finally, we would like to cover outreach and coordination efforts. We are excited about the new opportunities we have had to engage stakeholders, which will be discussed on the following slides. These include the advanced clean

transit work group, the transit agency subcommittee, and the technology symposium.

In addition, staff will continue to hold statewide workshops, have individual or group meetings with transit agencies and other stakeholders, work closely with funding programs and partners, engage with technology and bus manufacturers, coordinate with other programs -- excuse me -- such as the Low Carbon Fuel Standard regulation, the State's Implementation Plan, the scoping plan, and sustainable freight strategies to ensure seamless program integration.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: Staff has created an Advanced Clean Transit Workgroup that comprises a wide range of stakeholders, such as technology providers, original equipment manufacturers, transit agencies, and other interested parties to discuss the current status of advanced technologies for reducing emissions from transit buses.

The focus of the workgroup is to discuss barriers and solutions to implementing near zero and zero emission technologies in existing transit fleets. In addition to the workgroup, we have created a transit agency subcommittee. The subcommittee includes transit agencies, California Transit Association, California Association for

Coordinated Transportation that represent small, rural, and specialized transportation providers and metropolitan planning organizations. Staff is working closely with the subcommittee -- with the subcommittee on topics such as cost and flexibility options.

To date, we have met with the subcommittee twice and the broader workgroup once and conducted separate meetings with some of these members on special issues. Staff would like to take this opportunity to thank members of the technical workgroup and transit agency subcommittee for working with us collaboratively and figuring out solutions and the best data to use.

We'll continue our data acquisition and analysis with joint effort from our transit partners and technology providers.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: On February 8th, staff held a technology symposium to cover topics, including transit agency experience operating zero emission buses, advanced technology availability and near-term outlook, low carbon fuel costs and supply, and on-site infrastructure for clean technologies. Subject experts were invited to be on the panels for presentations and discussion. The technology symposium had a focus on issue identification and was solution oriented.

The technology symposium was a success with many technical highlights, as indicated in this slide. We also -- it was also well attended by transit agencies. However, the work did not end there. There action items and other necessary efforts identified from the symposium. The output of these action items would help staff's technical analysis and move heavy-duty transportation electrification forward.

--o0o--

AIR POLLUTION SPECIALIST BARFJANI: As we move forward, staff will continue working with the stakeholders for data collection and proposal crafting. We plan to continue utilizing the workgroup and subcommittee meetings and to increase the outreach and education for transit agencies especially the smaller ones.

Staff is also planning a series of statewide workshops in the spring and summer 2016 to craft the technology and regulatory proposal, provide economics and business cases, and also provide additional information in regards to funding and incentives.

Staff will come back to the Board in late 2016 for the Board to consider the staff proposal.

This concludes my presentation. I'm more than happy to answer any questions the Board may have.

Thank you.

CHAIR NICHOLS: Thanks for the presentation. I think what perhaps is missing from the context here is what's the hook? What's the ARB's hook here in terms of where we're headed with this program?

I mean, wanting to transform the fleet, needing to transform it, accelerating it, the introduction of zero emission vehicles are clearly appropriate goals for the Air Resources Board. But is this all done under the context of the scoping plan of AQMPs, of the ZEV bus rule that was adopted years ago but has been sort of in suspense for a while now, or all of the above? How are you actually thinking about moving this forward, in addition to the process part?

MOBILE SOURCE CONTROL DIVISION CHIEF KITOWSKI: Let me start that.

CHAIR NICHOLS: Okay. Thanks, Jack.

MOBILE SOURCE CONTROL DIVISION CHIEF KITOWSKI: I think a check the all-of-the-above box might be the appropriate answer here.

CHAIR NICHOLS. Okay.

MOBILE SOURCE CONTROL DIVISION CHIEF KITOWSKI: The context for our regulation would likely be a revision of the current clean transit bus regulation, but we would certainly be coordinating and seeing it consistent. We would need to sure it's consistent with

the scoping plan that's being -- updated scoping plan being developed now, as well as the SIP measures that are being developed.

CHAIR NICHOLS: That's helpful. Thank you. We have number of people who have signed up, 12 to be exact. Their names are up on the screen there, so you can see where you are in the order, and just be ready to come forward when it's your turn, we'll begin with Michael Pimentel from the California Transit Association.

MR. PIMENTEL: Good afternoon everybody.

Madam Chair and Board members, Michael Pimentel, legislative and regulatory advocate for the California Transit Association, a trade organization representing nearly 200 transit affiliated members, including, but not limited to, California's largest urban transit agencies, as well as dozens of small- and medium-sized transit agencies operating in suburban and rural areas.

I'm joined today by two members of the association that have been particularly involved in recent months in the development of the Advanced Clean Transit regulation, Paul Jablonski, CEO of the San Diego Metropolitan Transit System, and Mike Wiley, general manager of Sacramento Regional Transit District and chair of the Association's Executive Committee, essentially our board of directors.

I'd like to begin my comments this morning by thanking you for this opportunity to provide the Association's take on the continued development of the Advanced Clean Transit regulation, and for your willingness to meet individually with various subsets of the Association's membership over the past few months.

Some of you may recall that the Association and some of our members were before you in October 2015, as you considered the discussion draft of the mobile source strategy. At that time, we provided comments that cast doubts on the appropriateness of the ACT regulation, given the costs and range of existing zero emission technologies and transit agencies' limited budgets. And we also made clear our request that ARB formalize its engagement with transit agencies.

Today, I'm happy to report that since we presented to you in October, ARB staff has established several formal channels for regular and ongoing collaboration with transit agencies. We are now working in tandem with ARB staff to identify strategies for advancing the goals of the ACT that more consciously take into account the operational limitations of zero emission technologies and the financial constraint of transit agencies.

In the past few months alone, we've had meetings

of the transit agency subcommittee, the advanced clean transit technology symposium, and the Advanced Clean Transit Workgroup. And through these meetings, we witnessed an evolution of ARB staff's understanding of the cost of the regulation, the complexity of our funding needs, and the importance of flexibility options to the viability of zero emission bus -- a zero emission bus purchase mandate.

Nevertheless, there remains a sizable gulf in our understanding of the magnitude of the regulation's cost and the concepts that should be considered when we discuss flexibility.

To further highlight the work that is ongoing with ARB staff, and for specific insights related to life-cycle costs, I'll turn to Paul Jablonski. Paul will then be followed by Mike Wiley who will summarize what we think these costs mean for the ACT regulation, and what we believe ARB might consider supporting instead to encourage the adoption of zero emission bus technology in a cost effective and flexible manner.

Thank you.

MR. JABLONSKI: Madam Chairwoman and members of the Board, thank you for allowing me to speak today.

My name is Paul Jablonski. I'm the Chief Executive Officer of the San Diego Metropolitan Transit

System. And I'm also the chair of the recently established transit agency subcommittee.

As Michael mentioned, we greatly appreciate the process that's been established by the ARB to include transit operators in the discussion of the Advanced Clean Transit regulation. And as early adopters of clean fuels and technologies, we, in San Diego, have been for over two decades involved in CNG. We very much understand ARB's mission to improve the climate and to reduce -- and to improve air quality.

And the Association's membership also has been supportive of zero emission technologies across the Board. We also want to see that technology mature and become more commercially available. But I think what's at the heart of the ACT regulation is the assumption that zero emission technologies are viable for transit operations statewide.

Our experience with battery electric buses and independent analysis of operations of vehicles showed that it's too soon for a purchase mandate to be put into effect. Whether we look at the Altoona testing for buses, or a recent draft report prepared for the Advanced Clean Transit Consortium in Los Angeles, we're seeing that cost, durability, emissions profiles of these vehicles aren't what they -- where they should be yet.

We have given careful thought to what a zero

emission bus purchase would look like from a cost and operational perspective, and we want to make sure to avoid the unintended consequences that has been talked about this morning.

