MEETING

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AIR RESOURCES BOARD

JOE SERNA, JR. BUILDING

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

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Mr. Ken Yeager

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Ms. Mary Alice Morency, Board Clerk

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Ms. Karen Magliano, Chief, Air Quality Data Branch, Planning and Technical Support Division

Dr. Eileen McCauley, Manager, Atmospheric Processes Research Section, Research Division

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PROCEEDINGS

BOARD MEMBER RIORDAN: Good morning. Let me call the meeting to order. This is the May 26th public meeting of the Air Resources Board.

Our Chairman will be here momentarily, as will Mayor Loveridge. But because we have an agenda today that we want to complete in a timely way so that we can move to a tour of one of our facilities, I'm going to ask that we begin. And, of course, we begin with by the Pledge of Allegiance. If you will stand and join me in the Pledge of our flag.

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

BOARD MEMBER RIORDAN: Let me ask the Clerk to call roll, please.

BOARD CLERK MORENCY: Dr. Balmes?

BOARD MEMBER BALMES: Here.

BOARD CLERK MORENCY: Ms. Berg?

Ms. D'Adamo?

BOARD MEMBER D'ADAMO: Here.

BOARD CLERK MORENCY: Ms. Kennard?

Mayor Loveridge?

BOARD MEMBER LOVERIDGE: Here.

BOARD CLERK MORENCY: Mrs. Riordan?

BOARD MEMBER RIORDAN: Here.

BOARD CLERK MORENCY: Supervisor Roberts?
Professor Sperling?
BOARD MEMBER SPERLING: Here.
BOARD CLERK MORENCY: Dr. Telles?
Supervisor Yeager?
BOARD MEMBER YEAGER: Here.
BOARD CLERK MORENCY: Chairman Nichols?
BOARD MEMBER RIORDAN: Thank you, Madam Clerk.

As custom, I have a few announcements before we get started this morning. Anyone wishing to testify should fill out a request to speak card available with the staff in the lobby outside of the auditorium. You have the option to include your name on the speaker card.

Also, speakers be aware that the Board will impose a three-minute time limit. Please state your first and last name when you come up to the podium. Put your testimony into your own words. Any written testimony we will take in and file it as part of the record, but we like your testimony in your own words, please.

And for safety reasons, please note the emergency exits to the rear and the right side of the room. In the event of a fire alarm, we are required to evacuate this room immediately and go down the stairs and out the building. And when the all-clear signal is given, we can return to the hearing room and resume our hearing. And I

thank you for listening to those items.

This morning, the first agenda item is 11-3-1. This is an informational report on California's progress in reducing ozone air pollution. Californians are breathing less ozone air pollution than ever before. This is especially evident to those of us who have lived in Southern California for many years.

California has worked hard to meet the Clean Air Act requirements for ozone, and it's good to see it shows. We focus a lot of attention on meeting federal air quality standards, but it is also important to look at the progress along the way. Our rate of progress in reducing harmful public exposures is important since it translates into real health benefits.

At this time, I'd like Mr. Goldstene to introduce the item.

EXECUTIVE OFFICER GOLDSTENE: Thank you, Ms. Riordan.

Today, staff will discuss California's long-term ozone trends and air quality progress. A number of regions that were previously out of compliance now meet the current federal standard. Other areas, such as the San Joaquin Valley and the South Coast, present greater challenges but also show a lot of improvement.

Today, staff's presentation reflects the most

recent air quality monitoring for ozone, because variations in weather will affect ozone levels. We always look at monitoring and results over a period of at least three years when assessing progress.

At this time, I'd like to ask Karen Magliano, the Chief of our Air Quality Data Branch, to begin the staff presentation. Karen.

(Thereupon an overhead presentation was presented as follows.)

MS. MAGLIANO: Thank you, Mr. Goldstene. And good morning, Madam Chairwoman and members of the Board.

In today's presentation, I'll discuss the progress we've made in improving ozone air quality in California, as well as EPA's ongoing review of the federal ozone standard.

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MS. MAGLIANO: I'll begin with an overview of ozone health impacts and the ozone standard review process.

Next, I'll discuss ways in which we can evaluate progress towards meeting these standards.

The major portion of the presentation will then focus on the progress we've made in the two most challenging areas of the state: The San Joaquin Valley and the South Coast.

Finally, I'll close with the discussion of the current federal ozone standard review process and the potential impacts it may have on the attainment status for California and the rest of the nation.

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MS. MAGLIANO: Ozone is a regional pollutant, which is formed which oxides of nitrogen and reactive organic gases react in the presence of sunlight. The highest concentrations occur during the summer months when weather conditions are most conducive to ozone formation.

Exposure to ozone reduces lung function. Therefore, it can aggravate conditions such as asthma and other chronic pulmonary diseases, including bronchitis and emphysema.

With repeated exposure, ozone can cause permanent lung damage. The people most susceptible to the impacts of ozone are children, people with lung disease, and the elderly. However, even healthy people experience ozone impacts.

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MS. MAGLIANO: The Clean Air Act requires U.S. EPA to set and periodically review federal air quality standards. These reviews consider the most recent health studies, and the standard must be set solely based on health considerations. The costs are considered in the

air quality planning process through development of State Implementation Plans, or SIPS, that must demonstrate how the standard will be attained.

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MS. MAGLIANO: U.S. EPA is required to review federal air quality standards every five years. These reviews incorporate the latest scientific health findings. The documents supporting development and review of air quality standards are peer reviewed by the Clean Air Scientific Advisory Committee, or CASAC, before U.S. EPA adopts or advises an air quality standard.

Over time, an improved understanding of the health science has shown that impacts are occurring at lower levels of exposure, leading to more stringent standards.

Due to these changing standards, in 2007, the SIP adopted by the Board transitioned from the original 1-ozone standard to the current 8-hour ozone standard. Progress towards meeting this 8-hour ozone standard of .08 parts per million will be the focus of today's presentation.

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MS. MAGLIANO: The Federal Clean Air Act also contains specific planning requirements that apply to the ozone standard. The design value, which is a measure of

peak concentrations averaged over a three-year period, is the benchmark used to assess whether a region meets the standard.

While each monitoring site will have an individual design value, the site with the highest design value determines an area's attainment status. Thus, attainment status alone provides only one view of progress. Looking at additional indicators and multiple sites provides a way to characterize incremental air quality progress within a region and a more complete picture of the remaining challenges.

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MS. MAGLIANO: Let's start, however, with simple attainment status. This slide shows two maps that reflect the statewide progress. On the left is the map showing initial attainment status of the Federal 8-Hour Ozone Standard when designations were done in 2004. The urbanized portions of the state and many downwind areas were designed as non-attainment.

The map on the right shows those areas with concentrations still exceeding the standard today. A number of original non-attainment areas now meet the standard, including the regions in the Sacramento Valley, Mountain counties, Imperial County, and the San Francisco Bay Area.

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MS. MAGLIANO: As discussed previously, there are a number of ways to measure air quality progress beyond simple attainment status. Understanding improvements in overall population exposure also helps us better understand the nature of the problem in a region, as well as the effectiveness of the control program.

These improvements take the form of: Fewer people being exposed to concentrations above the standard; high concentrations that are occurring over a smaller geographic area; and fewer days with concentrations over the standard.

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MS. MAGLIANO: Now I'd like to focus on air quality progress in two key areas: The South Coast and the San Joaquin Valley, starting with the valley.

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MS. MAGLIANO: The San Joaquin Valley is a long inland basin surrounded by mountains. These mountains act as a barrier, trapping emissions and pollutants within the valley. During the summer months, the valley's persistent hot temperatures, combined with stagnant air, create prime conditions for ozone formation. These conditions are especially severe in the central and southern portions of the valley.

In contrast, the northern valley derives a modest benefit from its closer proximity to the coastal influences.

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MS. MAGLIANO: While ozone air quality has improved throughout the valley, a number of challenges remain. Peak concentrations need to be reduced by 20 percent in order to meet the current 8-hour ozone standard. The actual number of exceedance days varies from one location to another, but the greatest number of days generally occurs in areas located downwind of the valley urban areas. These downwind sites still exceed the standard on 20 to 30 days each year.

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MS. MAGLIANO: Despite these challenges, people living in the San Joaquin Valley have experienced improving air quality, and more people are now breathing cleaner air.

Today, about a third of the valley's population lives in areas that meet the standard. Although the remaining two million live in areas where concentrations are still above the standard, they are also breathing cleaner air than they were 10 to 20 years ago.

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MS. MAGLIANO: We can see this graphically by

comparing ozone air quality maps in 1990 versus today. Green indicates air quality that meets the standard, while the yellows, oranges, and reds indicate areas with increasingly higher concentrations.

