MEETING

STATE OF CALIFORNIA

AIR RESOURCES BOARD

SCIENTIFIC REVIEW PANEL

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

SIERRA HEARING ROOM, 2ND FLOOR

1001 I STREET

SACRAMENTO, CALIFORNIA

FRIDAY, NOVEMBER 1, 2013

9:33 A.M.

JAMES F. PETERS, CSR, RPR
CERTIFIED SHORTHAND REPORTER
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A P P E A R A N C E S

PANEL MEMBERS:

Michael T. Kleinman, Ph.D., Chairperson

Cort Anastasio, Ph.D.

Jesús A. Araujo, M.D., Ph.D.

Paul D. Blanc, M.D.

Alan R. Buckpitt, Ph.D.

Sarjeet S. Gill, Ph.D.

Stanton A. Glantz, Ph.D

S. Katharine Hammond, Ph.D.

Beate R. Ritz, M.D., Ph.D.

REPRESENTING THE CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY:

Dr. Gina Solomon, Deputy Secretary, Science and Health

REPRESENTING THE AIR RESOURCES BOARD:

Mr. Jim Behrmann, Liaison, Scientific Review Panel

Mr. Peter Mathews, SRP Support Administration

Ms. Lynn Terry, Deputy Executive Officer

REPRESENTING THE OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT:

Dr. George Alexeeff, Director

Dr. James F. Collins, Staff Toxicologist, Air Toxicology and Risk Assessment Section

Dr. Andy Salmon, Senior Toxicologist, Division of Scientific Affairs

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

REPRESENTING THE OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT:

Dr. Melanie Marty, Assistant Deputy Director, Division of Scientific Affairs

REPRESENTING THE DEPARTMENT OF PESTICIDE REGULATION:

Mr. Brian Leahy, Director

ALSO PRESENT:

Mr. Roger Dickinson, California Assembly Member

Dr. John Froines, University of California, Los Angeles

Mr. Kip Lipper

I N D E X

P R O C E E D I N G S

CHAIRPERSON KLEINMAN: Good morning. I'd like to call the meeting to order. So if everybody can take their seats, we can get ourselves started.

DR. FROINES: It's pretty tough to come in here and not know where to sit.

(Laughter.)

CHAIRPERSON KLEINMAN: John, you can sit anywhere.

PANEL MEMBER GLANTZ: We can ask him nasty questions.

(Laughter.)

CHAIRPERSON KLEINMAN: That's right.

DR. FROINES: This is when everybody sees how this Committee really works

CHAIRPERSON KLEINMAN: Good morning, and welcome to this meeting of the Scientific Review Panel for Toxic Substances. I'm going to call the meeting to order.

My name is Michael Kleinman, and I am the incoming Chair of the Committee. I was recently appointed by CalEPA Secretary Mark(sic) Rodriquez, following my appointment to the Panel by a Assembly Speaker Pérez. And I'm very pleased to be able to address everybody, and welcome you to this meeting.

I also want to take the opportunity to introduce

a new member to the Panel -- another new member, Cort Anastasio. And I'd like to welcome him. And I'd like to give Cort just a few minutes to just introduce himself.

PANEL MEMBER ANASTASIO: Thanks. So I'm Cort Anastasio. I'm a professor in land, air, and water resources.

Okay. Apparently, I was not on, so I'll start again. So my name is Cort Anastasio. I'm a professor in the Department of Land, Air and Water Resources at UC Davis. I'm and atmospheric chemist and my research focuses on reactions in condensed phases in the atmosphere, so that's cloud drops, fog drops, aerosol particles. We're also interested in the generation of reactive oxygen species by particles, and how that may be linked to human health effects.

CHAIRPERSON KLEINMAN: Thank you, Cort.

I'd like to give -- just take a few minutes for -- and go around the table, so that the people on the panel can introduce themselves.

PANEL MEMBER BLANC: Why don't you start actually, since we don't know you.

CHAIRPERSON KLEINMAN: I'll start. My name is Mike Kleinman, in the School of Medicine at UC Irvine. I am a professor in the Division of Occupational Environmental Health. And most of my studies involve

inhalation of airborne particulates, and in -- mostly in animal models. I have done or participated in some epidemiology studies, and I've been involved in air pollution research for -- well, at UCI for more than 30 years. And before that, with the U.S. AEC, and at NYU. So I've been involved in this field for a quite a long time with a very diverse background in atmospheric chemistry, in exposure modeling, and in exposure assessments.

So I'll pass it on

PANEL MEMBER GLANTZ: So I'm Stan Glantz. I'm a Professor of Medicine at UC San Francisco in the Cardiology Division. I also direct the tobacco program. With John's retirement, I'm now the longest serving member on the Committee.

And I have done a lot of work on -- in addition to the laboratory work, on cardiovascular function, a lot of work on secondhand smoke and risk assessment. And I'm here as the biostatistician.

DR. FROINES: I would prefer to be stepping down, not retiring.

(Laughter.)

PANEL MEMBER GLANTZ: Okay. I'm the longest serving member since John fell off the Committee.

(Laughter.)

PANEL MEMBER GLANTZ: Yeah, I'm done.

PANEL MEMBER HAMMOND: I'm Kathy Hammond, Professor of Environmental Health Sciences from University of California, Berkeley, at the School of public health. My research has been exposure assessment for epidemiologic studies. I do occupational and environmental studies, and also secondhand smoke. And I don't think anyone could really call John retiring.

(Laughter.)

PANEL MEMBER GLANTZ: Maybe shy.

DR. FROINES: Shy is not a term that was used often.

PANEL MEMBER RITZ: All right. So I'm Beate Ritz. I'm an epidemiologist and Chair of the Department of Epidemiology at UCLA. I'm an environmental and occupational epidemiologist. I conduct studies on air pollution, pesticide exposures, and just about every health effect you can imagine. And I've worked with John my whole career in California. And I'm very sad that he's leaving when I just stepped on.

PANEL MEMBER GILL: I'm Sarjeet Gill. I'm from the University of California at Riverside. And I'm in the Department of Cell Biology and Neuroscience. My research activity is primarily on the molecular mechanisms of toxin action at the cellular and molecular level.

PANEL MEMBER BUCKPITT: I'm Alan Buckpitt. I'm from the School of Veterinary Medicine at UC Davis. My interests have been in chemical induced lung injury, primarily by agents that require P450 metabolism. I've been interested in looking at both the activation of those chemicals, the detoxification of them, and what happens when they become bound covalently to proteins.

PANEL MEMBER ARAUJO: I am Jesús Araujo. I'm a Associate Professor of Medicine at the UCLA School of Medicine. I am a vascular biologist and a cardiologist, and I direct the environmental cardiology and vascular biology lab at UCLA. And my research interest has been on the study of the vascular oxidative stress in atherosclerosis used in mouse models.

I've been doing air pollution research for the last 10 years, and focused on elucidating or dissecting the mechanisms and how does that particular pattern induces atherosclerosis by effects on plasma lipoproteins and HDL functionality.

PANEL MEMBER BLANC: My name is Paul Blanc. And like Jesús, I'm also a physician. And like Stan, I'm also at UCSF. And my work is on the epidemiology and clinical outcomes, particularly in lung disease. Although I also am trained in medical toxicology and work with the California Poison Control System, and also work in the

translation of scientific knowledge into publicly accessible information, including the history of the health sciences. And I am currently this year on academic development leave at the Center for the Study of -- the Center for the Advanced Study of Behavioral Sciences at Stanford University working on a book on the history of the viscose rayon industry in the 20th century.

And I've known John since I was an undergraduate and he was my teacher at Goddard College. And we worked together both on science and on its public policy implications, even then.

CHAIRPERSON KLEINMAN: Thank you very much.

The next part of the meeting is very pleasurable. I want to take the opportunity, first, to thank John for his friendship and his guidance over the last decade. We've worked together on a number of different projects. And I've come to really value him as a person that I could go to and speak to about research endeavors. I've always appreciated his depth of knowledge.

And John is, as everyone knows, stepping down as Chair of the Committee, and as one of the -- has been a founding member of this Panel, and Chair for I don't remember exactly how many years, but it's been quite awhile.

DR. FROINES: Fifteen.

DR. FROINES: '98 to today.

CHAIRPERSON KLEINMAN: Today.

DR. FROINES: One month ago.

CHAIRPERSON KLEINMAN: At any rate, he's done a remarkable service to the State and the community and to public health. And in that regard, I'd like to ask Gina Solomon to make some presentations and discussions.

CAL/EPA DEPUTY SECRETARY SOLOMON: Is this is on? Yes.

Thank you, Mr -- Dr. Chair.

(Laughter.)

CAL/EPA DEPUTY SECRETARY SOLOMON: And this is a bittersweet event. It's for me a wonderful opportunity to recognize someone who I've looked up to personally for very, very many years, and someone who I think all of us admire enormously professionally, and someone who has given so very much to the people of California.

And so I'm really happy to take this opportunity to honor and recognize John Froines, but also very sad that this marks the end of his tenure as Chair of the SRP.

You know you should all know that John made enormous efforts to be here today. And we twisted his arm, because we really didn't want to have a transition without an opportunity to tell John ourselves how much he has mattered to this Panel, to CalEPA, and to the boards

and departments.

But, you know, he just got off a plane from Italy less than 48 hours ago, and then got on another plane to come up here for this meeting. So this was yet another demonstration of his commitment.

PANEL MEMBER BLANC: And he's not as young as he used to be.

(Laughter.)

CAL/EPA DEPUTY SECRETARY SOLOMON: We'll keep that part off the record. No comments on age.

(Laughter.)

DR. FROINES: Usually, under normal circumstances, there would be a rejoinder, but I'm being polite today.

(Laughter.)

CAL/EPA DEPUTY SECRETARY SOLOMON: So John was in Italy, by the way, to receive the 2013 Ramazzini Award, and to deliver the prestigious Ramazzini lecture. This is no small honor. And, in fact, we really have a giant in our midst, and it's great to recognize that today.

The Collegium Ramazzini conferred this award, in part interestingly, because of John's work on the SRP. The statement on the award said, "The 2013 Ramazzini Award will be conferred upon John Froines for his outstanding career in occupational and environmental health research".

It went on to mention some of his minor contributions related to, oh, the federal cotton dust standard, the federal occupational lead standard, little things like that, and then got to the important point, which is and for his work in California that led to the recognition of diesel exhaust as a significant toxic air contaminant preserving the health and the lives of millions. How true and how impressive.

More than 15 years ago when John stepped onto the scientific -- well, actually stepped into the role of Chair on the Scientific Review Panel, one of his first tasks was to lead the Panel through multiple drafts of an enormous document on the health effects of diesel exhaust.

And, at that time, diesel was not considered to be carcinogenic or a toxic air contaminant by any entity. And there was enormous criticism on OEHHA and ARB at that time. And yet, the science withstood the very careful and systematic scrutiny of this Panel under John's leadership. And diesel was listed as a toxic air contaminant and the rest is history.

In 2012, the world finally caught up with California, and the International Agency for Research on Cancer finally identified diesel as carcinogenic in humans. But in the meantime, we have had over a decade to implement a wide range of air toxic control measures. And

we can show dramatic decreases in air pollution, diesel pollution in California over that time period.

And these reductions especially benefit disadvantaged communities in the State. They especially benefit children in the State. And this is only one example of the many, many ways that this Panel, under John's leadership, has helped the State of California address toxic air contaminants in public health.