And I think in our discussions the CARB staff agrees with us. We don't want to cause cuts to transit service as well as increased fares. And we believe that such consequences would undermine the progress transit operators have made in terms of air quality or diminish the economic mobility environmental justice benefits of transit, especially when you consider that most of our customers are the most transit dependent of our communities.

To avoid these consequences, we are putting a lot of time and effort into the advisory subcommittee. We have two subgroups set up. One is to deal specifically with costs and the lifecycle costing of zero emission buses. And from -- and for the last several -- well, we've been actually working on a cost model for months and months now. But one of the things that's imperative is that we believe that the cost of implementation of ACT will cost the industry between eight and ten billion dollars in current dollars.

For a system like San Diego with 800 buses, that means from an acquisition, from a cost, and from an

operating standpoint about $400 million total. And that does not include the operational limitations of range that exist with the current vehicle.

The second subgroup is looking at flexibility or off-ramp opportunities for the ACT. And while we want to advance the technology and reduce emissions, we have to be careful about not having these negative consequences. One particular aspect that we like is the use of CNG and now 100 percent biogas, as several of us are in the State, combined with the new low NOx engine. That will produce a carbon intensity score of about 11, with respect to that combination, as opposed to what we've seen on the CARB website where electricity now is about 110.

So significantly improvement. And we think that's -- for many of us that have gone down this path, that that is a very cost effective path to continue on.

So we want to continue working with the ARB and the staff over the next several months to refine the cost model and to help refine the ACT itself for an implementation that can work for all of us.

Thank you.

BOARD MEMBER ROBERTS: Madam Chairwoman, could I ask a question?

CHAIR NICHOLS: Yes, please. Go ahead.

BOARD MEMBER ROBERTS: Mr. Jablonski, you

mentioned the Altoona test or testing. Maybe the staff mentioned that. I don't know what that is, but would you help me with that?

MR. JABLONSKI: Yeah. Altoona testing is the bus testing that's required by the federal government. Before any new bus is put on the market, they must go through a series of Altoona tests. And what we saw in the Altoona testing is a very high amount of breakdowns that occurred during the tests of both the battery -- slow charge battery bus as well as the quick charge battery bus.

To put it in perspective, the CNG bus that was tested had about 39 hours of breakdown, and both electric buses were 260 and 290 in unscheduled maintenance requirements during those tests. So about seven times higher.

And I think what's that's the product of is that both the largest bus manufacturers for ZEV technology right now are power plant -- focused on power plant in the battery et cetera, and the bus is not as robust as some of the manufacturers that have been in the industry for quite some time.

BOARD MEMBER ROBERTS: Are these recent tests or are these --

MR. JABLONSKI: Conducted over the last couple of years, yes.

BOARD MEMBER SPERLING: Could I ask one question?

CHAIR NICHOLS: Yes, please.

BOARD MEMBER SPERLING: So there's a cost analysis that the staff presented. You were kind of suggesting you disagreed with it. Is -- it was -- you know, it's on slide 17/18, is that -- do you think that's correct or not?

MR. JABLONSKI: Well, I can't wait to get some of that financing that's going to reduce the cost of the bus below what we pay now. That's like free money. But at every aspect, we're seeing the cost of the bus -- you know, a CNG bus that we're running right now is a little over 500,000, a zero emission bus is about 800,000. So it's between 50 and 60 percent higher.

The fuel. In San Diego, it costs us about $8,000 a year to run a bus on CNG, and we're 100 percent biogas right now. And, in fact, we're testing the new Cummins low NOx engines also. Electricity costs in San Diego would go up to $18,000 per year. It's a difference between $0.21 a mile and almost $0.47 a mile. And those are by our own electricity charges and CNG charges, and what the manufacturers have told us in terms of kilowatts per hour.

BOARD MEMBER SPERLING: Thank you.

CHAIR NICHOLS: Okay.

MR. JABLONSKI: The other cost element, just --

CHAIR NICHOLS: Yes, please.

MR. JABLONSKI: We have not refined this totally -- is that if you take the range of a bus -- a slow charge bus and let's say it's 120 or 130 miles, the vast majority of our routes we send the bus out in the morning and it stays there all day. We relieve the driver, so the bus keeps going on the schedule. If you have a bus that can only go 120 miles on a slow charge, that means after 100 miles or so, you have to bring it back into the yard in order to charge. That means you have to send out another bus.

We've actually run schedule scenarios in trying to run our operation with electric buses, and at minimum it would take 25 percent more buses than we have now just to operate the same schedule. And we have not quantified those costs in our cost model yet. That will be coming up in the next month.

CHAIR NICHOLS: Okay. Thank you.

MR. JABLONSKI: Thank you.

CHAIR NICHOLS: Next is going to be Mike Wiley.

MR. WILEY: Good morning, Chair Nichols and members of the Board. Yes, I'm Mike Wiley. I'm the General Manager, CEO here in Sacramento. I'm also the chair of the California Transit Association. And in deed

it's a pleasure for us to be here today to express our views.

We've been working very cooperatively with your staff. Obviously, we've met with most all of you as well to express our interest and our concerns.

Zero emission buses, I mean, which community wouldn't -- in California wouldn't want to have the cleanest vehicle available? Which community wouldn't want it to be most -- the most cost effective as well? Certainly, I know when I talk to my supervisor and member of my Board, Director Serna, he would absolutely support that as we would as well.

The real issue is how do we get there and when do we get there? As both Michael and Paul mentioned, the Association has been actively engaged with your staff for the past, well, quite some time to help -- help guide and influence in a cooperative approach to achieve a regulation that we can all support.

Work is now underway that we believe will help shape the regulation in a way that advances your overarching environmental and technological goals, while limiting negative operational and financial impacts to transit agencies.

We don't want to have a regulation that's going to cause us to reduce service, and therefore have the

negative effect of us having to cut service and therefore reduce ridership. That is not where any of us want to go.

As data has become available and our early assumptions regarding costs and the operational hurdles of implementing zero emission technologies are validated, we've arrived at the conclusion that a one-size-fits-all approach is untenable. Making this regulation viable will require tremendous flexibility that takes into account the limitations of transit agencies and the importance of investing limited State resources strategically to maximize the regulation's cost benefit.

For this reason, the Association continues to advocate for the enactment of a technology neutral performance-based regulation that provides transit agencies with the flexibility to implement zero and/or near zero emission technologies best suited to meet their specific community and operational needs.

This approach recognizes that for some transit agencies broad implementation of zero emission bus technology is feasible and perhaps even desirable, while at the same time, rebutting the assertion that robust or enthusiastic implementation of this technology, in some transit systems, means it can and should be aggressively implemented statewide.

This approach also recognizes that many transit

agencies have invested heavily in clean natural gas fleets and fueling infrastructure, including Paul Jablonski in San Diego, here in Sacramento 100 percent natural gas. We've been 100 percent for about nine to 10 years now, and we also purchase biofuel. So we're taking full advantage of all the opportunities that we can.

CHAIR NICHOLS: We are imposing the three minute time limit. I didn't issue a second warning. However, Supervisor Serna wants to ask you a question, so that could extend your time for a while.

MR. WILEY: Wonderful.

(Laughter.)

BOARD MEMBER SERNA: Thank you, Chair Nichols. And thanks for being here, Mike, to address this today on this important update. I have a -- first of all, I appreciate you speaking for me and expressing the fact that, you're right, I think it goes for our entire Regional Transit Board of directors, it probably does for many similar boards across the State that are governing transit agencies, that we want to do everything we can to get to a place where we're maximizing zero emission transit service. But there is a very real concern that to get there, we want to understand - I think someone mentioned earlier - the possible unintended consequences of doing so.