In 1990, most of the San Joaquin Valley exceeded the standard. The highest ozone concentrations were found throughout much of the central and southern portions of the valley.

In comparison, in 2010, the green areas now include nearly all of the northern valley. The darker orange is limited to the Fresno urban area and the area downwind of Bakersfield. And the red areas are completely gone.

The two highest concentration categories shown in the map legend, the very darkest red colors, do not appear on either of these maps. These categories were included so the maps would be comparable with the South Coast maps you will see later in the presentation.

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MS. MAGLIANO: The next series of slides focus in on specific sub-regions of the valley. As shown in the maps, the best air quality occurs in the northern valley. The Stockton and Modesto areas have transitioned to attainment over the last ten years. Concentrations still exceed the standard at Turlock, shown here by the dot near

of the southern border of Stanislaus County. However, concentrations in this location are nearing the standard, with only five exceedance days in 2010.

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MS. MAGLIANO: Moving further down the valley, the nature of the air quality problem becomes more complicated. In the Fresno and Bakersfield areas, there is general improvement, but the rate of improvement varies.

Overall, portions of the central and southern valley are nearing the standard. And urban sites experienced fewer than 20 exceedance days in 2010. This is in contrast to a decade ago when there were between 60 and 80 exceedance days in the most impacted urban locations.

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MS. MAGLIANO: The Fresno urban area has become the Valley's most challenging location. Limited progress occurred during the 1990s. However, there has been greater progress in the last ten years.

Some sites show more progress than others, and the location of the peak site tends to move from year to year due to variable meteorology and complex circulation patterns. Although the concentrations in the Fresno area are still above the standard, there are currently fewer

than 20 exceedance days each year at any site.

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MS. MAGLIANO: Now let's look at progress in the Bakersfield area. Ozone concentrations in the Bakersfield urban area are lower than those in Fresno. The Bakersfield urban area has also shown a more consistent rate of progress and is now within approximately 10 percent of the current standard. In 2010, sites in this region experienced 10 or fewer exceedance days per year.

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MS. MAGLIANO: Some of the highest ozone concentrations in the San Joaquin Valley are found downwind of the Fresno and Bakersfield urban areas. These transport-impacted locations include the Arvin-Edison area, and the Sequoia Kings Canyon National Park, which are shown on the map on the left-hand side of the slide.

Both of these areas have a greater number of exceedance days than their up-wind urban neighbors. Although concentrations in Sequoia Kings Canyon have remained fairly constant, concentrations in the Arvin Edison area have been declining and are now similar to levels in Fresno.

However, both areas have made significant progress in reducing the number of days on which the standard is exceeded each year. For example, 20 years

ago, Arvin had 82 exceedance days. Today, it has dropped to 30. The new monitoring site in Arvin is now better situated to characterize public exposure of key concern since it is located at an elementary school site.

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MS. MAGLIANO: While the San Joaquin Valley has made progress towards the current federal ozone standard, the Valley still has a ways to go. Ozone concentrations at a number of sites met the standard during 2010, but there were still 30 days with concentrations above the standard at the Valley's high site. In addition, the design value at the high site was .104 parts per million, 20 percent above the current standard of .08 parts per million.

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MS. MAGLIANO: The San Joaquin Valley also has a large number of low-income communities which are exposed to high ozone levels, particularly in the Central and Southern Valley. Many of these communities also experience high PM2.5 levels in the winter months.

Socioeconomic factors in these communities can affect vulnerability to air pollution as well. Therefore, it is important to recognize and address this potential for multi-pollutant exposure as we are tracking progress.

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MS. MAGLIANO: Now let's move on to the South Coast.

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MS. MAGLIANO: A large portion of the South Coast is located directly on the coast, with lower temperatures and a moderating sea breeze. In contrast, the inland areas are much warmer, and pollution is trapped by the coast range mountains. As a result, the South Coast has distinct coastal versus inland air quality regimes.

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MS. MAGLIANO: The South Coast has made tremendous progress in reducing ozone concentrations over the last 40 years. In the mid to late 70s, ozone concentrations were more than three times the level of the current federal standard, and there were more than 200 exceedance days each year, or about two out of every three days.

More than a hundred Stage 1 alerts occurred each year, which 1-hour concentrations reached levels considered very unhealthy. There were also a number of Stage 2 alerts, with concentrations reaching levels that were considered hazardous.

Now, smog alerts are a thing of the past. And although the population has nearly doubled, the South Coast has seen a 60 percent drop in both concentration and

exceedance days. These great strides have resulted from California's comprehensive air pollution control programs.

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MS. MAGLIANO: Although ozone levels are much lower now, there is still work to be done. Peak concentrations need to be reduced by 25 percent in order to meet the current ozone standard. The highest concentrations occur in the eastern portion of the basin, where some sites still exceed the standard on 25 to 45 days each year.

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MS. MAGLIANO: While the entire South Coast area is designated non-attainment for the current ozone standard, today, ten million of the area's more than 14 million people live in communities that meet the standard. The remaining four million live in areas where concentrations are still above the standard. However, they are also breathing substantially cleaner air than two decades ago.

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MS. MAGLIANO: These maps show the dramatic improvement in ozone over the last two decades. The map on the left shows concentrations in 1990, when most of the South Coast was the darkest shades of red. There were only two small circles of green near the coast that met

the standard.

The map on the right reflects ozone concentrations in 2010. The two darkest shades of red are completely gone. In addition, the green area now includes the entire coastal region. This, and the yellow area, which indicates concentrations within about 10 percent of the standard, cover more than half the map.

The highest concentrations in the South Coast are now limited to a small portion of the northeastern basin, which is the current focus for attainment planning.

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MS. MAGLIANO: Looking next at specific sub-regions, let's start with the coastal area.

As I mentioned earlier, this portion of the South Coast benefits from a more temperate climate. Ozone concentrations in this area have met the standard for almost a decade. The coastal area is also where the bulk of the South Coast population lives, approximately eight million people, or more than 60 percent of the total basin population.

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MS. MAGLIANO: Ozone concentrations in the South Coast increase further inland, but progress is still impressive. The valley area, which includes both the San Fernando and San Gabrielle Valleys, once had the worst

ozone air quality in the South Coast. However, concentration have dropped substantially. And now much of the area meets or is within ten percent of the current ozone standard.

This area is home to three million people. Each monitoring site is located in this area also measures fewer than ten exceedance days in 2010. Putting this into perspective, 20 years ago, Glendora had over 100 exceedance days.

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MS. MAGLIANO: Ozone concentrations in the inland area are generally higher than those in the San Fernando and San Gabrielle Valleys. But this area also shows substantial improvement, with a 40 percent decrease in peak levels over the last two decades. Most communities in this area now have about 15 to 20 exceedance days each year.

Finally, although sites in the inland area still exceed the standard, peak concentrations at most sites are within 20 percent of the standard. Highest concentrations occur at Crest Line, an elevated site in the San Bernardino mountains.

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MS. MAGLIANO: As required by the Clean Air Act, attainment in the South Coast occurs when the highest site

in the region meets the ozone standard. This site, Crest Line, still has 45 days with concentrations above the standard and a design value of .112 parts per million. Therefore, although ozone air quality in much of the South Coast now meets the standard, the basin will not be considered in compliance until the last remaining high site meets the federal ozone standard of .08 parts per million.

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MS. MAGLIANO: In assessing community health risk, it is important to look at all pollutants. As in the San Joaquin Valley, environmental justice communities in the South Coast can experience multi-pollutant exposures. The pollutants that are of key concern are exposure to ozone, PM2.5, and diesel particulate matter.

As ARB has adopted regulations necessary to meet air quality standards on a regional basis, there has also been a special focus on highly impacted communities near ports and rail yards.

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MS. MAGLIANO: I've shown progress being made towards the current standard. Now let's look at the ozone standard review that U.S. EPA is currently conducting and how things might change over the next several years.

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MS. MAGLIANO: In 1979, U.S. EPA adopted a one-hour standard of .12 parts per million. With fewer health studies showing impacts over a longer averaging time, the 1-hour standard was revoked. And in 1997, the U.S. EPA adopted an 8-hour ozone standard of .08 parts per million.

The 8-hour standard was revised downward to .075 parts per million in 2008. However, this level was higher than that recommended by the U.S. EPA's Science Advisory Committee. As a result of litigation, U.S. EPA is currently reconsidering the level of the standard, and SIP planning for this standard was put on hold. U.S. EPA has proposed to revise the zone standard to a level within the range of .060 to .070 parts per million. However, no final action has yet been taken.