So Secretary Rodriquez expresses his regrets that his schedule didn't allow him to be here today. He's just back from China. He's trying to get ready for the Climate Conference of the Parties in Warsaw, and he's out of town today. But he will be sending a letter to thank you for your many fine years of public service.

And he specifically said the following words to me, and I thought you might like to hear them. He said, "I believe that the public is safer and healthier and the environment is cleaner and more productive because of John Froines' leadership and dedication".

The Secretary was sorry this summer to learn that John was -- hmm, I wrote retiring, but I guess I should be saying, what was it stepping down, from the SRP, but he also recognized that everyone must make that decision at some point.

And so, John, we'll certainly miss you. We hope

that you'll -- that we will continue to live up to your high scientific standards and rigor. And I am actually very highly optimistic in that regard. The SRP contains such an impressive group of scientists. All -- you're all leaders in your fields and you have a number of long-time members who will -- who have the experience to really keep that history alive, and keep the continuity. And I'm also very confident that Dr. Kleinman will exhibit a steady hand as Chair guiding the Panel forward maintaining these high scientific standards that John established.

The Secretary gave me the honor of presenting a Certificate of Appreciation today. It's a really small token. It's hardly adequate recognition of your decades of service to Cal/EPA and to the State of California. There's no way we can repay you for that, but you are an inspiration.

And so can I get you to come up here for a photo op and to accept this Certificate of Appreciation from the Secretary

DR. FROINES: At the Ramazzini meeting I was awarded a bust.

(Laughter.)

CAL/EPA DEPUTY SECRETARY SOLOMON: Darn, why didn't we think of that.

DR. FROINES: I was awarded a bust of Bernardino

Ramazzini, and it's about -- isn't this, would you say? It's about this high, and it weighs about 50 pounds.

(Laughter.)

DR. FROINES: And they said that I had to bring it back and not -- they wouldn't send it. So I carried from Bologna, Italy this guy we now call Bernie.

(Laughter.)

DR. FROINES: -- to -- so that award is a --

PANEL MEMBER BLANC: Well, John, it's not the first time you've been busted.

(Laughter.)

CAL/EPA DEPUTY SECRETARY SOLOMON: Touché.

DR. FROINES: I'm not going to touch that one with a 10-foot pole.

CAL/EPA DEPUTY SECRETARY SOLOMON: Well, this is much lighter weight, but it's a little something.

(Thereupon pictures were taken.)

CAL/EPA DEPUTY SECRETARY SOLOMON: And there are a few more speakers, so we're not done yet.

DR. FROINES: Oh, good.

(Laughter.)

CAL/EPA DEPUTY SECRETARY SOLOMON: So I would like to introduce the next speaker, Assembly Member Roger Dickinson is here today with us. And he will be speaking on behalf of the Speaker and on behalf of the Assembly.

DR. FROINES: Oh, good.

CAL/EPA DEPUTY SECRETARY SOLOMON: So thank you for coming. I'll slip by.

ASSEMBLY MEMBER DICKINSON: Good morning. I am, in fact, very, very pleased to be here on behalf of Assembly Speaker John Pérez. And I think he asked me to do this, not just because we're in the district that I represent. And I live seven minutes from here, so it was relatively convenient to be here this morning, but perhaps more importantly because of my long-standing interest in and work in the area of clean air, both indoor and ambient.

And I'm proud to join all of you in honoring Dr. John Froines for his commitment to scientific integrity and for helping California to address serious health issues from toxic air contaminants.

As we have discussed, Dr. Froines was first appointed to this Panel at its inception in July of 1984 by then Assembly Speaker Willie Brown, Jr. He, in fact, has spent nearly 30 years since that time, and has been reappointed by numerous Assembly Speakers over that span of decades to continue serving on the SRP.

As again we have already noted this morning, he became the Chairman, and my notes say 1977, but if you say 1998, we'll go with you, because it's about you.

DR. FROINES: I think I was '97. I think it was '97. I think you're right. I think --

ASSEMBLY MEMBER DICKINSON: All right. So '97, so 16 years as chairman, and you became the fifth chairman when you assumed that post, and as has been alluded to, guided the Panel through numerous difficult and complex scientific issues throughout that span of time, including identifying diesel exhaust as a human carcinogen, and secondhand smoke as a substance that can cause breast cancer just to name a couple of the issues that all of you are very, very familiar with.

At their core though, these are issues that have led to significant advances in protecting public health of Californians. As a part of the result of the deliberations of the SRP, California's air has become much, much cleaner over the past decades. And we have seen major reductions in everything from diesel exhaust pollution to smoking in public places. Behind all of these public policies was a solid foundation of science thanks to the Scientific Review Panel's work under the leadership of Dr. Froines.

In addition to these activities, Dr. Froines also notably headed the Scientific Review Committee for Methyl Iodide, a highly controversial and toxic fumigant that was pulled from the U.S. market just a couple of years ago by

its producer.

Dr. Froines areas of expertise in toxicology and exposure assessment, his research interests in chemical toxicology, chemical and biological exposure assessment and governance -- and risk governance policy are all well known. And his academic career is also one of repute and note as well, joining along the way the UCLA School of Public Health in 1981.

He served as the director of the Center for Occupational and Environmental Health for 25 years, and the Director of the Southern California Particle Center and Supersite. And I must say that caught my attention, because my father was a professor of forestry at the University of California, Berkeley and spent 25 years as a director of the Forest Products Laboratory at the Richmond field station the first 25 years of its existence, and engaged in numerous California, national, and international endeavors in his field. So hearing about your travels to Italy and the world brought back some memories for me of my father's own activities as well, professionally speaking.

The State of California has certainly been lucky to have Dr. Froines at the helm of this important scientific panel for so many years. And on behalf of the speaker, I want to extend his personal thanks and the

thanks of all of us as members of the State assembly for the work that you have done that has made such a significant improvement in the quality of air and the quality of life for all Californians.

And I also want to just take a moment to recognize the new chair, Dr. Kleinman, who's assuming his position today, as the sixth chair of the scientific review panel. Dr. Kleinman was appointed by Assembly Speaker Pérez in August of this year, and was appointed chair by Secretary Rodriquez last month.

So welcome to you, and best wishes as you undertake your responsibilities and role as the chair. Certainly, you are a worthy successor to Dr. Froines. And I know the Panel will continue to work in good hands through the difficult issues that we continue to face in making sure that we can continue to advance the cause of clean air for all Californians.

So thank you for allowing me to come spend a few minutes with you. I wish you personally the very best in whatever lies ahead for you. I know it will be challenging whatever you take on. Your career shows that and past is prologue.

And I certainly wish you, Dr. Kleinman, the very best as well. To all of you, you are welcome any time in the Seventh Assembly District here in Sacramento.

(Laughter.)

ASSEMBLY MEMBER DICKINSON: Thank you.

(Applause.)

CHAIRPERSON KLEINMAN: Thank you.

CAL/EPA DEPUTY SECRETARY SOLOMON: We also have a representative here today with us from the State Senate. A consultant to the Senate Pro Tem Darrell Steinberg, Kip Lipper, who works on energy and environment issues and has been in the Senate for longer than John has been on the SRP.

MR. LIPPER: Yes.

DR. FROINES: That's a statement of some significance.

(Laughter.)

MR. LIPPER: Thank you. I had not come over here to speak today, but I just -- and no one contacted me. I just am on the listserv for the agenda for the Scientific Review Panel. I thought because Stan Glantz, I think probably about 15 years ago, said to me you ought to come to a meeting once in awhile and see what we do.

(Laughter.)

MR. LIPPER: I thought this would be a good occasion. But I come over -- I'm actually a staff person in the Senate, and I'm not here representing the Senate, as Mr. Dickinson is the Assembly. But I know that if I

checked with all 40 State Senators serving today, they would all say what I can say as a long-standing staff person, and that is, Dr. Froines, thank you for your outstanding service.

I'd just say one other thing to the Panel members and the great work that you do, that I actually think the SRP is one of the most underappreciated and probably most significant transformative bodies in California environmental law and policy. And the work that you all do, some of which is recognized very publicly, like the diesel exhaust work, secondhand smoke, and other things, but the work that you do every day on these issues is critically important. And I don't know that it's appreciated as much as it should be in the political arena. But I can tell you as a liaison -- the political hack liaison to the State Senate --

(Laughter.)

MR. LIPPER: -- we appreciate you a great deal.

And Dr. Froines I look forward to staying in touch with you and working with you in whatever capacity you're in. So thank you very much.

(Applause.)

DR. FROINES: I just want to say thank you to Kip. He's been an ally for all these years, and deserves more credit than he's -- you know we're giving him right

now.

CAL/EPA DEPUTY SECRETARY SOLOMON: And so for our next speaker we have Lynn Terry here from the Air Resources Board.

DEPUTY EXECUTIVE OFFICER TERRY: Dr. Froines, I can't believe it. We're so young. Stepping down already. But we won't count how many years many of us in the room have followed the work of the SRP. And Kip is absolutely right, it isn't as widely recognized as it should be broadly for the work you do. I know we've talked a lot about diesel particulate matter and that work, but I just can't understate the significance of that work broadly for the Air Resources Board's public health programs.

These days, I work primarily on programs to meet national ambient air quality standards for particulate matter and ozone, but it was the identification of diesel as a toxic air contaminant that really got the Board focused on the toxicity issues, the public health issues, and as we pursued our legal authority there, and we looked at diesel engines holistically, we look traffic emissions, we began to see that we had cancer risk. We had other health effects in children. We have a huge contribution to particulate matter pollution, and premature mortality, the NOx emissions are essential to control for ozone.

So the focus put on diesel engines has become the

focus of the Board for so many years. And not only are we well on our way to meeting our 85 percent risk reduction goal, we are well on the way towards meeting PM 2.5 fine particulate standards in southern California next year, and very close behind in the Central Valley. And the public health benefits of all of those programs taken together are so immense.

So I thank you, personally, on behalf of Chair Nichols, our current Board members, many former Board members who are well aware of your work, and of course, all of our staff. So we all look up to you as a role model. And I'm happy to say we see a lot of new young scientists coming to work for the Board. And it's people like you and others on the Panel that have really been the inspiration for those bright young students to work in the public health and environmental arena. So thank you, John.

DR. FROINES: Thanks, Lynn.

(Applause.)

CAL/EPA DEPUTY SECRETARY SOLOMON: Thank you, Lynn.

And next, I'd like to introduce Brian Leahy from the Department of Pesticide Regulation.

DPR DIRECTOR LEAHY: Well, first off, I want to thank you, John. Thank you very much for all the work

you've done. Dr. Kleinman, thank you for the work you're going to do.

(Laughter.)

DPR DIRECTOR LEAHY: First -- and the Panel, this Panel is amazing. You know, your diversity, your training, your world experiences, what you bring to our process is really important, and we'll be using you all in the future.

You know, it's good to reflect on what this is about. You know, I grew up in Ontario in the sixties. Third smoggiest city in the world. My cross-the-street neighbor was the 10, so, I mean, as a child your eyes would burn, your lungs would burn, you know, diesel smoke was real. So I appreciate that work.

You know, in the seventies I took my first job in corporate America, and people around me were smoking in the office -- in these closed buildings. I'd never been around cigarette smoke before. My body was in crisis. I went to the doctor. We couldn't figure out what was wrong, so I thank you again.