How -- you know, you're chair of the organization your representing today, the California Transit Association. I'm pretty familiar with our own circumstance here in Sacramento in terms of post-Great Recession how are we grappling with the service cuts that unfortunately were imposed to balance our budget. But how would you characterize the condition of transit agencies across the State in a similar regard? Are there agencies that have restored 100 percent and are doing -- having even more robust service delivery compared to before the recession? Are we at, you know, 60 percent, 70 percent? Where are we generally?

MR. WILEY: We're still behind statewide. Many systems cut in the neighborhood that we cut. Director Serna is mentioning we reduced service in 2010 by about 23 to 24 percent, and we've restored a total of about 12 percent of that. So we're behind locally. And that's true pretty much throughout the State, in terms of what I hear from all the other transit operators.

So we still haven't caught up in terms of the overall level of service that we previously operated. Other operators in California are doing what we're doing here in Sacramento as well, which is to restore that service in the most cost effective way as possible, so that we can, in fact, look at generating more riders than

we otherwise might have in the past.

Resources continue to be limited. Our own operating budget in 2007, our annual operating budget, was $147 million. This current fiscal year it's $155 million. So we've just barely caught up, even though costs have continued to increase over time, over the past, well now, nine years. So there's still quite a bit of catching up to do statewide.

BOARD MEMBER SERNA: And also fair to say, I would assume, that across the State most of those cuts have affected the transit-dependent, the non-choice riders in those systems?

MR. WILEY: Typically, when you reduce service, you reduce your least productive services. And unfortunately, the folks that are continuing to ride those services before they are cut are those that generally don't have another option. And generally, that's going to be your lower income constituents.

BOARD MEMBER SERNA: Right. So therein lies my very real concern. To what extent has there been any discussion with staff about the timing of the rule relative to some metric that is associated with a condition that we still suffer based on the recessionary effects of the economy?

MR. WILEY: We haven't specifically discussed the

recessionary effects of the economy. We have talked about a performance-based approach that looks at all of those factors and considers it as we implement a new rule that we -- and I -- we're getting a very positive reaction from your staff about that as well, that collectively we don't want to implement a rule that's going to result in further cuts and further losses. And as you indicated, most likely the areas, if in fact that happen, would be in those areas that can least afford it, and that's the more transit-dependent folks.

BOARD MEMBER SERNA: Thank you.

MR. WILEY: And that certainly is the goal that we've set for ourselves. We've also set the goal of making sure that the current capital investments that we have are -- we can take full advantage of and not throw some of that away before the end of its useful life.

We just opened a second CNG facility -- fueling facility several years ago. So there's a huge capital investment in that, and it has a life that goes well beyond the life of a bus, which is typically 12 years. We're talking two to three times the life of a bus before we really are looking at a replacement of that type of a facility. So that's part of what we're looking to achieve.

BOARD MEMBER SERNA: Thank you, Mike.

MR. WILEY: Thank you.
CHAIR NICHOLS: Thank you.
MR. WILEY: Thank you.
CHAIR NICHOLS: James Holtz.
MR. HOLTZ: Chair Nichols, esteemed Board members, I want to thank you today for allowing me to speak in support of ACT rule. BYD, as you may know, is a manufacturer of electric vehicles, electric buses, electric trucks, photovoltaic energy solutions, as well as fixed energy storage all using our iron phosphate battery chemistry which is safe, environmentally safe, and also non-combustible.

So many times we're going to find ourselves aligning with your clean air initiatives. We strongly support the ACT rule primarily because it aligns directly with BYD's goals, which is to create zero emission buses, provide the lowest total cost of ownership for transit operators, and provide also the safest technology for transporting passengers.

Over the last two years, BYD has done the following things: We've reduced the price of our buses by 9.4 percent. We've reduced the overall weight of our battery pack by 10 percent, and we introduced a 12-year battery warranty.

In contrast, internal combustion engines have all

increased over time and will continue to increase as they try to preach near zero emission goals. And this is due to the use of particulate traps, as well as urea-injected CSRs, and also greater compression of an extremely flammable gas.

The cost to maintain these buses will continue to increase as well, because they're going to use more consumable components to achieve these lower emission totals. Additionally, the engines will have to operate at higher temperatures, which may create more failures in reliability, and also require larger cooling systems to keep these engines cool.

So, in short, we're coming down in price. We're becoming -- we're at zero emissions today. We have a lower total cost of ownership, and we're safer on the streets. And they're growing and getting higher in price and their total cost of ownership is growing, and their technologies are still not zero emission.

So I can see that today there is a gap between the capital acquisition costs between a zero emission bus and an internal combustion bus, but that gap is narrowing all the time. And as previously mentioned, it will continue to become less of a gap.

With the endorsement of the FTA, we have come up with a creative leasing proposal, not just BYD, but all

electric bus manufacturers, which allows transit operators to purchase the price of the bus from an electronic bus manufacturer for the same price they'd purchase an internal combustion engine bus. And with the savings on fuel, which will represent about half of the cost to fuel a internal combustion engine, you would payoff the lease for the battery plant or the battery pack and power plants. Pardon me.

CHAIR NICHOLS: Your time has actually expired.

MR. HOLTZ: Okay.

CHAIR NICHOLS: Thank you. Appreciate your presentation.

Ray Pringle -- Ray Pingle.

MR. PINGLE: Good afternoon, Chair Nichols and CARB Board members. My name is Ray Pingle. I'm with Sierra Club california. I'm also a participant in the Advanced Clean Transit Workgroup.

We're here to strongly support CARB adopting an updated rule-making to support zero emission buses, and hopefully even to have that rule-making done by the end of this year. I wanted to talk about costs for just a second. So many of the reports and studies I've seen actually show total cost of ownership for electric bus, for example, as lower than a diesel -- comparable diesel bus.

I think when you compare it with compressed natural gas because the fuel costs for gas are much lower than diesel, the jury is out. In some cases, it's been a positive ROI, some cases it's been a negative, based on the electricity cost. So cost is everything in this discussion.

So what are the key differences in cost? Obviously, the bus -- an electric bus is going to cost about 750, somewhere like that. A comparable diesel gas bus is about 550. So there's about a 200 or so thousand dollar delta on the capital cost. And then it gets into the cost of the batteries that's a major component of that difference, as well as the electricity cost.

So battery costs have been coming down dramatically. In 2009, lithium ion batteries were costing $1,200 per kilowatt hour. Now, they're costing about $300 per kilowatt hour. That's a 75 percent drop in six years. And they are continuing to decline and they will continue to decline.

And it's a very analogous situation to solar cells, right? What did solar cells cost many years ago? What did people a few years ago forecast solar cells would go down. And obviously, solar cells have gone down much more rapidly than people forecast.

There's a huge rapid growing demand for batteries

in the world today and the U.S. and in California for storage, with the PUC's storage ruling, and also for electric vehicles. All the major manufacturer's of batteries are building huge new factories to meet this demand.

You take Tesla for example, when it completes its gigafactory and it's fully operational in 2020, they'll be making as many lithium ion batteries as the whole world made in 2013. BYD is doing the same thing. LG, a huge supplier, is doing the same thing. So all these economies of scale are going to continue to drive the capital costs down, and that's with relatively few technical innovations, which will also occur.

The second thing on cost is electricity. So I was at the technology symposium. Great presentations by Antelope Valley, Foothill Transit, many of these agencies. They're just starting to figure out how do we manage our electricity costs. And there's so many unexplored opportunities to lower their electricity costs.

For example, one of the biggest contributors to electricity cost is demand charges. And to my knowledge, I don't know of any transit agencies that are using battery storage to lower those costs. And there's many other opportunities as well.

Thank you very much.

CHAIR NICHOLS: Thanks. Good comment.

MS. VAZQUEZ: Hi. Good afternoon, Board members and Chair. My name is Diana Vazquez. I'm actually a policy advocate for Sierra Club California. And I just want to piggyback on to my colleague's comments. I'm also a member of the working group that has been established. And we've been working with, you know, your staff for the lasts two, three months closely attending different symposiums.