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MS. MAGLIANO: As shown earlier, the yellow areas on this map are the areas in California that do not meet the current federal 8-hour ozone standard. This includes the San Joaquin Valley and South Coast that have been highlighted in the presentation today. Other areas include Sacramento, Ventura, San Diego, and the desert areas located downwind of the South Coast.

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MS. MAGLIANO: So how might things change with

the new lower standard?

The yellow areas on the left-hand map are those areas that would not meet a federal 8-hour ozone standards set at 060 parts per million, while the yellow areas on the right-hand map are those that would not meet a standards set at .070 parts per million.

Under either of these scenarios, there would be substantially more non-attainment areas. And the only portions of the state meeting the standard would be the more rural counties in the northern and eastern parts of California. In addition, current non-attainment areas would have farther to go to reach the more stringent standard.

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MS. MAGLIANO: A more stringent ozone standard would also affect other parts of the nation. This U.S. EPA map shows potential non-attainment areas across the nation under several different scenarios. The dark blue represents the upper end of the proposed range, .070 parts per million; the medium blue, a mid range value of .065; and the light blue, the lower end of the range of .060 parts per million. Many of the non-attainment areas shown on both maps would be new to the ozone planning process.

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MS. MAGLIANO: In summary, due to benefits of

ongoing air pollution control programs, three-quarters of the state's population now lives in areas that meet the current federal 8-hour ozone standard. The South Coast and the San Joaquin Valley remain the greatest challenge, but ozone has improved in these areas as well.

Despite standards that have become more stringent over time, which changes the benchmark for clean air, California has made significant progress over the last 20 years in reducing ozone exposure. Given the health and economic consequences of not meeting air quality standards, ARB must continue to work further to reduce ozone levels throughout the state.

This concludes my presentation, and I would be happy to answer any questions you have.

CHAIRPERSON NICHOLS: Thank you, Karen. I'm sure there will be questions and comments from the Board.

Overall, obviously a lot of progress has been made and we need to celebrate it. But we also I think need to learn from it in terms of trying to understand which of our actions are the most important in achieving these good results and figuring out how best to target our future actions as we see the need to continue to not only bring down current levels, but potentially also face even more stringent standards. Our strategy of focusing on the places with the greatest exposures and trying to do the

most to protect public health clearly was the right one, I think. But as the problem becomes more and more a rural problem, what do we learn from that? What is the overall message to learn from that?

MS. MAGLIANO: Well, I think some of what we've seen particularly in the South Coast is the dramatic progress we've seen there has been due to our passenger vehicles and especially the great reductions that we've seen in reactive organic gases.

What we're seeing now is that the high sites tend to be the downwind transport-impacted sites. And what science is showing is those sites will benefit more from reductions in NOx rather than ROG. So I think our current focus of the 1997 standard and the plans that were adopted in 2007 and 2008 really have a very strong focus on NOx that will need to continue as we move forward.

CHAIRPERSON NICHOLS: By the way, I'm sure you didn't mean it this way, but in the beginning of your presentation, or the part I caught at the very beginning, you commented that ozone primarily affects children and people with impaired health and elderly people. But even healthy people are affected by it. I hope you didn't mean that those of us who might be considered to be elderly --

MS. MAGLIANO: Absolutely not.

CHAIRPERSON NICHOLS: Okay. I think I saw

Dr. Sperling raising his hand.

BOARD MEMBER SPERLING: Yes. So I'd like to follow up on some of those questions. As we go forward and all the low-hanging fruit has been plucked, at the same time, we've developed much more sophisticated GIS techniques, more sophisticated ozone formation and transport models, it seems like -- I guess at least as an informational perspective, it would be useful to see how many people -- kind of person exposure hours at different levels and by location and also just quantity. And then be able to look more closely at how do we come up with more refined strategies where we can see it, where the ozone transport is happening, and come up with strategies that might be much less expensive and more effective, rather than the kind of broad strategies that we used to -- I don't know in recent -- some of what you just described was interesting and useful. But just getting smarter about it. Especially if these standards are tightened up, it's going to be incredibly expensive. And we want to get smarter and smarter about it. How much are we doing that. And it would be good to see some of those numbers presented, as opposed to just saying 44 counties are in violation. How many people for how many hours experienced high pollution?

CHAIRPERSON NICHOLS: Did you want to respond?

DEPUTY EXECUTIVE OFFICER TERRY: Maybe I'll jump in, because it actually relates to the presentation you'll hear shortly about the CalNex Field Study.

Part of the reason for this presentation today was to move in this direction of talking in more refined terms about exposure to ozone pollution rather than simple attainment status so that we can use the science more effectively in the planning process. So over the next year, we will be doing a PM2.5 SIP for the 24-hour standard, but we'll have a hiatus on ozone planning for a couple of years at least. So we plan to use those years wisely if we can to really explore some of the very questions that you've raised.

And I think as EPA ultimately makes decisions about tightening ozone standard, that California can really show some leadership on the concept of innovative strategies that you touched on.

BOARD MEMBER SPERLING: Yeah. I was thinking maybe we put all electric cars into Riverside, it might solve all their problems.

CHAIRPERSON NICHOLS: And now turning to Mayor Loveridge, only too happy with that.

BOARD MEMBER LOVERIDGE: Is that a motion?

(Laughter)

CHAIRPERSON NICHOLS: Do you want to jump in?

BOARD MEMBER LOVERIDGE: Let me just offer I guess two quick comments.

One is from the South Coast, because I think the achievement in South Coast is really quite extraordinary. The population since I moved there in '65 has probably tripled. So clean air has come despite enormous population increases.

And the question is why this change and the causality not simply the fact it has, I think it's an interesting question.

But let me just speak, if I can, just briefly kind of an historic testimony as someone who lives in this inland region. I remember I grew up in the Northern California and went to University of the Pacific and Stanford. There was a fellow, Don Sherwood, CSFO reporter disc jockey and one of the things he used to do was talk about sending a can of clean air down to Southern California. I think that was kind of a nice joke.

I interviewed at U.C. Riverside in December/January and the air was clean and clear. I remember my shock as my wife and I packed what little we had in our Volvo and left Stanford and went through the Tejon Pass and saw -- the year we arrived I think there was, like, 200 first stage and 65 second stage smog alerts. And it wasn't simply a visual thing. You could

feel it in your chest. We would watch this huge wave come from the hills and up the Santa Ana River into Riverside every day. We had filters on our air conditioners. We would not let our kids go outside and play without trying to find out what the measurements were. And I can still feel the weight and pressure on your chest as you try to breathe in those days.

Politically, I was astounded that people accepted the air that they found. I remember my second day at UCR I went up to see John Milton, who was the first head of the Air Pollution Lab at Riverside, first head of EPA back in D.C. asking, what is this stuff? Why is it here? Why do we except it? The polls in those days, the number one issue in the inland area was air quality. It's not surprising I think the major legislators who were involved in State legislation, Bob Presley, Jerry Lewis, Greg Bittle were coming down to the inland area. People were essentially angry at what they found.

I just wanted to emphasize what a long distance from my arrival. You want to speak somebody who was there at the same time. But we've come a long way in the inland area from when I first descended to come pass and to U.C. Riverside.

CHAIRPERSON NICHOLS: Yes, Dr. Balmes.

BOARD MEMBER BALMES: Well, I've actually been on

the KSAC Ozone Review Panel, not the one that's reviewing the current standard, but the one that as been reactivated several times to deal with -- well, to revisit the 2006 deliberations. And that's the panel that's providing the scientific support for the current reconsideration.

And one thing that's come up in those discussions is nothing really about the health effects. I think the data are pretty solid, and the only data that were considered were up to 2006. There are new data since that support a stricter standard.

But the issue with the stricter standard is getting close to the background levels, and it's problematic. So not only would attainment be much more difficult for so many more counties in California, but it's how much can you ratchet down the standard versus what's there to start with, because EPA is only supposed to be regulating what's anthropogenic, not what's there to start with. Of course, what's there to start with on our shores is affected by our neighbors across the Pacific. And --

BOARD MEMBER SPERLING: So what are the background levels?

BOARD MEMBER BALMES: Well, at the time that we were considering things in 2006, because 2005/2006, it was officially 40 parts per billion. But there is a lot of

evidence that's it's higher than that now.

CHAIRPERSON NICHOLS: People think it might be even as high as .06.

BOARD MEMBER BALMES: So just wanted to point that out. I know many people know about this here, but I wasn't sure my fellow Board members did.

CHAIRPERSON NICHOLS: Well, I suppose while we're doing true life confessions here, I should reveal I was the head of the air office at EPA at the time we adopted the standard.

BOARD MEMBER BALMES: The 80.