In the eighties, you know, I'd be out farming in my fields, and our neighbors would be doing their thing, and your throat would lock up, and your bowels would go nuts, and you get a little jittery feeling, a little organophosphate poisoning for the day.

(Laughter.)

DPR DIRECTOR LEAHY: You know, the work that we have done here in this building has changed our lives. And that's because, you know, we have brought a scientific approach. We've brought some reason, and we continue to push for industry, for the production of food for all the things that make modern life possible, but in a way that respects human health and the environment. And for that I thank you all.

And for John's -- for stepping up, is that what you're doing? You're going to have a great future. I thank you very much. And, Dr. Kleinman, thank you. You're going to appreciate this work.

Thank you.

(Applause.)

CAL/EPA DEPUTY SECRETARY SOLOMON: Thanks, Brian. And I guess George Alexeeff is going to be speaking -- no, he's coming up. George Alexeeff, Director of OEHHA.

DR. FROINES: I was wondering where he was for awhile there.

(Laughter.)

OEHHA DIRECTOR ALEXEEFF: I was hiding, hiding behind you like always. How's that?

(Laughter.)

OEHHA DIRECTOR ALEXEEFF: So, yeah, I'm George

Alexeeff, Director of the Office of Environmental Health Hazard Assessment. Welcome, Chair Kleinman, to the Panel, and other members of the Panel. Thank you for all being here.

So when I began State service in '86, my job was to provide reviews that the toxicant -- that your -- that this panel would review. The first one I did was on carbon tetrachloride. And then -- so over the years, as a staff member, I prepared a number of reviews that were reviewed by the Panel, and then also over time I was fortunate enough to be promoted to, at this point, Director of the Department.

So I've seen the panel over these years, and I've worked with Dr. Froines on a lot of activities, both with this panel and others. For example, other things that we're not going to talk about today that he served as a member of our Carcinogen Identification Committee for Prop 65 for a large number of years, about 15 years or so. And he also served on this expert panel in oxygenates when we had the MTBE problem, as you recall, and that also came before the Panel as well.

And it just struck me today as kind of an interesting thing, the Panel did adopt our potency for MTBE. Although, other entities don't adopt that potency as being in existence. And it's interesting, we think of

cancer potency as coming up with a risk that is so small, no one would ever, you know, be able to detect it or measure it. Well, it turns out that our drinking water standard for MTBE is not based on a cancer potency, because you can smell it at levels below that, below the one in a million risk.

So, you know, just something to keep in mind that although the risks we come up with are very small, sometimes it's actually detectable. And this Panel was willing to, you know, look at the science and come to the conclusion that supported what we were proposing. And he's also recently -- I mean, John has reviewed many of our documents, but most recently he's reviewed our PBPK modeling for lead, which is going before -- for proposing a change in the occupational lead standard in the state.

So John has provided a lot of service to us. But I want to talk a little bit about what I think his services for this Panel has meant. One is, you know, this particular program I was looking -- I always like to look at the law. And I know that basically, you know, a toxic air contaminant is an air pollutant, which may cause or contribute to an increase in mortality or serious illness, or may pose a present or potential hazard to human health.

So that's what the statute says. So it was this Panel, and -- had to help interpret what's the science

that connects with may pose, present, all that, what are the assessment procedures, what are the calculations, what are the risk levels, all that.

So John has been instrumental in creating -- helping to create that sort of process that we could then actually function and come up with a procedure that would be helpful.

And this also lead into our cancer identification guidelines for the state, in other words, the California Cancer Identification guidelines for all of our programs in the state. The Panel's work has led to that as well.

And so when I was thinking about John's -- realizing I don't have much time, I kind of -- I don't know, I think I've been watching too many reruns lately for some reason. I was watching NCIS reruns. And there's a thing called Gibbs Rules.

So I thought well what are John's rules? And he doesn't really articulate them, but I thought, you know, this is what I think John's rules are, based upon his work on the Panel.

Okay. I think -- and the rules, if you don't know, are usually very short little brief sentences. So like the first one is stick to the science. That's one thing John always pushes is stick to the science. This Panel, especially, you know, the chemicals that have been

mentioned already ETS, diesel exhaust. There are a lot of other issues related to that -- to any sort of regulation that might go into those ultimately. And that all comes to the Panel in documents and things like that, and letters. So the point is, well, where is the science? And John always said stick to the science.

And not only did he stay stick to the science, but this is, I think, the hard part about it, he says tackle the -- this is what I think he says, tackle the hardest science issues head on. So what is the issue that's really, really tough here that people are complaining about your document that's wrong, and let's go ahead on it, why are you right, what's your evidence, where is it? So that's another thing I've always taken.

And then as a Chair, I would say he's always pushed for consensus. You know, there's been other panels that I've been on where they vote and it's like 3-2, okay that science issue passes, you know. But John has always pushed for consensus. And sometimes that means -- well, first of all, it means all the members have to contribute in the discussion. And second, the decision may not be made that day, which always bothered us. We wanted it done.

(Laughter.)

OEHHA DIRECTOR ALEXEEFF: But he would say, okay,

everybody would have to think about it, read the documents some. Let's come back. Let's see if we can get there. So that's another one, always push for consensus.

Another one, don't blindly adopt U.S. EPA guidelines.

(Laughter.)

OEHHA DIRECTOR ALEXEEFF: That was one. We came in -- when the hazardous pollutants became adopted as toxic air contaminants, we came in and said, hey, let's just adopt all of the U.S. EPA numbers. It will just be fast. We'll get a good bunch of numbers. John said, no, we don't know what the science is. We're not going to approve it. We're not voting on it. You guys have to look at all the science and bring it to us.

Okay. So as a result, this Panel ended up adopting hundreds of numbers, reading hundreds of reviews of chemicals, instead of just adopting what EPA did.

And the other one I thought is don't be afraid to talk about your research. I think that's one of his rules too. Particularly, we've all heard about quinones and quinones, and particulate matter, hexavalent chromium.

But he also liked -- you know, and I -- he also liked us to talk about our research that led to part of the science. And I really appreciate that, because we all -- as scientists, we do research that tries to address

some of these risk assessment issues. And John was always, you know, pushing saying, well, come on, you guys have got to put your information in there too that you've developed. And I've always felt really good about that.

We heard about diesel, and I just wanted to mention one more thing about that that I thought was -- well, one thing about it was that, you know, it was at a difficult time, as Gina had mentioned. And we were kind of stuck, us and Air Board, as to how to proceed, because the researchers of which we were basing our risk on said don't use our research. You can't use it. So what do we do then?

The researchers are writing letters telling the Governor don't use it. So John --

PANEL MEMBER GLANTZ: Researchers who are being paid by the diesel industry.

(Laughter.)

OEHHA DIRECTOR ALEXEEFF: Well, John said let's convene the Panel. Let's convene a Panel of experts, so we had this Panel, plus another, I don't remember how many, additional experts come, including -- we had televised discussions and things like that of experts. And the Panel asked the experts some of these key questions, and we were able to get to a consensus. We were able to get to the experts and say what did they

really agree with, what did they not agree with. And they could agree with the science, I think in the end. That's what we concluded.

DR. FROINES: And Stan -- I should say Stan, to his credit, asked the key question.

OEHHA DIRECTOR ALEXEEFF: Yes.

DR. FROINES: What was it Stan?

PANEL MEMBER GLANTZ: Yeah, I actually from a -- when they brought Garshick, who did the research that George is talking about, who then had become a consultant to the diesel people, and basically repudiated his own quite good work, was really an embarrassment. But after going on and on with all this equivocation, I got a -- I reached back to the ARB's lawyer who's sitting close by and got the law, and read the definition of the toxic air contaminant, and said is there anyone in the room who thinks diesel doesn't meet this definition?

And there was dead silence.

(Laughter.)

PANEL MEMBER GLANTZ: It was the high point of my career on the Panel.

(Laughter.)

OEHHA DIRECTOR ALEXEEFF: And so, you know, that was a key -- you know, it was a strategy to bring the science again, you know.

And then one of the thing I -- now, one of the things is personally, as I -- when I was a staff scientist, and pharmacokinetics were first being used, and industry was proposing that we use pharmacokinetics for methylene chloride to go from -- to calculate the animal potency level and then to extrapolate from animals to humans use these pharmacokinetic analyses things.

And OEHHA, we just -- we felt there were too many assumptions to use all that. And I forget how many assumptions we calculated, somewhere in the 80 or 90 assumptions that were used. And so John basically told us, look, use the science for calculating the PBPK analysis for adjusting for the animal potency. That is solid. Use that.

So that actually moved us on to use PBPK modeling. And then when perchlorethylene came around, we used it then. And so that was, you know, a big push, and that's one of the rules of the science panel has been under John is to push us a little bit sometimes in the direction that where the science really is. And sometimes we -- you know, we might miss, or we're not sure if that's the place.

So anyway, I want to thank John for all of that guidance, for helping put together a lot of the strategy of how we work with toxic chemicals in the state, not just

in the air, but in our other programs as well.

And thank you.

(Applause.)

CAL/EPA DEPUTY SECRETARY SOLOMON: Thank you, George. And I'd also like to invite Dr. Paul Blanc up to say a few words, or you can stay them from there, whichever you prefer. Well, come on up here. It's probably better. Well, no, just John. Then we're going to ask him to rebut everything that we've all said.

(Laughter.)

PANEL MEMBER BLANC: So I'd like to try to synthesize some of the comments that have been made, but also add my own personal comments. As I mentioned earlier, as we went around the table, I've known John since I was an undergraduate and he was my teacher. So that we first met in April of 1972, and worked on -- he was my advisor on -- a couple of years later on my senior project, which was a agitprop theater piece on vinyl chloride causing industrial cancer.

But we also had another creative project together. We toured several campuses in the northeast performing a agitprop prop theater pierce called The Court-Martial Johnny Appleseed, in which Johnny Appleseed, who is immortal, has been drafted and sent to Vietnam, where he starts helping the peasants plant rice, and then

is court-martialed. And John is -- plays a Civil War general who's been brought out of retirement, since he's the only one without a specific opinion on the Vietnam War to -- for the trial.

This was under the aegis, I should add, of the Goddard College. It was the Goddard Indochina Action Project, or GIAP. And many of you will note that General Giap just died a few weeks ago at the age of 102. So I think all of that is very auspicious.

And in my many years working with John, John was I think instrumental in helping me get accepted into the Harvard School of Public Health. When John Peters met with me, as I started as a student, he said, well, we looked at your record from Goddard and we really didn't know what to do, and then we sort of said, "What the hell". And I think that was because of John's backing.

(Laughter.)

PANEL MEMBER BLANC: The other thing, I could probably add to George's list of aphorisms, or rules, would be something that I call lowering the boom, which I learned from John.

What that means is that you sit at a meeting like this and you let things sort of happen, and then at a certain point you lower the boom on the person or the subject depending. And everything sort of grinds to a

halt and then moves on. And it's sort of the yin of the yang of consensus.

And I've always appreciated it and, some might argue, have learned the technique myself. I don't know. I can't speak for that.

And I also liked George's comments about John as a catalyst for difficult work. And I know that the Panel -- what the Panel does often ends up leading to more work or revisions, or revisiting, or recalculations, or getting additional data, but I believe that it is the role of the Panel to make life difficult, so that life can be better. And I think that was John's guiding principle, and I know that we will be true to his spirit as we go forward.