And I just want to say this is definitely vital for our members. Really having a strong and clear rule being established by the end of the year, given that the staff has been asking for a natural turnover of fleets. So we're not asking -- we understand that it's going to take the agencies -- and we're seeing these conversations happen with the transit agencies that it's been difficult to transition to zero or near zero emissions. And we're not asking them to transition tomorrow. We're asking them to transition 20 years from now. So hopefully, we can actually start planning for this.

We can see examples throughout California. Specifically when Antelope Valley Transit, AC Transit, and also Foothill Transit that they had actually started thinking about this. And those are just some examples, and some examples in the urban areas and the rural areas

that we can actually learn from.

And as well, in slide 19, we have a lot of incentives as the State has been putting out there to really incentivize the transit agencies to actually utilize this, and is this something that we need to actually provide technical assistance for the -- or your staff need to provide technical assistance in actually providing transit agencies how to apply for these incentives.

There's a lot of money being put into these programs, especially with cap-and-trade and how do we actually utilize this, given that by 2050 we have to reduce our emissions by 50 percent. So keeping that in mind, and really keeping in mind that we have to have a strong and concise rule by really hopefully by the end of the year, the beginning of next year. We can't really postpone this anymore.

By postponing it, it's going to actually delay the fact that really how to incentivize the manufacturers to start producing affordable buses for transit agencies for them to purchase them.

So I really thank you for your time. I really thank for working the staff -- with the staff. They've been really helpful in really explaining it to somebody who's not really, you know, more technically feasible, but

to explain it to our riders and to our members who are really utilizing these buses.

So thank you for that.

CHAIR NICHOLS: Thank you.

MR. BARRETT: Good afternoon. I'm Will Barrett with the American Lung Association in California. First off, I wanted to welcome the new members to the Board. We look forward to working with you as the Board continues its mission to protect public health. So, welcome, and thank you for your service.

The American Lung Association supports strong integration of zero emission technology into transit bus fleets and school bus fleets across California. We support the Board's -- the staff's proposal to move forward with this important rule. We've been impressed recently with the level of dialogue and outreach that's gone on around the rule through the symposium and other working group meetings. I just wanted to note that.

Also, the Lung Association has a long history of advocacy for zero emission vehicles, technologies, and fuels to protect the public's health from air pollution and climate change health impacts. We've also been before this Board a number of times talking about the importance of SB 375 and the integration of smart land-use planning with transit accessibility.

We think that the zero emission buses that are on the roads today in Stockton, in the Bay Area, and Southern California really help to bring together multiple benefits for clean air, improving public health and active transportation, and making our communities healthier, walkable, and transit accessible.

We think the rule can really help bring together all of these benefits. It's especially important in disadvantaged communities, as a number of members and others have spoken to already. At the technology symposium earlier this week, it was really exciting -- or last week, sorry -- it was exciting to hear from so many transit agencies looking to zero emission technologies as the -- their standard for moving forward and want -- we want to be able to support that through the rule, but also with connections between our local staff offices and local transit agencies.

Our staff in San Diego and Southern California have been really looking at this as an important rule --

(Thereupon a phone rang.)

MR. BARRETT: Who's going to answer this?

(Thereupon a discussion occurred off the record.)

CHAIR NICHOLS: Interesting.

I'm sure that interrupted the webcast.

Yeah. I'm just waiting to get a sign? Are we

okay, do you think?

All right. We'll -- why don't you go ahead. We'll give you a little more time for that.

MR. BARRETT: I wonder if they're looking for La Ronda and the Ombudsman's office or something.

So basically, I want to work with our local staff to bring together some of their efforts to talk with local transit agencies and the technology providers, who are really doing a lot of great work in California to get these vehicles available to the transit agencies.

I also wanted to note at the technology symposium that Same Wade on the ARB staff gave a great presentation on ways that transit agencies can really look to the Low Carbon Fuel Standard and take advantage of the new credits that are available that this Board approved last year. We think that's again a really important way to bring multiple benefits of ARB's programs and regulations together. So we have zero emission technology. We have clean fuels that are providing credits and available value to local transit agencies that we think they can take advantage of.

I just wanted to note that we thought that the presentation Mr. Wade gave was really important. And again, just -- we'll bring together multiple benefits through the ARB's programs to air quality and climate

health.

In closing, we want to urge the Board to establish a strong Advanced Clean Transit rule that will support clean air, protect our climate, spur the transition to zero emission technologies, not just in the bus sector, but the broader heavy-duty sector really looking at ways that the battery technologies can translate into the freight sector, and then really providing regulatory certainty as these agencies move forward.

I have a call to return apparently --

(Laughter.)

MR. BARRETT: -- so I'm going to thank you for the time and look forward to working with all the staff.

(Laughter.)

CHAIR NICHOLS: Well, that was interesting. Thank you.

Ms. Jatkar -- Mr. Jatkar.

MR. JATKAR: Good afternoon, Chair Nichols. And welcome to the new Board members, Senator Florez and Ms. Takvorian. I look forward to working with you.

My name is Shrayas Jatkar with the Coalition for Clean Air. And I'd like to start by just, you know, emphasizing the need for the Advanced Clean Transit rule. Nearly twice as many Californians die from pollution --

tailpipe emission pollution than from automobile accidents or collisions. And so the ACT rule I think is vital to make sure that we meet our air quality, public health goals and standards, and also petroleum reduction and climate standards that we've set as a State.

And I think these benefits in terms of air quality and petroleum reduction and climate protection will be beneficial to all Californians, but especially to those who are not only most dependent on transit, but also most impacted by tailpipe emissions. And those are seniors, people on low income -- low income residents, people with physical disabilities.

And so we support the ACT rule. We support specifically a mandate and a phase-in requirement for purchasing zero emission buses. And again, we see these as vital to making sure that we improve our environmental and human health in California,

I also want to just speak to the fact that I think this is also -- that this rule will also be aligned with the goals of Senate Bills 1275 and 1204, which call for increasing access to zero emission technologies for low income households and moderate income households in California.

You know, the Coalition for Clean Air, we do support the policy framework of zero emission vehicles

where feasible, and near zero emission technologies everywhere else. But here in the transit sector, I think this is where we're seeing zero emission buses are increasingly technologically feasible and also increasingly commercially viable.

And so I think we -- it is definitely time to develop and implement a zero emission bus purchase requirement. And as noted by my colleague at Sierra Club, this is, you know, not calling for it to be done immediately and all at once, but phasing it in over time as with natural fleet replacements.

And here in California, we need more transit. We need greater service throughout the State to really get at the issue of transportation emissions. And so I think the ACT rule plays a vital role in making sure that we're minimizing and eventually eliminating those tailpipe emissions as we get more and more buses on the road.

And also, I'd just like to say that as a transit rider every day from Davis to Sacramento on Yolo Bus, I also see that there's other advantages and benefits to this kind of rule moving towards zero emission buses, specifically they're quieter, they tend to be smoother, and so -- you know, that's reducing noise pollution, it's improving the quality of the service, improving the comfort and the quality of service, not only for riders

but I think drivers as well.

Thank you.

CHAIR NICHOLS: Thank you.

Jonathan Nelson, yes.

MR. NELSON: Thank you Board and members. Jonathan Nelson on behalf of the Antelope Valley Transit Authority, or AVTA. Pleased to be here today in support of the proposed ACT rule framework.

So as quick background, AVTA is a transit agency located in Southern California that serves the cities of Lancaster, Palmdale, and surrounding regions. We have pretty challenging routes that are characterized by long duty cycles, steep inclines, temperatures that in the summer can sore quite high, and we also have a population that is quite disadvantaged. So we take the services that we provide to our residents and ensuring continuity of those services very seriously.

A couple years ago, AVTA first began testing a pair of zero emission battery electric BYD buses, and were quite impressed with the performance capabilities and the range of these vehicles. And so much so, that, in fact, our AVTA board of directors had the confidence to put the public goal out there of trying to transition to 100 percent zero emission bus vehicles by 2018.