CHAIRPERSON NICHOLS: The 80 parts per billion. So I was involved over a period of many, many months and many, many meetings in looking at that science and briefing the administrator and the White House on the science. It's only gotten stronger since then at the very low levels of seeing effects of -- we were coping then with the question of what you would do with parts of the United States that were primarily rural and had no sources around and how to device control strategies. And, of course, the law is very clear that you're only supposed to look at public health in setting the standard. Yet, at the same time, public health can be defined in a lot of was. So what we try to do at the time was to focus on vulnerable populations and the most severe effects and set

a standard there. But if you were to look more broadly, it could go down quite a lot lower. And I think that's been a tension ever since.

From a practical perspective, I think, you know, ironically we're going to end up in our next round of SIP planning is trying to figure out what strategies we can be pursuing that are going to be the most helpful, not only in bringing down ozone levels, but having multi-pollutant benefits. And, of course, that has to include greenhouse gases at the same time. And I think that could lead to some productive cross-fertilization and new approaches.

You saw Mr. Goldstene has a pamphlet in his hand, which he might wish to mention as one example of some of the kind of thinking that's going on here.

EXECUTIVE OFFICER GOLDSTENE: Thanks, Chairman Nichols.

This is a pamphlet. You should all have this. This is available out front for people in the audience. This is a new brochure that we worked on with the SCAG and the South Coast Air Quality Management District that really is a call to action along the lines of what we've been talking about. It highlights the need for a coordinated approach to air pollution, energy, mobility, climate, and economic growth. And we recommend if you need these, we have these available to take home and give

out. We've been working on this quite a while with our partners. We're very proud to be able to have this available. This might be the first in a series of these kinds of calls to action and trying to make the challenges understandable to everyone, not just scientists, but what we need to do.

CHAIRPERSON NICHOLS: I really want to acknowledge that the leadership on this originated in the South Coast with SCAG and AQMD. But it is an outgrowth of the partnership that goes back to the last round of SIP planning, which I remember having gotten into when I first arrived here in 2007. So this is a fulfillment of a long-standing commitment that we made.

BOARD MEMBER LOVERIDGE: One of the things that we agreed to at the Board retreat for the South Coast was that bimonthly or every month staff's review the status of this so it's not simply something that's handed out and forgotten. And I think you may not want to do it here every other month, but at least every quarter may be worthwhile taking at least kind of a staff look at where we are in meeting the different calls for action.

EXECUTIVE OFFICER GOLDSTENE: I think we essentially do that, but we can tie it directly to the document and give updates like we did today. We can talk directly to this.

CHAIRPERSON NICHOLS: Ms. D'Adamo.

BOARD MEMBER D'ADAMO: Well, I think that's a good approach. I've been kind of concerned for a while now as I hear people talking about EPA's proposed standard, a lot of talk about background levels and EPA going too far. And the concern that I have is that it may undercut the strong program that obviously progress is significant that's been made. And I think we've come a long way not just in terms of the actual reductions, but in terms of the intense teamwork that's going on even within the regulated community.

And I think that, you know, a concern about "going too far" may undercut that sense of teamwork. So looking for strategies in terms of co-benefits and still keep the regulated community there, rather than putting them in a position to speak out against the actual standards, despite the fact that obviously there are public benefits, public health benefits. But I think we're getting close to background; it makes it a challenge.

CHAIRPERSON NICHOLS: Did you have your hand up, Ken? No. Sorry.

BOARD MEMBER D'ADAMO: I did have one more question.

CHAIRPERSON NICHOLS: Sure.

BOARD MEMBER D'ADAMO: The strategy -- and I know I've heard this before. But I could use a refresher course on NOx versus ROG as the strategy as we go forward. Why is it that ROG is not necessarily the best approach to take?

MS. MAGLIANO: When we're looking at sites now that tend to be those downwind transport-impacted sites, there's sufficient time for the chemistry to occur that the NOx controls really are more beneficial. It's not to say that we don't need that concurrent ROG control as well, especially given where we're looking at more stringent standards we are really going to need both of them. But sites that tend to be further away from urban areas really benefit more from the NOx control than the ROG control just because of the chemistry regime that takes place.

CHAIRPERSON NICHOLS: Did we have any members of the public who signed up? No, we do not. Okay.

Well, if that's it for the Board comment at this point, then close this item and move onto the next one, which has already been previewed, slightly.

We have a rare opportunity here today for the Board to get an opportunity to hear about some of the important scientific work that underlies our regulatory programs. Don't worry, we'll get some intense regulatory

action later this year. Can you feel that urge to go regulate something at every opportunity?

But in all seriousness, we are going to be facing some tough decisions later on in the year. At the moment, however, while the staff is busily trying to be prepared for those things, we're also reviewing and the Board has a chance to get updated on some of the important scientific work that underlies all of our air quality efforts.

So we today have an opportunity to hear from our research division folks about a very important study, which I know we've had a little bit of exposure to before in the context of funding. And that, of course, is the CalNex program, which is a really cutting-edge project in which we are a participant, but not the only ones. And where we're really trying to figure out how to make the links between air quality and what's going on in the global climate as well.

I had an opportunity some time ago to meet with our partners from NOAA, National Oceanic and Atmospheric Administration, and to go tour the research vessel Atlantis when it was in port in southern California, which was really one of the best field trips I've had in a long time. It's a ship that was completely outfitted with research equipment, every nook and cranny filled with scientists working on their on experiments as this thing

was cruising up and down the coast, capturing air samples and looking at ocean water issues and temperature and all sorts of other stuff and more equipment than I've ever seen on one vessel, ever. So anyway, it was an interesting tour. And it gave me a lot of excitement, made me excited about the opportunities to actually get some results and a good feeling that our investment was being well leveraged by contributions from federal and local agencies, as well as very significant contributions of time from -- I think it's about 50 academic institutions that are involved in this thing. So our bit of infrastructure that we provided, not to mention our State resources that were being used here, made a big difference.

So anyway, we're looking to the CalNex study to give us a lot of information that can be used to meet our air quality standards and greenhouse gas reduction goals. And we have a bit of a preview of some of those results here today.

Mr. Goldstene.

EXECUTIVE OFFICER GOLDSTENE: Thank you, Chairman Nichols.

Last week, I had the pleasure of opening up the CalNex Data Analysis Workshop, which was held here for four days. More than 100 scientists attended the

discussion, sharing preliminary study results and talking about how to collaborate on answering the next round of questions.

The researchers presented previews of their findings and expected to be completed in another year. But early results are very promising. For example, data collected by the research vessel Atlantis, which Chairman Nichols just talked about, showed that ARB's first in the nation regulation requiring oceangoing vessels to use clean fuel when near our coast has been extremely effective in reducing sulfur dioxide pollution from ships, a finding we announced to the press last week.

As other study elements are completed, staff will be busy evaluating how the results can be best used in our programs.

So now I'll ask Eileen McCauley from the Research Division to make the staff presentation.

(Thereupon an overhead presentation was presented as follows.)

ATMOSPHERIC PROCESSES RESEARCH SECTION MANAGER MC CAULEY: Thank you, Mr. Goldstene.

Last week, over 100 scientists and researchers gathered in this building to share their preliminary analyses and results at the four-day CalNex Data Analysis Workshop. This was an important time of sharing early

results, reviewing overall efforts, and forging work groups to foster collaboration. It was exciting to see the preliminary analyses begin to shed light on the many complex scientific questions regarding air quality and climate issues facing our agency.

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ATMOSPHERIC PROCESSES RESEARCH SECTION MANAGER MC CAULEY: California has been the site of dozens of air quality field studies, which yielded over 2,000 peer reviewed publications. By improving our understanding of the sources and processes which form pollution in the state, these field studies have played an important role in shaping the Board's decisions about control strategies.

It has been over ten years since the last major field study, so ARB was very interested when the National Oceanic and Atmospheric Administration, or NOAA, suggested collaborating on a major field study focused on both air quality and the climate study.

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ATMOSPHERIC PROCESSES RESEARCH SECTION MANAGER MC CAULEY: The study became known as CalNex 2010, because it focused on air quality, climate science, and the nexus between the two. CalNex provided measurements that are too sophisticated and expensive to make routinely. It will improve our understanding of the current sources and

atmospheric processes that form pollution.

CalNex also has additional foci - greenhouse gases and climate science - areas that have not been a significant component of previous field studies in the state.

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ATMOSPHERIC PROCESSES RESEARCH SECTION MANAGER MC CAULEY: The CalNex field study was the most comprehensive air quality collection effort ever in California. It employed three research aircraft, one research vessel, six sonde sites, two super sites, and the large routine monitoring network already operating in California.