So, John, from my heart, thank you.

DR. FROINES: Thank you.

(Applause.)

PANEL MEMBER GLANTZ: I just want to say something.

CAL/EPA DEPUTY SECRETARY SOLOMON: Sounds like we have an additional speaker. Dr. Glantz.

PANEL MEMBER GLANTZ: Yeah. I just want to --

DR. FROINES: Can I say one thing about what Paul left out.

(Laughter.)

DR. FROINES: What Paul left out is he is one of the most strategic thinkers alive. And what he used -- what he told me once, he said, "I always know what you feel you need to accomplish in a meeting, but sometimes you can't do that, so I have to lead the direction of the meeting, and then it comes back and people say, Froines got this through". But, in fact, it was Blanc who actually pushed the envelope.

So for that strategic thinking, I really appreciate his work. Does that make sense?

(Laughter.)

PANEL MEMBER GLANTZ: Well, I just want to add, as -- I have -- I've been on the Panel since a few -- about three years after it was formed. And this is also for our new Chair to learn, and that -- I want to second everything everybody said, but one thing that was left out was that accomplishing a lot of these things was often politically very difficult. And it was often done -- we have an administration with Gina Solomon as a high official, which is a strong statement of priorities.

But we've also had other administrations that this Panel has operated under and with John as Chair, which weren't so interested in moving the mark forward, including on things like lead and diesel and secondhand smoke. And under John's leadership, I think that all of

that politics was pushed through or pushed aside, again by focusing so much on the science.

But I think that the -- and Kip Lipper was involved in some of this at various points. But, you know, I -- and this is also for the members who haven't been around so long. I think the Panel has really emerged as a very powerful voice that people don't mess with, politically.

And that we had a couple of joint meetings with the EPA just for scientific discussions. And the difference to me was really remarkable how this Panel was just -- whatever the science said, the science said, and the politics were pushed out of the debate, and kept out of the debate, and moved forward despite the political pressures.

And, you know, I think that's -- that -- the strategic thinking and the backbone that -- that went behind that, I think, made as much a contribution to the things that everyone has been talking about, because it really allowed the science to dominate the discussion.

It contributed a huge amount to what we've been able to accomplish. And I hope that you will follow in his footsteps in doing that, as will the other people on the Panel, because a lot of these things were not easy to do. And there was a lot of pressure coming down on some

of these reports from unsympathetic people in the -- not this administration, but in some administrations. And it was hard, very hard sometimes, to move those things forward.

And I also think -- just since I have the floor, I also want to thank the staff, because they've worked very hard to do the same thing, which in many ways for them, was even harder than for us, because they worked for these guys, but -- I mean, that's why I've stayed on the panel so long. It isn't for the money.

(Laughter.)

PANEL MEMBER GLANTZ: But, I mean, the group of people here and the absolutely unbelievable leadership from John -- I mean, I just always leave astonished at how much he knows, and how he's able to take very arcane scientific details and turn them into sort of practical lessons of how you need to present things and frame things and accomplish things that then actually move the mark forward in ways people talk about.

I mean, it's really been amazing to watch you, even though you've yelled at me a certain amount.

(Laughter.)

PANEL MEMBER GLANTZ: But I'm going to miss you.

(Applause.)

PANEL MEMBER GLANTZ: On the Committee.

CAL/EPA DEPUTY SECRETARY SOLOMON: Thanks, Stan.

And so I'd like to -- John, I'd like to give you an opportunity to address the Panel and pass on your words of wisdom and advice. And I don't think this is going to be the last chance. I mean, we actually really want to, you know, have, at some point, some, you know, forward looking opportunity for the Panel to think about next steps and future roles. And so we might want to have a guest speaker, for example, for such an event. But just for today, we wanted to give you a chance to talk to them.

DR. FROINES: Well, thank you, Gina.

I think it's wonderful every -- what everybody has said. I sit here in awe of myself.

(Laughter.)

DR. FROINES: And the -- I think I want to say one thing with respect -- that goes back to what Stan was talking about. I think what this Panel has displayed throughout its history is integrity, integrity to science. It has been the wash word of this Panel, and it will continue with Mike's leadership.

But I think that the quality of science, the integrity in relation to science, and the commitments at the individual level have just been really quite extraordinary. So I think that the Panel, as a model, is something that does need more attention to even expand

beyond where we are now. And I'll be happy to come back.

I would like to come back and give a talk about where I think the Panel should be headed, and what the implications of that are for the agencies.

And I'll just tell you, you know, everybody keeps talking about diesel exhaust. Well, the Scientific Review Panel named diesel particulate. We didn't name diesel exhaust. We still have to deal with the vapor phase. So that, you know, you don't get it right every time.

(Laughter.)

DR. FROINES: What I want to say -- I want to take advantage of this moment and say goodbye to the Panel. I mean, I don't know you --

(Laughter.)

DR. FROINES: -- but I know everybody else pretty well. And this has been a wonderful experience. And so from me to you goodbye, and I love you for all the things that you've done and the quality of the work that's come out of this Panel.

It's really extraordinary what this Panel has done. We have done 450 risk assessments during the 30 years. Unbelievable. And Melanie has, you know, probably got some back there.

So I want to say -- and, of course, Paul, Stan, and Kathy I know best. But now that I'm doing research

with Jesús, so there's a history that's forming there. But I wanted to -- I want to, in a sense, stop the academic side of this, and I want to say that there are two people in this room who none of this could have happened without and that I have the deepest regard for them, and that is Peter Mathews, and Jim Behrmann. They're staff. And Peter and Jim, wherever he may be, you know, they carried the ball. And so we all need to recognize the importance of their role, and that sometimes people get lost in the shuffle, and we can't -- should not let that happen.

And there are lots of other people, which I'm not going to go through a long list of names. But I do want to mention Mary Nichols. I want to mention, of course, Lynn Terry. And there are others that -- DPR staff, for example, Jay Schreider, Lori Lim, Ruby Reed were important scientific toxicologists on methyl iodide. And that may not be the SRP, but it's also important.

And then the whole group of people at OEHHA that I can't even go through the names. There are too many for me to go through the names. So if you don't mind, I'm going to not go through and list every -- Andy Salmon, Melanie Marty, et cetera, et cetera. It will take too much.

But I want to know that -- I really think that

the relationship between this Panel, especially because of 2588, and OEHHA has been remarkable. I think that there is a lot of important work to be done with DPR over the next period of time. And I think Brian reflects -- Brian, as being here, reflects his commitment to making a positive approach.

And I know I'm leaving a whole bunch of people out, and I don't want to, but I think that the -- the two things that I wanted to really stress is the relationship with Jim and Peter, but also more the relationship with the scientific staff that we've worked with, and the leadership of the agencies, so that they really have been -- it's been a joint relationship. And so that's been very important, and it's worked out very well.

We always don't agree, but we've always gotten through it. There's never been, as far as I know, correct me Stan, Paul, Kathy, there's never been a time when we couldn't get through what we had taken on, every time. Four hundred and fifty times we were successful in producing relevant documents and decisions that led this Panel and the follow-up agency work to its benefit.

So I had written down a whole bunch of contributions we had made, but, you know, because we've left out -- we haven't left out 2588. We haven't said anything about SR -- the SB 25. We haven't mentioned the

risk assessment methodology. We haven't mentioned specific chemicals. But I don't think I'll go through, but the list is really quite long and impressive, and so I'll leave it.

But to finish up, what I just want to say is thank you. Thank you for honoring me. I can't tell you what it means to me. It -- I can't -- I can't thank you enough for honoring me. And I appreciate every word that's been said here today, and I agree with all of them.

(Laughter.)

(Applause.)

CHAIRPERSON KLEINMAN: Thank you, John.

And I think everyone recognizes your leadership and your role in making this body and moving the State of California ahead of the rest of the country, and a leader in the world, in terms of improving air quality, improving public health, improving occupational health.

And we owe you all a great amount of respect and admiration. So again, thank you very much.

And to that end, we've prepared a resolution. And this resolution I'm going to read it, recognizing Dr. John R. Froines for dedicated service on the Scientific Review Panel on Toxic Air Contaminants.

"Whereas, Dr. John R. Froines has served with distinction as a founding member of the

Scientific Review Panel on Toxic Air Contaminants, and as the Panel's fifth Chairman from 1997 to 2013;

"Whereas, the Scientific Review Panel advises the Air Resources Board, the Department of Pesticide Regulation, and the Office of Environmental Health Hazard Assessment on important issues of science and public health;

"Whereas, as a member and then Chair of the Panel, he participated in and led the examination of numerous substances to determine whether they should be identified as toxic air contaminants, and reviewed the derivation of hundreds of reference exposure levels, and cancer potency factors to be used in health risk assessments;

"Whereas, he has provided insightful leadership in decisions made by the Panel to consider the scientific underpinning of proposed decisions to list chemicals as toxic air contaminants consistent with the statutory mandate that the identification and regulation of such contaminants should utilize the best available scientific evidence gathered from the public-private industry, the scientific community, the federal, state, and local

agencies;

"Whereas, his service on the Panel has benefited the people of California by helping to ensure that emissions of toxic air contaminants are controlled to levels that prevent harm to public health;

"Whereas, he has a consistent record of maintaining the highest standards of scientific integrity in the pursuit of knowledge and its application to public policy;

"Whereas, he has devoted his research and teaching career to expanding scientific knowledge in the areas of occupational and environmental health with major contributions to scientific understanding of the health effects resulting from exposure to air pollution; and,

"Whereas, he has consistently provided keen scientific analyses of toxicological issues and applied his expertise in exposure assessment has made an invaluable advisor to the state, and has dedicated endless hours toward the improvement of the environment and the public health of the people of California.

"Now therefore, be it resolved, that the Scientific Review Panel publicly expresses deep

appreciation and gratitude to Dr. John R. Froines for his decades of outstanding scientific service to the people of the State of California."

And I'd like the members of the Panel to approve this with acclamation.

All approved?

(Ayes.)

CHAIRPERSON KLEINMAN: John, I'm going -- this is --

PANEL MEMBER BLANC: Actually, you should get a second, I think, technically.

CHAIRPERSON KLEINMAN: Technically. All right.

PANEL MEMBER HAMMOND: I second.

PANEL MEMBER BLANC: Now you can.

CHAIRPERSON KLEINMAN: Can we have a second.

PANEL MEMBER BLANC: Kathy just seconded it.

DR. FROINES: Mike, see what I told you?

(Laughter.)

CHAIRPERSON KLEINMAN: You're right. What can I say? Now we now. All right.

PANEL MEMBER BLANC: Now you can vote.

DR. FROINES: You can see it coming now.

(Laughter.)

PANEL MEMBER BLANC: Now, you can call the question.

CHAIRPERSON KLEINMAN: All right. I'd like to call the question.

All approved?

(Hands raised.)

PANEL MEMBER HAMMOND: Enthusiastically.

CHAIRPERSON KLEINMAN: Enthusiastically.

Therefore, this is executed at Sacramento, California on this 1st day of November, 2013. And I will sign on behalf of the Scientific Review Panel.

(Applause.)

DR. FROINES: Can I just say one thing?

This is a very wonderful certificate of appreciation from Matt Rodriquez, the Secretary of CalEPA, but there's no document that will mean more to me than the document that comes from the Panel, from the people who are in the trenches, and who have struggled to make this thing work and be successful.