We are committed to that goal and have confidence

in that goal for a couple of reasons: Number one, because we see that the prices are indeed going down, and going down quickly; number 2, because, at least in our case, and we've worked with ARB staff to provide some of this material, the cost economics for operating the buses are very favorable. In fact, we've seen significant savings per mile compared with our diesel vehicles. And so we're very pleased with what we're seeing there.

And then number three, we believe that this is the best pathway to providing high quality service to our residents. People love our buses. And so we do believe that as California looks to the future, and looks for ways to address our climate change goals, and they're ambitious, we know that we really need to make progress in this particular area. And I think we'll look back decades from now and identify this proposed rule as one of the landmark successes in this state.

So we want to extend the invitation to the entire Board to come visit and see what we're doing down there. We've already had some staff down there. We're also committed to working with staff both through the ACT subcommittee, the full committee, and as well as any other venues to make sure that we can put a rule out there that works for everyone.

Thanks so much.

CHAIR NICHOLS: Thank you. Oh, I'm sorry. Excuse me. Wait. Sorry. I didn't see that we had a question before you left.

Go ahead.

BOARD MEMBER TAKVORIAN: Thank you. Thank you for your testimony. I just wondered over what period of time you phased-in the buses? And can you describe that a little bit.

MR. NELSON: Sure. So we first began testing buses I believe in early 2014. It was a pair of BYD 40-foot battery electric buses. And we tested them on multiple of our routes, really trying to get a feel for the capabilities.

One of our key concerns was range. You know, we can't be in a position where we've got a vehicle that can't meet its duty cycle. And what we found was that not only were these vehicles meeting the duty cycles or the ranges that we were told they would be able to meet, but they actually were exceeding them quite significantly.

We also found, and this was another area of concern, of course, was the cost. And we found that we were saving I believe it was an average of like a $1.36 per mile, which adds up quite quickly, because our routes are long, and we're racking up a lot of miles on our vehicles.

So, so far, the experience has been positive. Again, you know, we are very sensitive to the need to be able to ensure service continuity. Our population is quite disadvantaged. They need these services. They can't go without. But we do have the confidence based on our experience with these buses to move forward.

Thank you.

BOARD MEMBER TAKVORIAN: Thank you.

CHAIR NICHOLS: Thank you.

Now, Mr. Kenny. Hi.

MR. KENNY: Hi. Good morning, Chair Nichols, members of the Board.

My name is Ryan Kenny. I'm with Clean Energy. We're are the nation's largest provider of natural gas transportation fuel. And we'd like to thank staff and Tony Brasil for including us in the collaborative ACT stakeholder group. We're a member and we're very pleased to do so.

Working with other stakeholders on developing the ACT proposal, and -- we're looking to incorporate, of course, advanced clean technologies, including low NOx engines combined with renewable natural gas. And we believe this is a cost effective and key strategy for transit agencies currently operating on compressed natural gas and liquefied natural gas.

Back in October, we were pleased that most of you expressed a desire for ARB's rule-making on this issue to be more sensitive to cost impacts on transit agencies and not exclude advanced natural gas technology solutions.

We strongly support this approach as it's technology neutral and also performance based. And it does set a goal, and therefore supports consideration of multiple clean low carbon strategies.

Policy signals that support acceleration of market adoption for low NOx strategies and ultra low carbon fuels and heavy-duty -- in the heavy-duty sector are vital to the State's environmental and -- environmental goals, including reduced carbon, clean air petroleum reduction goals, and, of course, the ozone attainment deadlines.

Just three quick points to mention on natural gas transit buses. One, they're capable of delivering zero emission like NOx emissions and the deepest carbon reduction available. Number two, they remain a very cost effective strategy that can utilize existing and significant transit infrastructure investments.

And third, natural gas transit buses deliver transit performance in terms of extended range, service reliability, and operations costs.

Now, as a rule that is being developed, we do

have one request as it's being promulgated, and that it does -- if there is a renewable fuel requirement, that it does consider the LCFS credits and not deny the fuel provider or the producer the ability to generate those credits. It's important that there's incentives still for the renewable natural gas requirement over and above what's already required.

Again, thank you for your time. And if there's any questions, I'd be happy to take them.

Thank you.

CHAIR NICHOLS: Thank you.

Mr. O'Dea

MR. O'DEA: Hi, Chair Nichols, and Board. I'm Jimmy O'Dea. I'm an analyst with the Union of Concerned Scientists. And on behalf of our 69,000 supporters in California, I really want to thank you for considering this rule and tell you that we support adoption of a zero emission bus rule. And just three points on that.

The first being health. You know, buses and transit represent a small fraction of emissions of, you know, California's overall emissions, that if you ask anyone that lives along a route, rides a route, waits for a bus, or drives a bus every day, you know that it's actually a big impact in their lives and in their health.

And as we mentioned, we know that these emissions

have disproportionate impacts on disadvantaged communities. And we really applaud the Board for considering these impacts, not only with this rule, but with all of the rules that it considers.

The second point I want to make is on technology. We feel that zero emission buses are incredibly well suited for adoption of zero emission technologies. And, you know, we recognize that the State has these ambitious goals for climate and emissions elsewhere. And if the bus sector can't meet these goals, we're really in trouble. With the fixed route nature, and the, you know, overnight charging at central facilities, transit buses are really well suited to be zero emission.

The third point I want to make is we recognize the intent of this rule is really tailpipe emissions that we -- you know, a lot of the conversation includes consideration of the greenhouse gas emission component. And, you know, in those considerations, we want to point out our analysis on light-duty vehicles, if you're comparing, you know, what a car -- a traditional internal combustion car emissions versus an electric car and its grid emissions, the grid in California wins even today. And we know we have, you know, really strong standards going forward for the grid to get even cleaner.

And so we expect those same -- that same benefit

to really hold true when you're comparing emissions from an electric bus versus a fossil fuel bus.

So the last point I want to make is I just want to thank the staff for the really great technology symposium and the workshops that have been hosted. It's been a great dialogue with all the stakeholders and thank you for considering this rule.

CHAIR NICHOLS: Hannah Goldsmith, and you are our last witness.

MS. GOLDSMITH: I think it's still morning. Good morning, Chair Nichols and members of the Board. And welcome to the two new members. My name is Hannah Goldsmith and I'm a project manager with the California Electric Transportation Coalition.

Our board is comprised of the five largest utilities in the State, and our membership also includes major automakers and electric truck and bus manufacturers, all of whom are committed to transportation electrification.

The advance transit technology symposium highlighted the array of advanced transit bus technologies currently operating within transit fleets, as well as many of the challenges that are inherent in shifting the market to advanced clean transit technologies. You've also heard about these today.

The expertise of the workgroup participants will be invaluable in addressing these challenges as staff moves forward with the advanced clean transit rule. The utilities share the State's and CARB's commitment to transportation electrification and are playing a broad role. In addition, the utilities are committed to the success of electric transit bus technology and are eager to work with the transit agencies and bus manufacturers to address any concerns.

Specific to utility rates, the utilities do not want the price of electricity to be a barrier. The utilities recognize, and this is in the recent CalStart report that's on electric truck and bus integration, that rates should acknowledge the unique needs of the electric bus market, recognize the environmental and grid benefits of electric buses be compatible with fleet bus operation, remain technology and business model neutral, and finally, the utilities are also willing to separately submeter electric bus charging where it makes sense.

We look forward to continued collaboration with the transit workgroup and continuing to work with staff throughout the advanced clean transit rule process.

Thank you

CHAIR NICHOLS: Thank you. I don't see any other people who have signed up or wish to speak on this item,

so we'll closeout this portion.

But I think Board members may wish to ask questions or make some additional comments at this time. And I'll start off with Mr. Serna.