With the long range of the WP-3 aircraft and the regional focus of the other aircrafts, most areas of the state had some measurements made within them. CalNex is unique compared to previous studies in that the focus was not in capturing episodic high polluting days, but to measure for a large number of days to capture a range of air quality conditions useful not only for supporting SIP efforts, but also for better characterizing emissions and atmospheric chemistry regimes.

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ATMOSPHERIC PROCESSES RESEARCH SECTION MANAGER MC CAULEY: Changing conditions mean that ARB needs

current and detailed information about the atmosphere over the state if we are to continue to improve the state's air quality and meet stringent air quality standards and GHG targets.

Regulations by the Board, local districts, and the federal government have resulted in significant reductions in local emissions in the state. Thus, concentrations aloft and those transported into the state from the Pacific are increasingly important. ARB's greenhouse gas inventory does not have the decades of focus that our criteria pollutant inventory has benefited from, and so measurements of GHGs will be useful.

Because some pollutants impact both air quality and climate, it is important to understand the linkages between air quality, climate change, and the meteorology.

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ATMOSPHERIC PROCESSES RESEARCH SECTION MANAGER MC CAULEY: NOAA's atmospheric researchers are among the best in the world. And the deployment of their planes, ship, and meteorological equipment provided an unprecedented picture of the state's atmosphere. In addition, almost 50 groups of world-class researchers came to California using their own funding to collect and analyze data. Chemical and physical measurements were routinely made on land, sea, and in the air for four to

six weeks. The WP-3 hurricane hunter and other aircraft and sounding balloons provided extensive spacial coverage aloft, which is critical for understanding global and regional transport of pollutants and greenhouse gases.

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ATMOSPHERIC PROCESSES RESEARCH SECTION MANAGER MC CAULEY: I will now cover some of the specific examples of how CalNex results will inform our programs to reduce particulate matter, specifically, PM2.5 and ozone, and to improve our understanding of climate science.

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ATMOSPHERIC PROCESSES RESEARCH SECTION MANAGER MC CAULEY: As part of ARB's efforts to reduce the impact of goods movement on air quality, in 2009, we required oceangoing vessels to switch to low-sulfur marine distillate fuels when operating within 24 kilometers of California's coast.

During CalNex, as part of efforts to understand the impact of shipping on the atmosphere, the research vessel Atlantis, sampled exhaust plumes from many ships. Their measurements indicate that the regulation has greatly reduced sulfur emission as compared to ships operating globally and once measured near the Port of Houston in 2006.

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ATMOSPHERIC PROCESSES RESEARCH SECTION MANAGER MC CAULEY: As ARB's regulations decrease in nitrate and sulfate emissions, organic particulate matter is an increasing fraction of the ambient PM2.5. The formation of organic particulate matter is a very complex process, with many compounds undergoing chemical reactions in the atmosphere. Because of its complexity, the sources and chemistry of secondary organic particulate matter are not well understood. And for that reason, it was a major focus of CalNex.

Multiple researchers used a wide variety of instruments and analytical techniques to collect and analyze data. Having a much wider suite of information available provides researchers with additional insights and allows findings not possible with simpler data sets.

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ATMOSPHERIC PROCESSES RESEARCH SECTION MANAGER MC CAULEY: While the reduction of ambient ozone concentrations in southern California is one of the ARB's most impressive accomplishments, we need to continue reductions in both Los Angeles area and the Central Valley.

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ATMOSPHERIC PROCESSES RESEARCH SECTION MANAGER MC CAULEY: One of the most exciting aspects of CalNex is

the wealth of information collected about the atmosphere above California with the aircraft. This slide shows vertical ozone concentrations as observed beneath an aircraft during flights over the South Coast air basin. This flight detected the presence of elevated levels of ozone covering much of southern California. Elevated layers of ozone aloft were also seen in the Central Valley.

Additional analyses are needed to determine whether the ozone aloft is coming from the stratosphere, recirculated due to meteorologic conditions, or transported across the ocean.

Some preliminary results that were presented at the workshop indicate that the weekend effect, where ozone concentrations are higher on weekends than weekdays, is impacting more areas. Additionally, aircraft observations indicated that the weekend effect may also occur aloft.

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ATMOSPHERIC PROCESSES RESEARCH SECTION MANAGER MC CAULEY: While ARB has funded and participated in many air quality field studies, CalNex was also interested in climate science.

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ATMOSPHERIC PROCESSES RESEARCH SECTION MANAGER MC CAULEY: Improved understanding of the overlap and

interaction of climate and air quality is a focus of the CalNex, so that balanced and informed decisions can be made in addressing these two inter-related challenges.

One example of this nexus is the important role that particles play in climate. Particles in the atmosphere can have either cooling or warming impacts. And the effects of particles on clouds is one of the key uncertainties in climate modeling. The mixing of the Los Angeles pollutant plume with off-shore clouds provided an excellent laboratory to study the effect of PM2.5 on clouds and climate.

In addition, the various measurement platforms improved our understanding of greenhouse gas emissions and will help to improve our emission inventory.

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ATMOSPHERIC PROCESSES RESEARCH SECTION MANAGER MC CAULEY: The CalNex data analysis workshop last week was a great success, with many participants and interested observers. Results from the field study are coming out early relative to most major field studies of this size. In addition to getting preliminary results out into the scientific community, one of the main benefits of the workshop was to further the process of collaboration and peer review.

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ATMOSPHERIC PROCESSES RESEARCH SECTION MANAGER MC CAULEY: The NOAA scientists who worked on CalNex have extensive experience in making sophisticated measurements from aircraft, ship, and on the ground. In all of these efforts, NOAA is interested in science which is policy relevant. Recognizing the need for quickly making available findings from their studies, NOAA will complete next year a synthesis report on policy relevant findings from CalNex. In addition, the research papers coming out of CalNex will be presented together in a special issue of the Journal of Geophysical Review.

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ATMOSPHERIC PROCESSES RESEARCH SECTION MANAGER MC CAULEY: Thank you for your attention. I will be happy to answer any questions you have about CalNex.

CHAIRPERSON NICHOLS: Do you have a comment? I think you attended some of this event, right?

BOARD MEMBER SPERLING: I heard the briefing.

You know, it's really exciting to be able to get better science and better information on dealing with air pollution and the greenhouse gases. So this is very promising.

I wonder how well we're doing mapping this onto the SIP process. You know, how well are we taking the SIP process, which in the past -- so I don't know exactly

how -- I know from the text books and how I used to teach it, it was a very prudent process in terms of emission inventories and coming up with strategies. As we get much more high-quality data about organic carbons and then start looking at that trade-off with black carbon and greenhouse gas strategies, it seems like, I mean -- it seems like there is an opportunity to really refine the SIP process to make it much more effective, tie it together with where are the problems, where is the exposure, what are the causes, and get much more sophisticated than we have been in the past. Is that a dream? Or -- I have a dream.

DEPUTY EXECUTIVE OFFICER TERRY: We like that dream, Professor.

Absolutely, and I think that's one of the real values of CalNex, the concept of the nexus between the climate and conventional air pollution. And Dr. Balmes has been involved in multi-pollutant exposures and the challenge of looking at it from a health perspective.

So I think good news is there is a lot of attention being focused on these very issues of understanding the health effects of multiple pollutants and then the integration of the strategies. And certainly after working on SIPS for a long time, I'd like to see California play a leadership role in moving to a more

refined planning process and really demonstrate that it can be done with a really good scientific foundation.

CHAIRPERSON NICHOLS: That's a good goal.

BOARD MEMBER SPERLING: You know, some day, wouldn't it be good to have a presentation on the whole SIP process? I know -- I mean, I supposedly know a fair amount about it. But I think when it gets right down to the details, I suspect I know very little about how it actually works. And you know, to try to start tying together the research capabilities with that institutional process, it doesn't have to be a Board presentation necessarily, but I think something like that would be very helpful.

You know, California is right in the cross-hairs. As EPA tightens up these standards, we're the ones that are going to be most effected by that and therefore need to be the most innovative and participating and figuring out how to deal with it in smart way.

CHAIRPERSON NICHOLS: I think that's a really good idea. I think something like a noticed workshop so Board members could come and ask questions. And it would be informal, not in the dias here, hearing room kind of context. But also where we would have staff really kind of work through some of those technical issues that are involved would very interesting. It would take some time

to do that, because it's complicated and in some cases, extremely counterintuitive.

BOARD MEMBER SPERLING: Maybe it shouldn't be so complicated and counterintuitive.

CHAIRPERSON NICHOLS: That's a nice idea.

Yes?

BOARD MEMBER BALMES: If I might, Ms. Terry has already mentioned the issue of multiple pollutants and trying to deal with the reality of the mixture of pollutants.