So thank you very much for doing that.

(Applause.)

CHAIRPERSON KLEINMAN: I'd like to present this to you and congratulate you.

Thank you.

DR. FROINES: It's all yours, Mike.

(Laughter.)

DR. FROINES: That's not true. I'm

just -- I'm -- that's why I say, I don't want -- the word "retirement" is a misnomer. I have no intention of not bugging this Committee.

(Laughter.)

CHAIRPERSON KLEINMAN: I think that is a good thing.

(Laughter.)

CHAIRPERSON KLEINMAN: I'd like to recess the meeting for about 15 or 20 minutes, and I'd like us to have an opportunity to just enjoy some refreshments, some coffee. And Melanie has been very gracious to provide us with some zucchini bread. I was going to say that anybody who, you know, voted against the resolution wasn't getting any, but --

(Laughter.)

CHAIRPERSON KLEINMAN: -- we were unanimous. So we're going to be recessed for about 20 minutes.

(Off record: 10:40 AM)

(Thereupon a recess was taken.)

(On record: 11:00 AM)

CHAIRPERSON KLEINMAN: Okay. I'd like to call this meeting back to order. So if everybody can take their seats, please.

Well, this interlude has been pleasant, but now we have to actually do some work.

The next order of business is to consider proposed acute 8-hour and chronic reference exposure levels for benzene.

And I believe, Melanie, are you going to make the initial presentation?

(Thereupon an overhead presentation was Presented as follows.)

DR. MARTY: Yeah. So I'm Melanie Marty, Assistant Deputy Director for Science at OEHHA. And I'm -- because we have a couple new members, including the Chair, I'm just going to provide a few introductory slides about the Air Toxics Hot Spots program, the role of the SRP in the review, and just get you oriented to the document and why we're bringing it to you, basically.

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DR. MARTY: So the Air Toxics Hot Spots program provides for reporting of emissions to the air from stationary sources in California. So a number of stationary sources are subject to the program. They report their air emissions to the local air districts, and then to ARB. And it also provides for assessment of the health risks of those emissions to the general public. And then there are additional provisions that are related to risk management that the districts are responsible for and implementing.

OEHHA, under this statute, is responsible for developing and keeping up to date the risk assessment guidelines.

Next slide.

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DR. MARTY: So under that statute, OEHHA adopted risk assessment guidelines for assessing risk from stationary sources. And this Panel actually reviewed all of this in the late nineties, and early 00s. Included were the technical support documents for a derivation of non-cancer reference exposure levels, cancer potency factors, and exposure assessment. In addition, a guidance manual was put together for actually conducting the site-specific risk assessments, which are generally done by either consultants or engineers in a company. So it's designed for that.

Next slide.

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DR. MARTY: So in the statute, there is language requiring the SRP to review the risk assessment guidelines and associated documents. So that's what we're doing today.

Then the language says the Scientific Review Panel established, pursuant to another section in the Health and Safety Code, shall evaluate the guidelines

adopted under this paragraph, and shall recommend changes and additional criteria to reflect new scientific data or empirical studies. So that's the language giving you guys the role of peer review for this particular statute.

So the requirement applies to the technical support documents, which you saw in the 00s, and also most recently another revision, which I'll get to in a second. It also applies to the guidance manual, which comes out as basically a compilation of what's in the technical support documents.

And then in addition, it applies to the reference exposure levels and cancer potency factors, which are our chemical specific dose response assessments, because they are actually part of the risk assessment guidelines.

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DR. MARTY: The statute in 1999, SB 25, Children's Environmental Health Protection Act, actually changed -- amended our statutory responsibilities a little bit. So OEHHA had a couple major roles in there, considering infants and children in quantitative risk assessment, and identifying toxic air contaminants. And these are actually already established toxic air contaminants, which may disproportionately impact children's health.

Next slide.

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DR. MARTY: So this statute actually triggered OEHHA to reevaluate our risk assessment guidelines, and look at the methodology to ensure that they are child protective. Under that, we completed updates of our technical support documents for non-cancer REL derivation, which went through the public review process and peer review by this Panel in 2008; our cancer potency factor derivation and application and risk assessment, including application of weighting factors for early life exposure, and this Panel reviewed that in 2009; and, then finally our exposure assessment methodologies, which this Panel reviewed in 2012.

So today's item is related to the hot spots risk assessment guidelines, in that it is reference exposure levels for benzene. That's -- and we applied the new REL methodologies to that.

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DR. MARTY: Also, related to today, we had to establish a list of toxic air contaminants that disproportionately impact children. And the actual language in the statute is that, "May cause infants and children to be especially susceptible to illness".

We had an initial list of five. So the statute actually said up to five that we published in 2001 that

this Panel also reviewed. We have subsequently had additions to that list, usually by bringing to the Panel a reference exposure level, and then recommending that that be added to the list. So that's the mechanism we've used to add chemicals to that list since 2001.

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DR. MARTY: So today, we're looking at acute reference exposure levels, 8-hour and chronic reference exposure levels for benzene, and also OEHHA's proposal to add benzene to the list of toxic air contaminants that may disproportionately impact infants and children.

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DR. MARTY: So I'm going to hand it over to Jim Collins, who you all know is with the -- with our Air Branch here at OEHHA. So Jim is going to walk you through the benzene reference exposure level derivation.

Okay, are there any questions for me?

Okay. Thanks.

DR. COLLINS: Well, I've been at OEHHA sometime between when Froines joined the Panel and before Glantz joined the Panel. So I go back to 1986 myself.

So today's document went out for public -- we originally came up with benzene RELs in 1999 and 2000. We sent this document out for public review. It came back with one comment letter. We then updated it based on the

comment letter and other newer data, and produced the SRP draft, which you got earlier this month.

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DR. COLLINS: Benzene is a multipurpose organic solvent used in newspaper printing. It's used in the oil industry. And some of the epidemiological studies that we reviewed were from oil industry refineries. Used in the tire industry, used in shoe manufacturing. And a lot of the data we'll show you today were from shoe manufacturers in China. And finally, for most people, probably the biggest exposure from benzene these days is from cigarette smoking or secondhand smoke.

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DR. COLLINS: Benzene was the first toxic air contaminant in California in 1985. There's a photo of it when it was identified. It's listed under Prop 65 for cancer, developmental toxicity, and male reproductive toxicity. And the ambient levels have fallen greatly in California, as shown on the next slide.

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DR. COLLINS: In 1990, the ambient -- average ambient concentration of benzene in California was just lightly above 2.5 parts per billion. And in the last 10 years or so, it's gone below half a part per billion.

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DR. COLLINS: However, the U.S. production of benzene in 2010 was about 13.3 billion pounds. Hot spot sources in California emitted in 2008 roughly 21.7 million pounds of benzene. The top California stationary source emitted 49,000 pounds of benzene. We're not naming names today. And there's at least 25 facilities in California that emit at least 4,000 pounds of benzene per year.

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PANEL MEMBER GILL: Are there any particular times? Are these throughout the year or are they --

DR. COLLINS: Those are total emissions.

PANEL MEMBER GILL: What about a specific emission at a particular time? Do you have any idea?

DR. COLLINS: You can do air modeling. We don't have a lot of that data. That's -- they're not required to report that. They're required to report their total emissions.

PANEL MEMBER GILL: Okay. Thanks.

DR. COLLINS: Acute RELs -- reference exposure levels are based on the most sensitive, relevant, health effect reported in the literature. Hour acute RELs are levels at which infrequent 1-hour exposures are not expected to result in adverse health effects.

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DR. COLLINS: For the acute REL, our key study

was that by Keller and Snyder from 1988. They exposed pregnant mice to five, 10, and 20 parts per billion benzene on day 6 to 15 of gestation, which resulted in suppression of erythropoietic precursor cells, persistent enhanced granulopoiesis and peripheral blood cells of 2-day neonates, and increased granulocytes in the livers of 2-day neonates and the spleens of adults at 6 weeks.

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DR. COLLINS: These are the critical effects from the Keller and Snyder 1988 data, which we used for the cute REL and which were earlier used to develop the Proposition 65 MADL for benzene.

In the third column, non-dividing granulocytes showed a statistically increase of cell number at 20 parts per million. The early nucleated red cells showed a monotonically decreasing level of those cells from air to 5, 10, and 20 ppm benzene, and there was no NOAEL for this endpoint. So from this study we got a LOAEL of 1.70 parts per -- I'm sorry 1.70 early nucleated red cells.

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DR. COLLINS: We then took -- okay, and as I said, this is a Prop 65 MADL. We then took the data and we put it to our benchmark dose. We did get a LOAEL, but we first applied the benchmark dose before we tried to use -- unless we have to use the LOAEL, we prefer to use

the benchmark dose approach.

We used that data in several of the models, and we were not able to get the adequate fit, so we dropped the top dose, which is custom in risk assessment, because we're interested in the benchmark dose at the lower end of the curve. Notice also that that cell level had a bound. They basically didn't detect any of those cells at the 20 ppm.

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DR. COLLINS: Now -- so we dropped the 20 ppm dose, and we're showing here results for the linear model. And if you go to the fifth column, p for fit, in this case, the higher the p, the better the fit. So if you don't have a p of at least 0.1, it's suggested that you not use any of the models for the data. So we therefore decided we would have to revert to the LOAEL/NOAEL approach, because we could not find an appropriate benchmark dose model that would fit the data.

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DR. COLLINS: So here is the table that we used to develop our acute RELs. The key study again, Keller and Snyder, with pregnant female rats inhaling 5, 10, or 20 ppm benzene, 6 hours a day through the entire -- through the day 6 to 15 of gestation.

The critical effects were altered cell counts in

fetuses and offspring, the LOAEL of 5 ppm. We did not find a NOAEL, and we could not use the BMCL because of the poor fit.

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DR. COLLINS: Human equivalent concentration. When the effect is systemic, animal ppm can be translated across the human equivalent ppm. So it was 5 ppm in the mice, it's considered 5 ppm in the animals. We used a slightly non-default LOAEL uncertainty factor, because some of the results from the benchmark models indicated that the benchmark was probably pretty close to the LOAEL, and using a factor of 10 was probably overkill.

The other uncertainty factors were the default uncertainty factors that are found in our 2008 guidelines. Two for toxicokinetic variance among animals, square root of 10 for toxicodynamic differences among animals, since we have no data.

The toxicokinetic uncertainty factor human kinetic of 10, which is our default, which is described at length in our guidelines. And the toxicodynamic factor, square root of 10 default. The cumulative uncertainty factor was 600. Dividing 5 ppm by 600 results in an acute reference exposure level of 8 parts per billion or 27 micrograms per cubic meter.

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DR. COLLINS: So that's our acute REL. And we're just going to keep going, unless the Panel wants to --

PANEL MEMBER BLANC: How would you like to handle it? Would you like --

DR. COLLINS: Whatever you -- I think what we've done is we've put the charge questions at the end.

PANEL MEMBER BLANC: So why don't we do that.

DR. COLLINS: If that's all right with you. I mean, it's up to you.

PANEL MEMBER BLANC: No I think that would -- I'd prefer that this time.

DR. COLLINS: Good.

So the chronic REL. A chronic reference exposure level is an airborne concentration at or below which no adverse noncancer health effects are anticipated in individuals, even in sensitive subpopulation indefinitely excessed to that concentration.