BOARD MEMBER SERNA: Thank you, Chair Nichols. So I tipped my cards a little earlier with my line of questioning to Mike Wiley about where my concerns lie. So I have a fairly surgical question for staff -- and forgive me if it was addressed or answered in the presentation. I don't think it was -- but what are we doing to actually safeguard against having that unintended consequence of affecting service, especially to what we in Sacramento call life-line ridership riders, or transit-dependent riders? What are we doing or what are we thinking about in terms of rule development that will precisely safeguard against that?

HEAVY-DUTY DIESEL IMPLEMENTATION BRANCH CHIEF BRASIL: So one of the things that we are doing is we're actually sending out a survey that gets into some of the details for individual transits to understand the variation among the different transits.

In terms of the rule concepts item, the items that we're discussing that we have a separate subcommittee for, are off-ramp provisions in the rule if the technology cannot meet the needs of an existing bus within the

existing operation of the fleet. We are interested in identifying ways to address those situations when they occur, because the time frame of the rule is so long, eventually, if technology doesn't advance as quickly, a fleet might even encounter a situation where the range that's available for their needs might not meet them. And we think we can identify a number of ways to address some practical limitations that can occur and may occur even today with some transits, that is maybe not terribly likely to occur for many.

BOARD MEMBER SERNA: So with regard to that -- the amount of discussion or brainstorming that there's -- there have been at the staff level in working with stakeholders, has there been any specific discussion about using some kind of measurement of service delivery that is sensitive to the fact that, as I mentioned and as Mike Wiley pointed out, we're all -- you know, we -- a number of us probably serve on transit boards. So we've got some mixed feelings here. We're still struggling to get back out of the recession in terms of getting to a place where we were, you know, before 2009.

Is there any discussion about using some kind of measure of service delivery relative to that circumstance, that experience, so that we don't have this effect on service, because we have a new -- the introduction of a

new capital cost that is mandatory?

MOBILE SOURCE CONTROL DIVISION CHIEF KITOWSKI:

Let me jump in a little bit. I think one of the things -- one of the items that you've heard throughout the day was that we're working very well with the transit agencies right now. A lot of that discussion, most of that discussion, is really on the core data that will go into the structure of the reg development. So what we put out there a number of months ago was a broad concept of how we would get from here to 2040. But the details as Tony was outlining, there's many to be worked through.

At this point, this was the first I had heard of that sort of concept. And it is something we can look at different metrics as part of the off-ramps. But we're really focused on making sure, at this point, we get clarity on the cost data, the operational concerns, what are the limiting factors, and then move into reg development.

BOARD MEMBER SERNA: I would certainly encourage you to think about it as you call it an off-ramp. And I'll tell you in the Sacramento experience, you know, we cut service by about 24 percent. And we're only about halfway back, so we restored about 12 percent. And again, I don't think we're unique across -- you know, compared to other transit districts, other agencies in the State.

So I'd strongly encourage you to at least consider that. Maybe not necessarily have it linked as some kind of trigger, but I think it is an important aspect of what we're trying -- all trying to achieve, both ARB through rule-making and our local transit agencies across the State.

DEPUTY EXECUTIVE OFFICER AYALA: Let me just jump in and to make it entirely clear for you, Supervisor Serna. One of the reasons we're here giving you an informational item is so that you have an opportunity to weigh in and give us your thoughts in terms of where we should go with this process.

Your message that looking at some sort of index to look at ridership is clear. So again, we will take that and clearly include that in some of the discussions we're having with the workgroups, and we'll look into that. So rest assured that the message is clear.

BOARD MEMBER SERNA: Very good. Thank you.

CHAIR NICHOLS: Others?

Yes, Supervisor Roberts.

BOARD MEMBER ROBERTS: Thank you, Madam Chairwoman. First of all, I was very happy when I looked at slide number 20 and it said no reduced transit service as a result of the regulation.

You know, in real estate they say location,

location, location. And transit it's service, service, service. Okay. It's a level of the service. And I don't -- you know, you don't need a scientific study to tell you that, if we could be running buses or other things.

And, you know, public transit isn't just buses. Okay. I don't want to bring this up, but there are some systems, and one I'm very familiar with, 40 percent of the riders now are all electric. It's on something called a trolley. And I didn't hear this. You know, we're talking about transit.

Yes, if you go to Antelope Valley, they're going to have buses. They don't have these other things that we're investigating heavily in. And to treat these systems, whether it's L.A. or San Diego or Sacramento, like they're, you know, Foothills or Antelope Valley or wherever you're getting these little tiny systems, they're different. They're significantly different.

I like the discussion about performance, because if you had peformance, and you had -- you know, you would phase-in electric. And even if you say we're going to get to zero by 2040, but let the systems figure out. You can have -- all the way along have the measurements of what they've got to attain, I suspect, especially with the large systems, they'd layout paths. We'd make the

progress that you want, but they do it in a way that works for them.

And I hope that -- and let me emphasize, everything I'm hearing from the people that are operating these systems and our staff there's a good dialogue going on here. And I want to -- I just want to encourage, these people are not the enemy. You know, we are trying like crazy to expand our systems. And I'm looking at numbers coming in from all over the State, and big systems like Los Angeles that has enormous drop in ridership. Now, you know, that's -- we've got to figure out how to get that up. And yes, we'd like to, at the same time, be making progress. And I think we can, but let's make sure we're working together, because we're in this together.

It's not going to do us any good if we have buses that don't have the range, that don't have the reliability. And there is a big discrepancy here you've got to work through, Richard, you and your crew, because we're hearing slightly different pictures. And I know that prices have dropped, but the rate at which they're dropping is leveling off. Don't expect they're going to -- you're going to see the rate at which the cost of the battery power has dropped to continue. That's going to, you know -- but it's kind of suggested. Oh, yeah, that's happened, so it's going to continue to happen, so

everything must be okay.

Please be looking at those costs. I know that these people want to work with you. And at the end of the day, you need them to be an ally in this. And I'm not talking about people who sell buses, I'm talking about the people who have to buy them, have to operate them, and have to operate the systems. They're the ones that are out there on the streets that are the end-users so to speak, as they pick up their passengers all over. So let's make sure we work with them very, very carefully.

CHAIR NICHOLS: Thanks. I think the process is actually going well from what I've heard from all sides. So I feel quite good about that. But I think there's some sort of overarching issues that the Board should be giving some additional thought to.

I had Dr. Sperling first and then Supervisor Gioia.

BOARD MEMBER SPERLING: Let me try to give a little more context and summarize some of these issues. So this idea of electrifying and zero emission buses is obviously a very desirable concept. I've spent my entire career trying to understand how best to bring low emission, clean technology into the transportation sector. But let me just give a little context here.

First of all, all transit operator -- urban

transit operators are government. They're all heavily subsidized. The urban -- the passenger fares cover about 30 percent of the operating costs, and none of the capital costs. All this money -- so they're heavily subsidized. They're getting monies coming from property taxes, from sales taxes, local governments, a little bit from federal and State sources.

There's really not that many buses in California, when you compare it to number of trucks, number of buses elsewhere in the world. We're really talking about a very small number. I just actually looked it up. There's about -- it looks like there's about six or seven thousand buses -- urban transit buses in California. And so, you know, the turnover is in the hundreds per year total.

These operators have absorbed large costs in recent years for a lot of them converting to natural gas and reducing the emissions in their buses. And probably the most important point is that buses -- these transit operators are performing a very fundamental public service. That's what they do more than anything. They are providing service to people that are mobility disadvantaged, and often economically disadvantaged, but elderly people, young people as well.

And buses are -- contrary to what someone said, the buses are inherently unsuited to battery -- to use of

batteries. Batteries work great in my electric toothbrush. They work fairly well in my smartphone.

(Laughter.)