One of the major problems that keeps the state of the science from, well, integrated with the SIP process is that the Clean Air Act it's one pollutant at a time right now. And especially as we have stricter standards for each single pollutant, it gets harder to figure out strategies to meet the stricter requirements when I think the science should be taking us to dealing with a mixture. It's not so easy to figure out how to do that. But that's where the science should be.

CHAIRPERSON NICHOLS: Back again to ancient history here. When we adopted the eight parts per billion ozone standard, we did it simultaneously with adopting the fine partical standard, which is the first fine partical standard. And a big part of the rational for that was that many, if not all, of the control strategies would be

the same for meeting those two standards. Basically, it's combustion.

And so I had a dream at that time also that we would be able to use this sort of joint standards-setting as a tool to get people to do combined SIP planning. There are many, many things that conspire to make that really hard to do, which have been added onto the Clean Air Act over the years. But it isn't impossible to do something like that. It isn't legally impossible to do a SIP that is addressing pollutants in a simultaneous way, as long as it's clear how you're going to meet each of those at the same time. So it's a worthy thing to try to do.

Anyway, any comments from the public on this one either? All right. Well, any further questions or comments from the Board?

BOARD MEMBER LOVERIDGE: Is there something going to happen as a result of that?

CHAIRPERSON NICHOLS: The next steps on the SIP process. On the SIP process, I think we should schedule the workshop that we've just been talking about.

EXECUTIVE OFFICER GOLDSTENE: Right. I think we'll take your discussion as direction to work on putting together a public workshop where we can have a discussion about the Clean Air Act and the science and how it all

works together. And then on the CalNex going forward, there is a plan to release the final report sometime next June.

I don't know, Eileene, if you want to add on that.

ATMOSPHERIC PROCESSES RESEARCH SECTION MANAGER MC CAULEY: In addition to the synthesis report which NOAA will deliver next year, the researchers are working on papers that will be published in the peer review journals.

BOARD MEMBER LOVERIDGE: I guess again --

EXECUTIVE OFFICER GOLDSTENE: But Mayor Loveridge, you're asking once it's published, then what do we do?

BOARD MEMBER LOVERIDGE: Right. It's getting some sense of this is really what's an important gathering of people and looking at science and evidence and so forth. And I guess is some -- I'm trying to get some kind of continuity to this.

DEPUTY EXECUTIVE OFFICER TERRY: Maybe I can comment on that. It really is -- it's ongoing science. Eileene talked about the fact we've done dozens of field studies. NOAA does these field studies every couple of years.

So one of the challenges I was discussing with staff yesterday is the data analysis that sometimes

there's more enthusiasm for doing the field study than doing the real data analysis. So we're going to look very seriously as we do our research strategic plan this year what our needs might be specific to California with respect to data analysis for this study to make it usable for us to answer the really tough questions we've been discussing today. So you may well see some proposals in this year's research plan that try to answer that question of how do we make use of this investment in the field study.

CHAIRPERSON NICHOLS: Okay. Thank you.

Our last item before we adjourn for the tour of the laboratory itself is a presentation from the Monitoring and Laboratory Division on the Board's ambient air monitoring activities. Some of you may not realize that the ARB staff possesses many different talents. One that has not been well known until now is the artistic and film production capacity that we have from our staff. This may possibly be the ARB's entry at Cannes. May need a little more work. But this is actually a presentation in a video format, unlike our usual PowerPoint type presentation, which is trying to take advantage of some multi-media features to enhance the delivery of information on a topic which some people may not realize is really exciting and sexy, which is clean air quality

monitoring.

So, Mr. Goldstene, take it away.

EXECUTIVE OFFICER GOLDSTENE: Thank you, Chairman Nichols.

The MLD, Monitoring and Laboratory Division, supports many of our planning and regulatory decisions through the ambient monitoring and air pollution and greenhouse gases and the analytical laboratories, all the monitoring work they do and the analysis. The video will highlight the monitoring network, which is really a partnership between us, the local districts, and the federal government.

And I'll now ask Albert oh who's the Chief of the MLD to introduce the video.

MONITORING AND LABORATORY DIVISION CHIEF AYALA: Thank you. Good morning, Chairman Nichols and members of the Board.

As the first two presentations this morning suggests, empirical data is essential to our ability to understand where we are and where we're going with respect to air quality and climate protection. But collecting such data can be quite a bit of an endeavor. So today we have prepared for you an review of what it's involved in generating the air quality information underpinning many of the Board's actions. Monitoring our environment for

air pollutants and greenhouse gases is a key element in the Board's clean air and climate programs.

Our staff who work in the lab and in the field from Chico to Calexico and many sites in between conduct research and monitoring to provide you with the full range of information for your decisions. We strive to produce scientifically-defensible high quality data in a partnership of federal, state, and local efforts.

We are proud of our programs, and many have national and international recognition. So this is the work of monitoring California's air. As they say, sit back, relax, and enjoy the show.

(Thereupon a video presentation was presented as follows.)

"What are the concerns with compliance with state or national ambient air quality standards, environmental justice, airborne pesticides, greenhouse gases, air toxics, radiation or source-specific emissions. Monitoring the ambient air for the presence of contaminants helps us to understand the nature and extent of air pollution and guides decisions on actions to limit exposure, reduce emissions and risks, and protect health and the environment. This is the subject of today's presentation.

"In the next few minutes, we will describe

California's approach to monitoring progress towards clean air. The Board's Ambient Air Monitoring Program is one of its fundamental functions and a key element in our core mission that allows us to strive for the most stringent requirements for clean air in the nation.

"The Air Resources Board and the local Air Quality Management Districts work in partnership and measure ozone concentrations around the clock, 365 days a year at more than 160 locations throughout California. These data are used for planning to assess compliance with State and federal air quality standards to determine trends and the extent of emission reductions necessary to achieve those air quality standards.

"But the most widely recognized use of ambient air monitoring data is to notify the public through the air quality index. The air quality index is disseminated to the public through the media, local air districts, and the U.S. EPA's Air Now website. The AQI, just like the daily weather report, has become a ubiquitous piece of public information.

"In California and nationally, ozone continues to be the biggest burden on air quality. So given the importance of ozone data, monitoring agencies are held to strict quality assurance requirements for collection of such data. All ozone measurements made by ARB and

California air districts use U.S. EPA-approved ozone analyzers. The instruments are operated in strict accordance with federal monitoring regulations and are traceable to National Institute of Standards' primary reference photometers. A photometer is an instrument that detects the amount of light absorption which is related to the amount of ozone present.

"ARB plays a unique role in the west, as we are one of a few agencies that maintain and operate a primary standard reference photometer. The instrument is located in our main laboratory facility in Sacramento. And we provide service to several local and federal agencies in the region.

"To ensure the integrity of the data collected, every ozone analyzer in the state used for ozone monitoring is independently verified annually under our Quality Assurance Performance Audit Program, another core function of our ambient air monitoring efforts. Unlike ozone, particulate matter is not a single chemical species. It is a collection of components that are primary emissions, as well as form through secondary processes from precursors. For this reason, a variety of sampling and analytical tools are used to track it in the ambient air.

"Some of these methods direct gravimetric data

and report it as an integrated concentration value over a day or year. Other methods take advantage of advances in instrument technology and collect report data in real time. Other methods provide data on the chemical and elemental makeup of PM mass.

"Here, we show field sampling equipment for PM2.5 that rely on collection on filter media. These filters are weighed in environmentally-controlled rooms before and after sampler collection. This process is resource intensive, but necessary to ensure the quality of results.

"Also shown is an alternative and equivalent method for PM monitoring known as a beta attenuation monitor, referring to the method of detection which provides hourly sampling and analysis of PM2.5 mass. Real time data is valuable to air quality forecasters, agricultural burn managers, school districts, media outlets, air emergency responders, and the public at large.

"But the options for PM monitoring do not stop there. When necessary for research, planning, or program development, the ARB monitoring team is equipped to deploy more advanced instrumentation and methodology, typically for the conduct of special studies. For example, in support of the Fresno Asthmatic Children's Epidemiological Study, a ground-breaking investigation by the Board and

the University of California and more recently CalNex 2010, staff used a gastric field ion chromatograph to scientifically measure ionic species such as nitrate, sulfate, and ammonia, and their gaseous precursors, nitrous oxide, sulfur dioxide, and ammonia.

"Later this year, ARB staff will deploy seven real-time sulfate analyzers as part of the Southern California Sulfur Study to better understand the sources and chemistry of this important constituent of PM2.5 mass.