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DR. COLLINS: In the last 20 years, there's been an incredible amount of data coming out from benzene exposure in China. There's a collaboration among the National Cancer Institute, the Shanghai Hygiene and Anti-Epidemic Center, UC Berkeley, the University of North Carolina and other institutions has produced an impressive amount of data on levels of benzene exposure and its

effect on nearly 75,000 Chinese workers in 672 factories in 12 cities.

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PANEL MEMBER GLANTZ: Could I ask so one question?

DR. COLLINS: Yes.

PANEL MEMBER GLANTZ: So one question I had, I mean is there any evidence of any racial differences in metabolism or susceptibility in benzene that would be important in terms of --

DR. COLLINS: There is a big racial difference in one of the enzymes that detoxifies benzene. And it's -- the incidence is five times higher in the Chinese population than in most of the rest of the world.

PANEL MEMBER GLANTZ: So does that mean that they would be less susceptible?

DR. COLLINS: No, more susceptible.

PANEL MEMBER GLANTZ: Okay.

DR. COLLINS: Because the benzoquinone then can go and cause its damage, whereas the enzyme that degrades benzoquinone that's considered one of the key toxic materials just gets higher. And I don't know, if you -- in the document you can see where when they stratified, according to different enzymes, there was a much higher incidence. So some of that is at least peripherally

explained in the text. I did not show -- I'd said that the difference between Chinese and others are like 22 percent are missing the enzyme versus 4 percent in other populations.

PANEL MEMBER GILL: Can I correct you. I think it was between the Chinese and Caucasians.

DR. COLLINS: Between Chinese and Caucasians.

PANEL MEMBER GILL: But it's not other people.

DR. COLLINS: I'd have to look. I don't remember that data offhand, between Chinese and Caucasians about 5-fold.

PANEL MEMBER GILL: And white Caucasians, that's what it is.

DR. COLLINS: And there's probably some other ethnic groups they've looked. I just don't have that on the tip of my --

PANEL MEMBER GLANTZ: Well, then how -- I mean, I realize we'll hold most of the questions till the end, but so how does that, if at all, affect, you know, your use of that study, in terms of getting the RELs if the --

DR. COLLINS: It's. We're --

PANEL MEMBER GLANTZ: Well, we have Chinese -- I guess if you're talking about the most susceptible, okay.

PANEL MEMBER HAMMOND: Yeah, we have Chinese people.

PANEL MEMBER GLANTZ: We have Chinese people.

DR. COLLINS: There's 1.1 million Chinese in California.

PANEL MEMBER GLANTZ: That's true.

PANEL MEMBER BLANC: I think it would be more appropriate, Stan, to come back to that question in the later discussion, like their uncertainty factor.

DR. COLLINS: So this study, Lan et al., and Martin Smith was part of this group, it's a cross-sectional survey, which studies 250 workers, mainly female, exposed in two shoe manufacturing facilities to glues containing 0.6 to 34 percent benzene for 6 years, on average.

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DR. COLLINS: And here are the data. The complete table is with standard deviations as shown in the guidance manual. However, I selected seven of about approximately the 12 things they looked at. And in all cases, the low group, with a mean value of 0.57 ppm benzene, had statistically significant lower cell counts for all seven of those indices. All of them are quite highly significant.

In our REL, we decided to use the B cells because they were -- there was a mono -- also not only was the LOAEL the low group significantly different, but there was

a monotonic decreasing level of cells with increasing concentration of benzene.

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DR. COLLINS: So here are a bunch of the models. Again, if we go to the P test, test 4, several of the models are not adequate. The exponential model is barely adequate. However, the Hill model passes the T test and it also has the lowest Akaike Information Criterion. The EPA recommends that if you have several tests that are positive with P greater than 0.1, that you look for the one with the lowest AIC, because that has the fewest variables in it, as I understand it.

We selected half a standard deviation as our benchmark. In categorical data, we've used five percent incidence as the benchmark. And depending on who you read, half a standard deviation is fairly close to about -- is fairly -- it's pretty much the 5 percent benchmark with categorical data.

Also, at half a standard deviation, the BMCL is the closest to the BMC. The variance is less. And the last line, when a standard deviation failed, which you'll find is one of the things that -- one of the main comments made about the document.

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DR. COLLINS: Here's the fit. What we're looking

at on the Y axis is the mean number of B cells per microliter of blood. We have four dots with error bars, and those are the four dose groups. In this case, the error bars are standard errors.

At the bottom, we see the BMD, and that intersects the Y -- the X axis about close to one and -- 1.6 parts per million benzene. And the BMDL is close to -- is about 0.47 ppm benzene, just slightly lower than the LOAEL that was determined by the authors.

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DR. COLLINS: So here is our table again. Exposure continuity. According to Martin Smith, these people work six days a week, not five, so we had a slightly different exposure continuity. The critical effect was decreased B cells. The LOAEL was 0.57 ppm. The BMCL was 0.476 ppm.

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DR. COLLINS: We then multiplied that by 10 over 20 times 6 over 7 to get a -- basically a 168-hour exposure of 0.204 ppm, because we're looking for continuous exposure in the human population. We used a subchronic factor of the square root of 10, because the average exposure was 6.1 years.

We used an interspecies UF of one, because we used a human study. And the intraspecies factor was 30,

and we did not split it. And if you looked at the document, there were reasons both for the toxicokinetic factor would either be the square root of 10 or 10, and for the toxicodynamic factor could be the square root of 10 or 10. So basically, we decided a compromise and we just used a factor of 30. And we're not saying which is which, but we think that that's an adequate capture of the uncertainty factor.

The database factor -- uncertainty factor was one, so the cumulative uncertainty factor was 100. The chronic REL was 0.02 ppm or 2 ppb or 7 micrograms per cubic meter.

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DR. COLLINS: 8-hour RELs are concentrations at or below which noncancer adverse health effects are not anticipated in the general human population with daily exposures of 8 hours. And these were developed partly to deal with workers who were exposed to the neighboring factory's emissions.

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DR. COLLINS: For health a protective approach, the 8-hour REL here is the same as the chronic REL. It's unclear whether the adverse effects of repeated benzene exposure, which can include adducts of both DNA and proteins, can be reversed by periods of non-exposure over

the night or over the weekend.

And the effects of benzene we consider are likely to continue worsening with additional exposure, so we felt that an 8-hour REL was not justified different from the chronic REL.

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DR. COLLINS: And then finally, we believe that benzene is a TAC that differentially impacts children. There's a widespread exposure to benzene. There's documented toxicokinetic variability in benzene metabolism. During development, there's a dynamic hematopoiesis, and therefore benzene may disproportionately impact infants and children, therefore we propose it be identified as a TAC, which may disproportionately impact children pursuant to Health and Safety Code, the given section.

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DR. COLLINS: The main -- the principal comment on the acute REL was the endpoint we used was inappropriately, that they -- although there were differences in the differential counts, there was no alteration in the maturation or development of circulating erythrocytes. That is total numbers observed, and the authors felt the biological significance of the endpoint is unknown.

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DR. COLLINS: From the chronic REL and 8 hours, comments that revolved around the choice of the study. The commenter wanted to use another study that -- from Schnatter et al., which has -- which is another Chinese study, which is a collaboration of ExxonMobil, Fudan University, and Richard Irons at the University of Colorado.

They also argued about the choice of endpoint. They had some questions about those response models, especially the Hill curve. And they pointed out that earlier literature showed a lack of effect at low exposure of benzene. And that's true, but we now have a couple studies that indicate the very effects in workers exposed chronically to less that one parts per million benzene.

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DR. COLLINS: Okay. Charge questions.

And obviously that one question I gave you said, basically we're talking about this Keller and Snyder being appropriate, and is the effect on hematological system endpoint for development of acute REL.

Oh, I'm sorry.

CHAIRPERSON KLEINMAN: All right. So. With regard to the charge questions, I think we can look at these one at a time. And I'd like to give, you know, the

Panel an opportunity to comment on these.

So the first one about the -- is the Keller and Snyder study the most appropriate for establishing the acute REL.

And I think, Paul, did you have a comment on that?

PANEL MEMBER BLANC: I guess I have comments, but I'm not sure they fit so well into the structure of the charge questions as they were circulated. And they may -- because they may cross over multiple aspects. And I think, for me, a thing that touches on this, in terms of the uncertainty factors, but perhaps more saliently the chronic calculation.

If you know from good data that there's a 20-fold variability in human susceptibility based narrowly on the enzyme -- function of one enzyme, if you know that variability is at least 20-fold, how can you use a 10-fold factor for uncertainty of within --

DR. COLLINS: Because other things might counteract. You could have one enzyme going up and another going down, or --

PANEL MEMBER BLANC: Well, but you know that there's a subset of the population for whom they have the two hits and you show that there's a 20-fold thing. So I -- this is one of the strongest examples you've ever

brought forward of a situation where there seems to be at least one very clear indication that it's 20-fold, not 10-fold.

DR. SALMON: But we are looking at the sensitive subpopulation in this case for the population.

PANEL MEMBER BLANC: No, you're not. You're looking at a population, which has relatively more of the enzyme distribution, but I don't think that's a justification. You certainly never explicitly say that's the justification for abandoning 20. So either -- I think this document either has to justify better abandoning 20 or it should use 20. And I don't think it should just dance around it.

PANEL MEMBER GILL: I agree with Paul in the sense that this -- the data you have is actually very strong. And if it is there, then either use it or justify as to why it has not been used, because the answer, in effect, is clearly an issue here, because it's very clear that there is a difference in populations.

PANEL MEMBER BLANC: And also, I should say that that's the pharmaco -- let's see if get this right. That's the pharmacokinetic issue. On the pharmacodynamic issue, elsewhere in the document, you make clear that women are likely to be differentially holding onto benzene, and therefore its metabolites, longer because of

it fat solubility. And clearly, leaving aside sex differences, the epidemic of obesity, including in children, is quite notable in America.

So that would -- I think that would speak to the pharmacodynamic. So I wasn't even sure that the square root of 10 was so solid there. But I think at least in your discussion similarly of that choice, you need to come back to it, since you bring it up in the text itself early on, in your sort of general commentary.

So I was struck by both of those things. And I think we've been through this before, where, you know, you're -- obviously, you're forced to make a decision in some direction at some point, and that's fine. That's what you're supposed to do, but you need to suspend our disbelief better.

DR. SALMON: Yeah, we do have a discussion of this issue in relation to the chronic REL on page 45 of the document, but it sounds like we need to examine that to see if we can clarify what we're saying a little bit better.

PANEL MEMBER BLANC: Yeah, I actually read it, and thought this is an argument for 20. I mean, I didn't really read it as --

DR. SALMON: Well, it's complicated, precisely because the population that we are looking at, at least

includes, you know, a larger element of the susceptible individuals than a general population without this particular ethnicity bias.

But I think that there's probably more that needs to be said about, you know, what are the quantitative implications of the ratios of the sensitive versus nonsensitive in the study population versus the supposed target population for the reference exposure level. That may be something we need to look at, but I don't think that the numbers support the idea that you can just, oh, 20 is the factor. It's more complicated than that, but --

PANEL MEMBER RITZ: I agree, but there are actually four points you need to consider. First, the 20 was derived from just bone marrow. So there could also be differences in metabolism in other organs, and they can be larger or smaller.