BOARD MEMBER SPERLING: They work moderately well in a small car. But the bigger the vehicle or the bigger the -- you know, the bigger the vehicle, the less suited it is to it. This battery packs in these buses are mammoth and heavy and expensive. And so, yes, battery costs have come down a lot. They're going to continue to come down, but they still represent a huge additional cost for the vehicle and will into the foreseeable future. And so that's kind of the context.

And also, these analyses about the cost -- the life of these batteries I saw was -- I guess it's assumed they're 12 years, but, of course, the buses are usually kept more than 12 years. And there's even question of whether, you know, they're really going -- they're going to last 12 years at a full state -- still having the full stated charge. They're going to deteriorate over that time.

And so that's kind of the context. And then we -- there is this statement that I think someone here mentioned about no reduced transit service. Well, that sounds great, but how do you enforce something like that? How do you actually make that part of a regulation or a

program?

I've been on this Board long enough to know that there are some things that work well and some things that don't.

And so at the end of the day, this is -- in many ways, this is an environmental justice issue. We've got the two new Board members that are concerned about this, but these are services that more than almost anything else in our society are serving the disadvantaged riders. And if we do anything to threaten that, the unintended consequence idea, there's lots of things that can go wrong here. And so the ones that are going to suffer are the most vulnerable.

So this is a really high risk strategy to do anything in a regulatory sense, I would say. And realistically, the only thing that makes good sense is to say that transit operators need to abide by some set of rules, whatever we were to come up with, if money became available to them through cap-and-trade revenues or some other kind of incentive funds. But if that's the case, why do we need regulations?

And so I think at the end of the day, I -- I mean, of all the programs -- and the things I think I've seen here at ARB over the years, this is the one that seems least compelling to me as a regulatory action, even

though it's a great concept.

And I should say, I mentioned batteries, fuel cells are actually a much better -- much better suited to buses and to trucks than batteries are, and -- but yet, we still have a long ways to go, you know, before the fuel cells are cost competitive and reliable.

CHAIR NICHOLS: John.

BOARD MEMBER GIOIA: It's hard following that.

(Laughter.)

BOARD MEMBER GIOIA: I had a chance recently to take some time to ride and meet with folks in the East Bay, my own area, AC Transit, which has the largest fleet of hydrogen fuel cell buses in the country. Very successful. They've made decisions to replace buses -- diesel buses with hydrogen fuel cell. And one of the things they acknowledged, and I think what we hear more and more, is that the price gap between traditional buses and the zero emission buses is diminishing. And the more we can continue to incentivize this technology -- sort of it's a chicken and egg thing, right? The more we incentivize this technology, the more that price gap continues to diminish and eventually disappear.

So -- and I -- the staff I think has heard, right, we're trying to seek, as many things we do here, a fine balance. We don't want to negatively impact

important bus service in communities with the limited resources that bus agencies and government has to provide that, while at the same time finding that right point where we can incentivize the technology changes, so that eventually the price gap between traditional buses and zero emission is basically, if you can -- is diminished or zero, especially when you consider the lifecycle costs, right?

It's not just the capital cost upfront, it's the operations and maintenance. What I heard from the bus providers is that -- I mean, that's how you factor in the lifecycle cost. And I'm confident that's the direction the staff has heard, and we're trying to find this right balance.

And the other point is, and I think several folks here have mentioned this, including in my own area, a lot of this bus service, right, are in communities already greatly impacted. And to the extent we can have clean zero emission vehicles, we're achieving the co-benefits of improving air quality in these communities at the same time, while we understand the financial limitations of the public bus agencies.

CHAIR NICHOLS: Thank you.

Diane, and then, Dean, did you have your hand up?

BOARD MEMBER FLOREZ: (Nods head.)

BOARD MEMBER TAKVORIAN: Thank you, and thanks to everyone, to the staff, and to all of the folks who came today to express their views. Obviously, a critical issue, and one that's going to affect our climate, our health -- our public health, and many of our communities.

You know, when I first looked at the materials, I said, "2040, are they kidding? How come we can't do it faster than that"? Just generally my response to everything, right?

(Laughter.)

BOARD MEMBER TAKVORIAN: But having listened to the testimony, I see the wisdom really of a long time that it's going to take, because I think the transit agencies have been very articulate about the time it takes to phase-in, the time it takes for buses to live out their useful life and for those kinds of changes to happen over time.

And I think we all understand that from a personal, organizational, and obviously from a governmental perspective. So, you know, I start to see the wisdom of that. I start to think that, okay, maybe that's not that long, and that we really can do this over time and that that makes sense.

I have a couple questions and then I guess another comment. It seems like buses are obviously

long-term investments, and that there was already this phase, this transition that happened with CNG. So what's the relationship between the transition that would happen with electric buses and the transition that happened with CNG? It seems like we've been through that. There's a useful life that these buses go through. Many of them are coming to the end of their useful life, even the CNG buses for the early adapters. So this is the time, it seems like to me, that we need to put this rule in force, to say this is what's coming down the pike, because we think the situation is going to get better and better and more advantageous. And if we wait five years to do this, then more of CNG buses will have been purchased, and we'll be further into that hole.

So I guess I'd say, you know, we need to take that leap, especially given the very conservative and I think wise way that we would go in on a long-term basis.

The other is that, given our first agenda item, I believe -- I can't remember back that far.

(Laughter.)

BOARD MEMBER TAKVORIAN: You know, I don't think CNG is wave of the future. So we need to think about where this gas is coming from. And I appreciated the comments about the fact that we also get environmental and climate benefits from the energy that's produced, the way

the energy is produced. So that's something I'm hoping that the staff either can respond to now or can talk about how that's incorporated.

I'm also interested in the avoided maintenance costs and whether those are included in the cost analyses?

And I would wonder about the market impact of the rule. I mean, I'm guessing that if this rule goes into effect that you're going to see some changes in terms of the capital cost, as well as the long-term cost.

Lastly, we've been talking a lot about environmental justice here. Transit affordability is an existing issue. So let's not kid ourselves, yes, low income people, people of color in EJ communities are on public transit more, but it's not all that affordable now. So we have issues with affordability in our communities. We have issues with accessibility. We don't have appropriate levels of transit, so it isn't just a low income community option. We need to have more folks on transit, and we need to make that transit more accessible and more affordable.

So we are totally in favor of that, and we want to make sure that this rule doesn't get in the way of that. So make no mistake about it.

But EJ communities and disadvantaged communities are also the ones that are most impacted by these

polluting buses. We -- not only the buses themselves -- I appreciated the comment about the roadways where the buses are, having -- being a walker or a biker myself, I have 10 or 12 buses that go by while I'm, you know, getting my exercise or trying to be healthy. So it's not all that -- it's a problem in that regard.

The other is that we have the transit yards in our communities. We have the bus repair facilities. We have the bus driver practicing facilities in our communities. So I want to make sure that those emission reductions are being calculated as well, because our communities are receiving more than their fair share of just the bus lines. They are receiving their share, if you will more than their share, as a result of having all of these other facilities in their communities.

So I really hope that we can really look at environmental justice in a broad way and understand that low income riders are the ones that are on these buses and transit the most, but they are also the most -- the ones that are most impacted by the polluting buses and polluting vehicles and the fact that they're surrounded by freeways, and other sources of pollution.

So I think it's a balancing act. It sounds like the staff is on that path, and I look forward to the next update. Thank you.

CHAIR NICHOLS: Thank you.

Mr. Florez.

BOARD MEMBER FLOREZ: I will try -- I'll be -- I think Diane pretty much said everything I wanted to say. And I would just ask maybe staff as we look at this and move to this next phase, and I do think we need to signal. I think there's some sense that signaling is super important to industry, and kind of being ahead of that, and getting everybody use to the next phase. I think my overall thought is that this is kind of the classic economic cost versus environmental protection, you know, dilemma that we're probably going to face here many, many, many times.

And it all centers around affordability, particularly in poorer income areas and who's going to subsidize a good portion of this, not just the riding aspect of it, but I think all the way down.