"Looking at historical trends in ambient air monitoring data, it's a pretty clear aspect of analysis that shows decision makers the value of past actions and the opportunities for further progress. Trend analysis can also reveal gaps and future challenges that may require more action.

"A good example is the now-famous record of the global carbon emissions from various parts of the world, this property shows the increasing trends in the carbon dioxide concentrations measured at the top of the Maunaloa Volcano located on the Big Island of Hawaii. It is this type of data and what it tells us about trends and emissions induced by human activity that are the powerful evidence necessary to support the efforts for a low-carbon future.

"Let us now describe briefly some of the Board's

emerging efforts in the area of monitoring for greenhouse gases at the regional scale.

"As you know, the Global Warming Solutions Act of 2006, commonly referred to as AB 32, propelled California and the ARB on to the national and world stage of climate change science, technology, and policy. But in addition to new policies, programs, and mechanisms for achieving greenhouse gas reductions, the ARB also was charged with developing and implementing new monitoring and analytical methods for detection of greenhouse gases and verification of emissions and reductions.

"One of the new efforts emerged in the sector of high global warming potential greenhouse gases. These are greenhouse gases that have hundreds to thousands of times the warming effect of carbon dioxide. Initial analytical efforts were focused on method development for hydrofloracarbons, mainly the refrigerants HFC-134a and HFC-152a. And later, methods for carbon tetrafluoride used in semi-conductors and sulfur hexafluoride, the most potent of the Kyoto basket of greenhouse gases and used in the electricity sector, were developed. All these greenhouse gases were identified in ambient air samples from our existing air toxics network.

"In 2008, we plan monitoring for carbon dioxide at a limited number of locations to provide a baseline

data set of urban carbon dioxide levels, distributions, and time series of surface level concentrations. In our latest effort beginning in 2010, a pilot network of methane monitors are being deployed in Sacramento Valley, San Joaquin Valley, and South Coast air basin. This network provides highly resolved temporal and spacial data of methane, carbon monoxide, and carbon dioxide concentrations to evaluate dispersion modeling and the existing emission inventories. These monitors use state-of-the-art cavity ring-down spectroscopy to measure methane in parts per billion precision.

"The pilot network has seven sites. Five of these sites have been deployed so far. Wildfires, tire pile fires, and other unplanned events can release massive amounts of pollutants into the air. Air monitoring for emergency response is one way air quality officials gather data to quickly assess the associated public health risks of a given incident and monitor a fast-changing situation.

"ARB operates under the California Emergency Services Act and accordingly responds to Cal/EPA and California Emergency Management Agency Incident Command Structure when air monitoring data is needed.

"Under requirements established in the California Food and Agricultural Code, ARB staff routinely conduct studies to assess exposures related to commercial and

agricultural pesticide use. This work is conducted in cooperation with and to provide assistance to the California Department of Pesticide Regulation.

"Since the 1980s, ARB has conducted numerous monitoring campaigns throughout California's agricultural areas. About half of these studies are performed to determine pesticide concentrations in the air immediately adjacent to and at the time of the actual application of a pesticide.

"The other half of all activity is focused on the measurement of pesticide concentrations in the ambient air and community with the greatest potential for pesticide exposure. In the last few years, ARB staff has also monitored pesticide applications of structural and commodity fumigation, such as phos fumigation of commercially harvested nuts.

"Pesticide can be a controversial topic. ARB's collaboration with the Department of Pesticide Regulations sometimes draws attention and makes our activities highly visible. An example of this is the ongoing debate about methyl iodide. At the present time, ARB staff is assisting DPR in the sampling study of methyl iodide and other soil fumigants and ambient air in Santa Barbara and Ventura Counties.

"To date, measurable levels of methyl iodide in

our ambient air samples have not been detected. This field campaign runs through the end of the year. Often, officials and policy makers call upon air monitoring to assess the environmental health of a particular community and require collection of additional site-specific data beyond that which is provided by the existing ambient air monitoring network.

"Last year, in response to public concerns related to increased incidents of birth defects in the small Kettleman City in the central San Joaquin Valley, the Governor directed Cal/EPA and its departments, including ARB, to investigate the environmental factors that may be responsible for the cluster of problems found in infants. Local and federal authorities and health officials were also heavily involved. Although narrow in scope, and as part of the ARB investigation, air monitoring with various tools and methods for examining teratogens, such as arsenic, dioxins, PCBs, and a variety of pesticides in the community of Kettleman City and around the parameter of a regional hazardous waste landfill did not find the causative agent in the air.

"In the past, the Air Board has been involved in several other environmental justice studies conducted in various parts of California, including San Diego, Los Angeles, Fresno, Alameda, and San Francisco Counties. In

all cases, monitoring the ambient air for possible disproportionate impacts of pollution is a critical tool in the fight for clean air for all Californians.

"Computer modeling of air quality is also a critical function of our agency. Models are sophisticated tools that require lots of data for operation and validation. Meteorological parameters are commonly needed by the models for forecasting; thus, these parameters are often part of the portfolio of measurement included in our comprehensive air monitoring program. These parameters help determine atmospheric conditions and indicate where a particulate air mass came from and which way it is headed.

"Unlike many meteorological networks, ARB and local air district met data is archived for future analysis and is also independently verified annually site by site through our quality assurance performance audits. Measurements are not limited to surface winds and temperature.

"To determine three dimensional air dynamics, radar and sonar systems allow for measurements of winds and temperature and up to four kilometers above ground level.

"Many factors by now you can tell happened behind the scenes. For the last element of this program, we would like to describe what is involved in special purpose

monitoring and data collected to investigate a specific issue. Special purpose monitoring conducted by ARB staff is diverse and can include a multitude of sources and contaminants. It can also include monitoring for cement dust deposition into natural waterways. Airborne asbestos sampling, roadside sampling for traffic emissions, indoor/outdoor air sampling, deposition of air pollutants into Lake Tahoe, investigation of odor and nuisance complaints, fenceline premises sampling, radiation monitoring, and even the quantification of ozone emissions from more than a dozen commercially available home air purifiers.

"The fact that we are called to conduct this type of work is a testament to our recognized competency and to the agency's reputation in the field. If you will, this is what we call the CSI aspects of our work. But it is work equally important and just as critical as our core function. And we continually strive to enhance other methods and modernize instruments and techniques in order to ensure that the data collected can withstand the highest scientific scrutiny. But as you can imagine, field work is never plug and play or trouble free. And many times, when conducting field activities, not everything happened according to plan. High winds, intense heat, floods, fires, vandalism, theft, and traffic

accidents can and do happen.

"At this point, we hope we have been able to relate to you what makes an effective and relevant air monitoring program. This is a program that relies heavily on the application of clear scientific principles, uncompromising adherence to the most stringent monitoring and quality assurance requirements, state-of-the-art instrumentation and equipment, robust methodologies, advanced telecommunications, and, on a practical level, special equipped trailers and vehicles so we can travel to the sites near and far where the information needs to be collected. These are the efforts that generate, collect, and report data that informs your decisions. We do all this not in isolation, but in many instances, our activities are collaborations with not only our ARB colleagues from other divisions, but also and often with partners from academia, other agencies, such as the local air quality districts, or the U.S. EPA and industry.

"Looking forward, we see not only a number of challenges facing us, but also many opportunities. In the era of information technology, we are subject to greater public demand for and dependence on real-time air quality data and on collection of those data with greater spacial resolution.

"Six sites for regional monitoring will be

complemented with new monitoring closer to sources including roadways, increasing our understanding of source impacts. And we are continuing to explore the potential identification at the distinct chemical markers in ambient air and potential use in source attribution.

"Keeping up with the changing nature of equipment, increasingly more sophisticated instruments, advances in computer systems, and wireless communication are all priority areas in an effort to make monitoring for air pollution and greenhouse gases more efficient and effective.

"And, of course, there is the practical reality of maintaining adequate resources to collect data required by law as well as for many other purposes across our vast state.

"We continually strive to do more with less, and ARB staff are developing and applying several types of technologies to conserve agency resources and improve efficiency. The spirit of innovation and desire to lead the way is what makes ARB special. The ambient air monitoring program is full of examples of this.

"One very recent activity that reflected creativity is our development in-house of an instrument diagnostics data system composed mostly of publicly-available open source software. This unique

system dubbed "CARB logger" automatically and continuously monitors instrument performance at the most sites that are part of our air monitoring effort and alerts staff via e-mail whenever anything is amiss, such as when instrument flow rates, temperatures, or operating voltages drift out of specifications.

"We are also conserving resources and increasing operational efficiencies with the recent addition of wireless bar code readers sample chain of custody and even a robotic hand for weighing filter media when determining heat and tailpipe emissions from cars and trucks. These are just some of the examples of the opportunities and talent a unique technology and afford us.