Second, it's -- the 20 I think is derived maybe from two or three genes. And according to one of the studies here, there are 450 involved. So once you sort through all of those, you can have a much larger proportion of people that, you know, have some genetic makeup that predisposes them.

Third, hydroquinones are more produced at lower levels, less than 1 ppm. So the metabolism actually is even favoring, at low exposure levels, higher production

of toxins.

And third, there's a -- fourth, there's an aging effect. It seems that this mechanism increases with aging, and we have an aging population.

And fifth, it's stored in the fatty tissue, and we have more and more obesity. So those are five different factors that increase my uncertainty.

CHAIRPERSON KLEINMAN: Any other comments on the uncertainty factor?

So it would --

PANEL MEMBER BLANC: And that would touch on -- just that I think that would -- I think would touch on both -- all three RELs, since there's uncertainty factors. So that's why I said it didn't neatly fall into, you know, just looking at the acute REL.

CHAIRPERSON KLEINMAN: There were other considerations in the acute REL.

PANEL MEMBER GLANTZ: Well, so -- I mean, I have to say this was an issue when I read the document that I missed. But the -- but based on the discussion, it seems like everybody is saying you ought to be going with a higher uncertainty factor for a whole range of different reasons.

I mean, are you guys convinced of that, or do you think the arguments you were making earlier that there

might be some countervailing effects or that you're already dealing with a sensitive subpopulation you would argue to stay with what you want. Because, I mean, this is a really important point.

But everybody who's spoken to this issue has said you need the higher uncertainty factor.

DR. SALMON: Yeah, I mean, I think our initial consideration was that we certainly thought that it was plausible that the uncertainty might need to be considered as being larger than default. And we -- I guess, we're going to need to rethink that decision. I don't know.

DR. MARTY: So this is Melanie Marty. We did have a lot of discussion about this uncertainty factor internally. Overall, we were comfortable with 30, and I think I'm still comfortable with 30. The population that Lan studies had actually more women than men, which is unusual in an Occ study, but it did. It was -- they were Chinese, so they had a already more susceptible -- or higher frequency of people who would produce more of the toxic metabolites than other -- than the general public in California anyway.

DR. COLLINS: And those women don't smoke or drink.

DR. MARTY: Exactly. The women were non-smokers generally. So given all of that, we felt that a factor of

30 for intraspecies variability was sufficient.

PANEL MEMBER RITZ: Well, from my smoking evaluations in California, we have a large immigrant Hispanic population that's also non-smoking. They have a lot more fatty tissue than the Chinese women, and they have a lot of Asian genotypes, because that's what makes them Hispanic.

DR. MARTY: So they would, in our view, be covered. By using the Chinese population, there was a large group of women in there.

PANEL MEMBER BLANC: I think you're obliged to do some kind of mathematical calculation that would show you how much you think you've overestimated the effect, because of -- because what you're arguing is that the slope that you've seen would be different if this was a Caucasian population or something, and that you have an inherent safety factor built in.

And I'm not sure that I buy that mathematically, and I think you should do some Monte Carlo modeling or something where you change the percentage of the purported genetic subtypes in the population, as well as -- it also doesn't address really Dr. Ritz's comment about the other genes that you don't know about, but if this is an area -- obviously, that's a generic question with any substance, I suppose.

And one of the challenges that you faced here, which I'm sensitive too, is that you actually have too much data, in a way. You know, a lot of times, we'd never come up with a lot of stuff, because we have so little data. Here, you have this incredible richness of data, which raises more questions. And so you've done due diligence and have gone back to this topic, you know, looking at the new data.

But, you know, bearing that in mind, I think that this is a chemical for which there is complicated metabolism, and there are two principal pathways, which may have different endpoints, and, you know, there's going to be effects at lower levels that may supervene and so forth.

But all of those things do put the burden, I think, on the document, to the extent that it wants to back away from a somewhat larger uncertainty factor. We're not saying it should, you know, throw in another 10 -- factor of 10 for, you know, other uncertainties, but it just -- it's just a little too glib for me.

So when we re-review this document at our next meeting, either there needs to be a much more solid defense of what you're doing, in terms of uncertainty or you need to go up to 20 for the -- within -- or if you want to fudge a little bit, you can say, well, there's

both that and there's the issue of obesity, and it's pharmacodynamic effects and therefore -- although, we're not going to specify which is contributing to the uncertainty factor here -- our total uncertainty factor.

PANEL MEMBER BUCKPITT: I think maybe one of my concerns, and you pointed it out here quite well, and it's exactly what we talked about with the butadiene issue, and that is the efficiency of metabolism. That, to me, is one of the key issues, as you go down in concentration, you continue to produce really high concentrations of metabolites in relationship to that dose. In other words, it doesn't drop with the dose. It stays pretty stable.

And you've pointed out all of the good literature in that regard. So I think maybe that would justify a lower or a higher uncertainty factor, because we don't know what those effects are going to be at lower concentrations.

DR. MARTY: To some extent, that's incorporated into the data you have, because the data go all the way out to 30 ppm, so -- and you can see it flattens out.

PANEL MEMBER BUCKPITT: It sure does.

DR. MARTY: So that steepness early on in the dose response load is because of this issue, at least partially.

PANEL MEMBER BUCKPITT: Yeah.

CHAIRPERSON KLEINMAN: One of the things that I noticed when looking at the curve is it's got a semi-logarithmic sort of shape to it. So even though it appears to flatten out, if you plot it semi-logarithmically, it really is a monotonic log linear curve. And I think it does lend itself to a better estimate of what the uncertainties might really be, because you do have the error terms built into that.

So I would defer to Stan about -- you know, in terms of the statistics on this, but I think that there may be a better statistical model that could be used to get a handle on the uncertainty.

PANEL MEMBER GLANTZ: Well, I think that's a different question. I think what we're talking -- what we're talking about here is the uncertainty due to the biology, rather than the statistical uncertainty of the fit. And I think the benchmark model and taking the lower confidence bound, that's built into what they did. So -- I mean, maybe I'm not understanding something, but I don't really think the issues that are being discussed now relate to the model itself. They relate to, you know, how, given the population they used to get the data from to do the fit, you know, how -- you know, what safety factors or uncertainty factors you need to include, so that you can say this is applying to a susceptible

population in California? So those really -- I don't think those relate to the fit or the shape of the curve.

DR. SALMON: I mean, parenthetically, I think it should be pointed out that the thinking behind the benchmark dose modeling approach explicitly doesn't assume that the model chosen has any particular significance, in terms of the biology that's going on. It is chosen and defined as, you know, an arbitrary model to fit the data statistically. It's not intended to provide an indicator of mechanism.

But I agree with you, in saying that there are substantial uncertainties around the biological factors. And, of course, it's also somewhat distressing that it seems particularly, in this case, the more biology we learn about benzene, the more -- the uncertainty appears to increase rather than decrease.

And I suppose there's a sense in which we need to be cautious about getting, you know, sent overboard by that apparent increase in uncertainty, because at some level we need to have this reference exposure level to be comparable in its derivation to others.

And, you know, perhaps then this is saying that all of our RELs incorporate uncertainties that we are not fully aware of, but we -- certainly, in this case, we do get the opportunity to think about them in a little bit

more detail.

PANEL MEMBER HAMMOND: Are you saying -- Kathy Hammond. Are you saying we have more certainty about the uncertainties here?

(Laughter.)

DR. SALMON: Well, I hope that's what is being said. I hope that's what I was saying.

(Laughter.)

PANEL MEMBER GLANTZ: Yeah, I mean, I think -- I mean, as I recall, I think I was the lead on the methodology document, where -- and we spent, for those of you who haven't been on the panel forever. I mean, we spent a lot of time talking about these default uncertainty factors, but -- which I'm comfortable with.

But I do think, based on listening to the discussion, and the -- this is the -- the whole point of the defaults is they're defaults, when you don't have additional information that pushes you away from the default in one direction or another.

And it sounds like it would make sense to go with a higher uncertainty factor. I mean, basically from a statistical point of view, you fit the model and try to come up with, based on the population that you use to get the model, with what would be a health protective exposure.

So that comes out of the graph and the benchmark dose. But then the question is, given who you use to derive that number, how should that be further adjusted to take care of the biological issues? I mean, here we have human data, but sometimes there's interspecies issues that have to be added in.

But it seems like, as Kathy said, that we have more certainty about the uncertainty, and so it may be that you should do the things Paul is suggesting and go to the higher number, absent a good argument not to. And frankly, what I've heard they're saying is there's some unspecified things that might push it in the other direction. For everything I've heard that's been concrete has been supporting using the bigger uncertainty factor. And everything I've heard about why you shouldn't increase it has been sort of vague. I mean, unless I'm missing something.

And I think the comments from the other Panel members are quite specific, in terms of the justifications that they were giving for going with a bigger number.

DR. SALMON: Yeah. Well, we'll obviously have to think about how we can -- how we can handle that. I mean, there's a difficulty in -- you know, if we were to decide to try and do some kind of a statistical analysis, based on the supposed difference between the subject and target

populations. That, to some extent, flies against the logic, regardless of who you think the target population is, we should be protecting any sensitive members within that population.

PANEL MEMBER GLANTZ: Well, no, and I --

PANEL MEMBER BLANC: I agree with that. I wasn't really rooting for such an analysis. I was just saying if you're going to make the argument, you better --

DR. SALMON: Yeah. Well, I think we have evidently to make that argument.

PANEL MEMBER GLANTZ: Well, or but actually I almost jumped in when that got suggested, because I mean you do say in the document that you're talking about sensitive subgroups, and so -- which sort of got back to the point I raised at the very beginning, when people pointed out that there's Chinese people in California and they're a sensitive subgroup. And so that would argue against doing the kind of simulation that was being talked about.

So I think the real issue is just the one that's been on the table, and that is should you be using a larger uncertainty factor based on what we know about the biology? You know, rather than coming up -- because you're not trying to get an estimate of the uncertainty factor for an average Californian. You're talking about

sensitive subpopulations.

DR. SALMON: Yeah. Yes, I think that is a very significant point that it's written into our guidelines somewhere I'm sure. I'm sure you made sure we add it in.

(Laughter.)

PANEL MEMBER BLANC: So coming back to the acute REL study and the endpoint issue. I don't have a fundamental problem of any kind with the choice of the endpoint that you used in that study, and I don't -- I think you're correct in responding essentially to the critique that, well, who knows what this abnormal observation means. I think you could have been perhaps more convincing in the response to that critique, but that -- I mean fundamentally you have a toxin where you believe that the target -- we have every reason to believe that the target organ is the bone marrow, and you're looking at a parameter of hematologic development.

So that, to me, in the health protective sense, you know, seems like a completely reasonable thing to do, and because you're part of this whole exercise is related to the question of are there sensitive subpopulations based on age?

And this is a study of fetal and young offspring exposure, it seems to me that it's a reasonable study to use. And you -- I think, I believe you talk about what --

you know, this is a different study than you used before and why you used it.

So I didn't find a particular problem. I do think that a generic comment on the document is that you should go back and look at the words that you use, the terms that you use, in terms of what hematologic parameter is being affected or -- you use words like hematotoxic, because some of your articles use that, but I'm not sure -- I'm not sure actually you're completely consistent in how you use those terms, and I'm not sure whether you would -- that the document would benefit from at least defining how you are going to choose to use these terms, because it's -- it is a confusing area, and I think it's not helped along by some vagueness.