One question I did have on the technology as it starts to phase out the natural gas to CNG, do we have stats on the amount of methane emissions that are affecting communities? I mean, obviously, we've talked about it in another sense in an earlier agenda item on methane period. But, you know, it seems to me from a warming perspective that, you know, also is not a good thing. It's probably good to phase out. And I don't know

if there's been studies. You guys have obviously many, many, many.

But it seems like that would be one of the reasons pushing us to a new rule. At some point, methane emissions is something we still want to eliminate moving forward. So hopefully we can move in that direction. I think it's a good item and look forward to supporting it.

Thank you for bringing it to us.

CHAIR NICHOLS: Dr. Balmes.

BOARD MEMBER BALMES: Thank you. I'll be brief, because many of my comments have already been articulated by other Board members. But I have to say that since I'm on an AC Transit bus line where I live, that, you know, service has been reduced. And I live in an affluent neighborhood in north Berkeley. But both students at Berkeley High, like my son, use that transit, and a lot of less well-off folks who provide service to or are in service jobs to my affluent neighborhood use AC Transit. And I see them standing waiting a long time for buses.

So just to both piggyback on what Dr. Sperling said, I have that same concern that we not move forward with this very well intentioned proposal and lead to service cuts. It's been articulated by multiple people, but I think it's a reality that I'd like to emphasize.

And I also would second what Ms. Takvorian has

said as well. It's a balancing act, and it will be hard to get right. That's why I think we need to be careful about being too restrictive in the final regulation that we put forward.

CHAIR NICHOLS: Thank you.

Hector.

BOARD MEMBER DE LA TORRE: Thank you. Two points. One, the ridership, which has been alluded to is a significant concern to me, because all of this is predicated on more people getting on these buses. And if that's not happening, maybe it's because of the last recession, but maybe not. And so I think we need to incorporate some of that into whatever analysis we're doing.

CHAIR NICHOLS: It's grams per passenger mile, not just grams per mile of bus, because if the bus is riding around empty, and emitting, you're not accomplishing very much.

BOARD MEMBER DE LA TORRE: So we really have to get a handle on that. I asked when I met with transit folks about this. And, you know, they're -- this is a statewide phenomenon. The article that got my attention was about L.A., but it's a statewide phenomenon. And so we need to get a -- and a national one, too. I mean, I think they alluded to some stuff happening in other parts

of the country.

So we need to incorporate that into our thinking, otherwise we're throwing a lot money at this -- a declining -- potentially declining benefit to society.

Second, in terms of the purchasing, I wonder if there are any models for regional cooperation for purchasing these buses. Because if you've got, you know, a small transit agency here -- and I don't know the transit world at all. I wasn't a county supervisor. I was a city councilman. We didn't have our own transit system.

But it seems to me that if you're buying them in onesies and twosies at the small level, that's not going to get you where you want to go, and maybe there's some economies of scale if the transit agencies would cooperate and do bulk purchasing together or whatever numbers as a group as opposed to individually. That would lop off some money as well.

I realize that there's autonomy there that folks would want to keep, but I think it's something that we should very much look at and see if there are any models for that.

Thank you.

CHAIR NICHOLS: Thank you. May I wrap-up or is -- I don't want to close things off prematurely, but I

feel like probably we're about ready for a wrap-up. And I do want to do something that frames the issue a little bit differently, because I often find that if a problem seems too difficult, maybe you need to ask the question -- ask a different question.

So I'd like to sort of step back and ask a different question, because I don't start from the premise that we have to save the zero emission bus rule, and fix it. I start from the premise that we have a goal, which is to turnover the transit fleet to make it more clean and efficient. And that's where we should be aiming to head. Statewide more zero emission buses, whether they're fuel cell, electric or whatever.

And if that is our goal, we may not be using the right tool. A purchase requirement may not be the most effective way to get us there. And it may be that this is a problem that's also, while it's within the ARB's area of jurisdiction and concern, we are not alone here.

And I guess what I would like to ask the staff certainly before the next time they come back to us, and maybe before the next workshop, is for a better understanding of what we, working together with the administration, with local governments, maybe with the legislature, could do that could actually create the mix of incentives and mandates that would get us to a more

effective way of making sure that whatever monies are available to be deployed for transit are being spent in a way that encourages and promotes a greater use of zero emission vehicles. That's a pretty big vague kind of question. It's the kind of thing that people at UC Davis might --

(Laughter.)

CHAIR NICHOLS: -- have some ideas about how to promote. But in all seriousness, as I've been listening to this, I've been thinking this is really frustrating, because, you know, we're trying to balance important goods. We know how hard it is. It's so much easier to tell Detroit go build us an electric vehicle, than it is to tell ourselves, you know, especially those of us with direct responsibilities, you need to go out there and buy more electric buses, even when those buses are available because there are others issues involved. And as we've heard, that not everybody wants the same thing.

I want to encourage the fledgling industry that we have in California, by the way. I don't think there's anything wrong with recognizing and taking advantage of the fact that we are home, as far as I know, to the largest constellation of people who are building zero emission technology for this sector, as well as others.

So I think they're a very legitimate part of our

overall concern, but we're just not going to get there if we're -- I think through this mechanism. So I don't want to say abandon it, but I also don't want to say let's just assume that this is going to be the major answer to our real concern here. I'd like to kind of go back and do some more brainstorming about what is potentially available that could help move us further faster in that direction.

Is that -- I see heads nodding. Somewhat perplexed looks. I'm sorry, I can be more direct and clear at this point. But maybe we could actually host some kind of a workshop along those lines and invite some of the Board members who know most about these topics to attend. That's a start.

EXECUTIVE OFFICER COREY: In fact, Chairman, that's where I was going with this, because we already had plans to continue to visit a number of additional transit districts. In fact, part of those conversations, have been -- even the existing business model, for those that have purchased or are considering battery electrics or fuel cell, what is the model? Even the models aren't all the same as to how they've done it, what role did federal play, what role did State incentives play, were there other partnerships that played a role in this?

And where I'm going with this is both through the

workshop that the San Diego transit district representative referred to, I think this is a question on the table for the workgroup. I think it's also a workshop, and I think it's something that we would reach out to Board members to participate in, just as we've been doing on a number of transit visits.

And based on that experience, basically key up -- tee up that question, and report back to you on what we find.

CHAIR NICHOLS: Okay. Is that acceptable to my fellow Board members as a path forward here?

Okay. Heads nodding. No need to vote on any anything.

We will take a recess for our executive session, and then I at least will come back with when we're finished with that to report on the outcome of the executive session.

Thank you all very much.

(Off record: 1:30 PM)

(Thereupon the meeting recessed into closed session.)

(Thereupon the meeting reconvened open session.)

(On record: 2:32 PM)

VICE CHAIR BERG: Hi. It's Sandy Berg, Vice

Chair. I'm back to report after our closed session. And so we'll bring the meeting back to order.

The meeting of California Air Resources Board is now in session. And I am here to report that during closed session, we brought the Board up-to-date on four different legal actions. There was no action taken by the Board.

And then with no additional public comment, I will close the meeting and see you next month.

(Thereupon the Air Resources Board meeting adjourned at 2:32 PM)

C E R T I F I C A T E OF R E P O R T E R

I, JAMES F. PETERS, a Certified Shorthand Reporter of the State of California, do hereby certify:

That I am a disinterested person herein; that the foregoing California Air Resources Board meeting was reported in shorthand by me, James F. Peters, a Certified Shorthand Reporter of the State of California, and was thereafter transcribed, under my direction, by computer-assisted transcription;

I further certify that I am not of counsel or attorney for any of the parties to said meeting nor in any way interested in the outcome of said meeting.

IN WITNESS WHEREOF, I have hereunto set my hand this 2nd day of March, 2016.

JAMES F. PETERS, CSR
Certified Shorthand Reporter
License No. 10063