"In conclusion, new more stringent standards, and the nexus between air quality and climate change are ushering in a new era for air monitoring. We expect our program will need to continue to fulfill the statutory requirements for data collection and reporting, while remaining responsive to the evolving nature of priority, the need for new data, and the advent of new technologies. Changes in the global climate influence our local environment and make the job of maintaining clean air more challenging. And since the very first statewide air quality standards set back in 1959, ambient air monitoring remains essential to track past progress and drive future

air quality management decisions."

(Applause)

CHAIRPERSON NICHOLS: Well, thank you. That was a good presentation. I think the sound track needs a little work.

BOARD MEMBER RIORDAN: But the visual is excellent.

CHAIRPERSON NICHOLS: The visual is excellent.

BOARD MEMBER RIORDAN: And a wonderful way to educate people for what you all do. You know, I mean, you could take this into a classroom at a junior high or high school and have I think a lot of interest based on just the way it's put together.

So, Madam Chairman, I really am very pleased with this and what it might do besides just all the work that you want to acknowledge here, and it could be a wonderful learning tool.

BOARD MEMBER SPERLING: Is that a nomination for best documentary?

(Laughter)

BOARD MEMBER RIORDAN: Absolutely.

CHAIRPERSON NICHOLS: Yes, John.

BOARD MEMBER BALMES: Well, first I wanted to thank you for including the Fresno Asthmatic Environmental Study, which I'm one of the co-investigators of. I caught

that little bit.

But I had a specific question about air monitoring for pesticides. I saw the segment about methyl iodide, and obviously that's of concern. But I'm aware that there are several sites in the Central Valley -- and at least two in the Central Valley and then someplace in Salinas, is the DPR doing that, or are you guys doing it for the DPR?

MONITORING AND LABORATORY DIVISION CHIEF AYALA: Those specific sites you mentioned are DPR sites. We have other sites in the valley. We have other sites in the valley, Fresno, Bakersfield where we expect our toxic samples and we've added these fumigants like methyl iodide to that suite of compounds. We're very much in the urban areas. I think DPR is out more in the agricultural areas.

BOARD MEMBER BALMES: I just want to clarify who is doing what.

CHAIRPERSON NICHOLS: Yes?

BOARD MEMBER YEAGER: Just a couple of quick questions.

I think it also would be great to let all the air districts know the film if you haven't already and play for the Board members. I know that often when there is a controversial issue with one of our communities where people are demanding more air monitors, it might be a good

film to present at the beginning of the meeting so people understand what they have.

My questions are: Do we often evaluate the monitors that we have to make sure that they're at the right location and that they're getting the information that we want? And maybe tied to that, is there maximum number of air monitors that we can have out there? If a community does want another one, does that mean another needs to be moved, because as the film says, we're being more efficient in how we gather information, can we actually have more out there than we currently have?

MONITORING AND LABORATORY DIVISION CHIEF AYALA: Yes, those are good points. We routinely work with our planning colleagues to make sure that we assess both the number and location of the monitors.

We're often also asked and respond to specific requests from local air districts for additional monitoring. So a lot of equipment that we have can be deployed very quickly real time. And in addition to that, as you heard in the video, we also have an emergency response function, which again can deploy very quickly. So depending on the need and the situation, that's something we routinely do.

BOARD MEMBER YEAGER: I know in Santa Clara County, we have six monitors. But every once in a while,

you just sort of the review them to make sure that again situations haven't changed or that there isn't a greater need somewhere else?

MONITORING AND LABORATORY DIVISION CHIEF AYALA: In addition to general review, we have a very -- and we pointed to this in the video, we have a very strict mandated by the Clean Air Act Program that does quality assurance and quality control. So a lot of our effort is our staff going out to the sites to make sure that everything is working the way it's designed to work.

CHAIRPERSON NICHOLS: And maybe just if I could just insert a second here, I mean, there is a minimum requirement under the Clean Air Act for how many monitors you have to have under the federal program. And they have very elaborate regulations that define exactly where those monitoring stations have to be. I don't think there is any prohibition on a state having more monitors if they want to, not just special monitors, but even regular monitors if they wanted to add them. And I believe we exceed the requirements of the Federal Act by quite a bit.

But routine monitoring is very, very expensive. I don't know what each station costs. You may have an estimate for that operation of a single station. But I know it's in the -- beyond the tens of thousands of dollars to establish and maintain all that equipment. And

then once you start collecting data, it's very, very, very hard to stop, because people begin to rely on that particular set of data. So it is hard to get a new station established.

BOARD MEMBER BALMES: So that reminds me of one other question I had.

In terms of the new NOx standards, there is a requirement for near-road monitoring. So how many near-road monitoring stations are you envisioning for California as a result of trying to comply with the NOx standard?

MONITORING AND LABORATORY DIVISION CHIEF AYALA: We're still reviewing the final number, but we're anticipating on the order of maybe ten. We're in the process of following that and determining what the actual requirement is going to be. But it is an important change, a paradigm shift, if you will. And we're gearing up to make sure that we're prepared to respond.

BOARD MEMBER BALMES: Would you be monitoring other things aside from NOx at those sites?

MONITORING AND LABORATORY DIVISION CHIEF AYALA: Initially, the standard calls for NO2. There is already a public document that is pointing to additional pollutants. As we have discussed with EPA, I think the expectation is we are moving towards a multi-pollutant type of operation.

So, yeah, we do expect that.

BOARD MEMBER SPERLING: I'd like to add a feel good comment. Is that appropriate?

CHAIRPERSON NICHOLS: Absolutely.

BOARD MEMBER SPERLING: You know, it really is impressive, this capability that ARB has in this day and age when science is questioned more and more and the public and government agencies are questioned more and more in terms of whether they're politicized or based upon science and evidence. The success of ARB has -- a huge part of it has been that, it's been more science-based, evidence-based than just about any agency, any regulatory agency. And so having this capability and seeing the breadth of it is very impressive and something I think we want to make sure we maintain that capability and make good use of it also in the regulatory processes. Very impressive.

CHAIRPERSON NICHOLS: Sorry. I, of course, agree with you. Just adding to the issue of public confidence in programs.

What you say, of course, is true about the nature of a lot of the debate these days about regulations and government programs in general.

On the other hand, we saw, for example, after the recent disaster in Japan tremendous interest on the part

of the public in getting information about what the impacts of that were, not just in Japan, but here. We were able, thanks to Alberto and all these abilities and our own internal web capacities, to very quickly start posting data from California about radiation levels in California. We're not even responsible for radiation monitoring. But because EPA uses our sites for some of theirs and, of course, the data were shared, we were able to compile it in a way that made it accessible to the public who just want to know what's going on. And we got a lot of very, very positive feedback on that. And it was something that, you know, once the issue -- once the question was raised, they were able to turn that around in a matter of days. So it was really terrific.

BOARD MEMBER BALMES: If I could add to the feel good.

I heard on KQED, the local public station in San Francisco, one of the staff -- and I don't know who it was -- you know, being really sort of baited by an interviewer about radiation health risks for the California population. And whoever it was did an absolutely fabulous job of not rising to the bait. He kept saying, "We're monitoring, but we don't really think there is a problem." And I really felt proud of the agency. He did a very good job. But I don't remember his

name. But I'm sure that you guys know. It was about a five-minute interview.

BOARD MEMBER SPERLING: Generic excellent ARB employee.

CHAIRPERSON NICHOLS: Wow. Okay. I think that with that, we will thank the staff for the presentation. Congratulations on the developing a useful communications tool, which I hope to have a life beyond this one Board meeting.

And we will adjourn this meeting and again invite the public to join us at an open house at MLD.

Did we give out the coordinates exactly?

EXECUTIVE OFFICER GOLDSTENE: They're on the agenda.

CHAIRPERSON NICHOLS: There's directions or information outside on the tables. Thank you very much. 10:45 AM

(Thereupon the California Air Resources Board meeting adjourned at 12:41 p.m.)

CERTIFICATE OF REPORTER

I, TIFFANY C. KRAFT, a Certified Shorthand Reporter of the State of California, and Registered Professional Reporter, do hereby certify:

That I am a disinterested person herein; that the foregoing hearing was reported in shorthand by me, Tiffany C. Kraft, a Certified Shorthand Reporter of the State of California, and thereafter transcribed into typewriting.

I further certify that I am not of counsel or attorney for any of the parties to said hearing nor in any way interested in the outcome of said hearing.

IN WITNESS WHEREOF, I have hereunto set my hand this 9th day of June, 2011.

TIFFANY C. KRAFT, CSR
Certified Shorthand Reporter
License No. 12277