You may have, as an oncologist, have even more of a thought on that. But I thought there were times where I wasn't sure you weren't meaning necessarily an effect on the red blood cell line, you were meaning at times a general bone marrow effect. And sometimes you were talking about erythropoiesis, but you didn't necessarily say erythropoiesis.

So just make sure you take a second look. Somebody should just look at it carefully and make sure that you're always consistent in what you mean. And, for example, even in the key table, since it's the table the

you're basing your thing on, there's no footer that it really explains to me what is an early nucleated red cell as oppose to a late nucleated red cell. And in the methods of the paper as their described, it wasn't --

DR. COLLINS: There's hemoglobin in the late one, but not in the early one.

DR. MARTY: I think the point is we need to define it more.

DR. SALMON: We need to say that in the document.

PANEL MEMBER BLANC: And then were various points actually in which you correctly reported something that seemed to be contradictory or inconsistent with expectation, but then there wasn't any like so how do you explain that, you know, or any kind of editorial comments. There were times when things were just sort of there, and I would make a question mark, so why, or, you know, whatever. That's a more -- that's sort of a generic thing, but I think -- I know you're not supposed to be writing a, you know, necessarily critical review, but there are times when it's just -- you're just summarizing a bunch of studies and it's very hard to know why did you -- why are you making a big deal about this particular study or not in a sense -- if that makes sense? But I don't have a fundamental problem with using the endpoint you used or the study that you used.

PANEL MEMBER RITZ: I have one comment on the acute reference level. When I looked at this list about the exposure of the Keller and Snyder, it says 10 days, day 6 to 15 in gestation. And the way it reads, it's almost like, okay, you have 6 hours per day for 10 days exposure, but actually 6 to 15 day of gestation in a mouse covers a lot of different developmental stages. So what of that is actually the acute one. It's probably not the duration, it's just that you hit a certain window, so you shouldn't probably say it's a 10-day duration that affects this.

DR. SALMON: One of the things which we went into in our guidelines was that for this kind of developmental study, we weren't going to scale the exposure, you know, following, you know, Haber's law or some derivative, which is what we would ordinarily do for non-developmental type toxicity. We specifically do say that the developmental limits we're looking them at -- looking at them as not-to-exceed concentration type of levels for developing an acute REL precisely for this reason. So to that extent, we are agreeing with you, yes.

PANEL MEMBER BLANC: I have another endpoint issue, which may cross over. I realize this is a non-cancer endpoint REL, so you're not talking about leukemia, although you allude, at a couple places, to

studies that touched on cancer outcomes.

This may be a question for Jesús, I don't know. But in thinking about that, is myelodysplasia, as far as you're concerned, because it's a pre-cancerous condition in a certain sense, are you excluding that from consideration as a -- in your review of the literature? I don't think there's going to be a study for you to use as a derivative study. I mean --

DR. COLLINS: We didn't Intentionally exclude it, but I sort of think of it as a pre-cancerous thing, but...

DR. SALMON: Yeah, I mean, I think that we have historically recognized dysplasia as not being the same as actually neoplasia. So we have -- you know, in principle, it's admissible as an endpoint for developing these RELs. But I don't think that we -- I don't think we found a study that used that -- you know, used that definition that was appropriate to base this -- you know, this study which is measuring more, you know, smaller scale --

PANEL MEMBER BLANC: No. This was a more generic question about endpoints that would cross over just in terms of --

DR. SALMON: Just, in general, dysplasia -- we would recognize dysplasia as a non-cancer endpoint, yes.

PANEL MEMBER BLANC: Jesús, any --

PANEL MEMBER ARAUJO: You know, I am actually a

cardiologist, not an oncologist.

PANEL MEMBER BLANCH: Oh, that's right. I'm sorry. You're right.

PANEL MEMBER ARAUJO: So you actually know more about cancer than I do.

PANEL MEMBER BLANC: Who is our -- don't we have an oncologist though? Who's our oncologist person, because -- isn't there a seat that's in oncology?

DR. COLLINS: Who wants it?

PANEL MEMBER BLANC: Anyway. But you're a doctor, so what do you say?

PANEL MEMBER ARAUJO: I agree with you, yeah.

DR. SALMON: I mean, at some level, there's an arbitrary cut point and --

PANEL MEMBER ARAUJO: From what I understand, and how we usually use it. So myelodysplasia is not really a cancerous entity. But you can talk about these plastic cells that are cured within cancer. And then you talk about the level of dysplasia, a percentage of cells that have showed dysplastic features.

And in that regard -- so that dose-related cancer is I guess it is really, you know, in the context how it is used, but as an entity it's not really cancer.

PANEL MEMBER BLANC: So that being said, I think that you should have a few sentences somewhere in your

literature review that talk about it. And I'll pass on to you and abstract of a recent study actually by the Schnatter group, the Exxon group, which talks about myelodysplastic syndrome as a more sensitive endpoint for low level exposure than leukemia. Now, they have their own reasons for saying that, but nonetheless it's an interesting -- it's an interesting thing worth -- and since it's -- it's recent enough that I can understand why it's not in your review.

But I think it's worth commenting on it, because it got a little blurry there where you're talking about aplastic anemia and other things.

PANEL MEMBER RITZ: Since I'm knew, can I ask a question? So I just heard from Paul that you're not supposed to write a critical review, but -- because when I was reading it, I had the same kind of feeling that you had, that there were studies just very nicely reviewed, but then there wasn't one or two sentences saying why this is a strong or weak study, which I would have liked. So I had to kind of make it up myself, which I can, because I'm an epidemiologist, at least for the human studies, but I think a reader wouldn't be so that -- who is not an epidemiologist and knows the literature.

And therefore, sometimes larger studies seem much more impressive. And there was especially one where they

didn't see any effects, and you wonder why that wasn't a study that got more weight in this argument. And, of course, I know they probably didn't have as good an exposure assessment or -- you know, there's a lot of misclassification of exposure from what I was reading. So maybe some statements in that direction would actually be helpful.

PANEL MEMBER GILL: So one of the questions they asked is, which of the studies are better, Lan or Schnatter? And what's your view on that?

PANEL MEMBER RITZ: Yeah, Schnatter was -- that was the big one from Collins, right?

DR. COLLINS: No, no, no. Schnatter was.

PANEL MEMBER RITZ: Schnatter.

DR. COLLINS: No, she's thinking -- you're thinking of Swaen. No, Schnatter is the industry study from China that was suggested by the commenter.

PANEL MEMBER GILL: And the other one is the Lan study, which is actually from the Berkeley group.

PANEL MEMBER RITZ: Yes.

PANEL MEMBER GILL: So which do you think was a better one? I have my own assessment, but I'd like to -- since you are and epidemiologist, I'm not --

PANEL MEMBER RITZ: Yeah. I actually have to go back to that one. That one I didn't find as impressive.

PANEL MEMBER GILL: Which one?
PANEL MEMBER RITZ: The Chinese one, the non-Berkeley one.
PANEL MEMBER GILL: They're both Chinese.
PANEL MEMBER RITZ: Yeah. Yeah, I know. The non-Berkeley one. What's it called?
DR. COLLINS: Schnatter.
PANEL MEMBER RITZ: Schnatter. Yeah. Exactly.
PANEL MEMBER GILL: Actually, when I read the papers, I had to go back. That's the only what I can do that. Actually, to me, the Lan study is actually much superior. And although, there's already -- there's only one table, the table is very extensive. And the endpoints they use are actually much more precise, to a large extent. And as a response that you gave to the external review, I think you were weak in your response, because I think if you had been more -- if you look at the original paper itself, is actually -- the differences between the B cells and the other cells, the T cells and others, are actually much more pronounced, even than -- because you selectively took some data, which is a bit less than the data that is in the original publication.
But your analysis is correct, it's a much -- in my view, it's a much better study. Although I'm not an expert in epidemiology, but from a science point of view,

it looks better.

PANEL MEMBER ARAUJO: But the point that Beate raises is whether they have to go and disclose and other reasons why the other sides are not good in the document, and -- or it is something that could just be disclosed in the response to the commentators, as opposed to perhaps just mentioning like the strengths of the study that they are choosing and just focus on that. Because otherwise -- and this is just going to be really tough, like for future documents, if you have to go and explain and justify why you're choosing one and justify why you didn't choose the other 19 that have been published. So it would make all the future documents really, really tough, I would say.

DR. MARTY: Let me just add something into the discussion. That when we do a toxic air contaminant identification document, we're going through the whole process, hazard identification, dose response assessment, exposure assessment, and we get into lots more details on those documents, and they're huge.

These reference exposure level documents, you know, we already know that it's a toxic chemical. In the case of benzene, we already know that the flood formation is the target.

So we don't go into a lot of detail except on the studies that we think are relevant to deriving the

reference exposure level, so they're relevant to the dose responses assessment. So that's one reason why somebody like Beate looks at this and goes, wow, I would have put a lot more studies in here, or I would have described more.

So we've tried to be better about saying why we chose the studies we chose as the basis of the reference exposure level, but we probably could improve that, for sure.

PANEL MEMBER GILL: But you see the assessment I'm making is not assessment you have to make. The assessment you have to make is to justify why you used Lan, and not another. You asked the question, that's why I wanted to know whether there's a point of view for the other Panel members which is better.

For me, one of the things -- difference was the subcategorization of the cell types, where they had particular cell markers was very critical. Whereas, the other study was actually just actually more observational without any cell markers actually identified. So there are very precise cell markers. The precise cell marker is then is very easy to say, okay, this is the cell marker we are looking at, and therefore you are more assured of what you're looking at is correct.

Whereas, if you just say it's a neutrophil or the subcategories and actually it's not as precise as when you

say it's CD4 plus, or CD8 plus, or natural cell, I think there's a much better characterization, as far as I can see from that, but I think that has to be gone further as to compare the two studies as such. I'm not an epidemiologist, but I think that needs to be evaluated as such.

PANEL MEMBER RITZ: Well, I wasn't asking for a comprehensive review, but you probably need to say that in the beginning that this isn't supposed to be a comprehensive review of all studies, and what the purpose is.

DR. COLLINS: I think we do say that.

PANEL MEMBER RITZ: Well, do you say it clearly?

(Laughter.)

DR. COLLINS: This review includes relevant material published through July 2013, is an integral view of those studies specifically applicable to developing non-cancer acute 8-hour and chronic inhalation RELs for benzene.

PANEL MEMBER BLANC: Yeah, let me just clarify I think what Dr. Ritz was really implying, which is just that there are some places where a two or three sentence summary would help considerably. So I don't think anybody is asking for pie in the sky, just there are certain places. And also, if you present something, which is

inherently contradictory to what you've just been arguing or a study, which then you -- you're obliged to have a sentence that says, you know, this, you know, had different findings and can't be explained or it is likely to be related to such. That's all.

So, I mean, we're not talking about pages and pages of text, but just here and there, you know -- and I think you probably know where those places are, better than we do from what you did.

I have one other comment, since the topic of all of the endpoint for the chronic came up and the choosing the B cell subset. I think the point is very well taken that you make -- I think it's in the document, not just in the responses, that all of the cell lines were responding.

So it's not that, you know, you -- it wasn't a multiple testing issue, you know, that was a consistent effect. I think it could be said -- the implication is that you cherry picked, but that's not actually correct, since all the cell lines were down, and I think there might be a way of saying that more explicitly.

But I also wonder if it would support the argument of what you did choose, when -- you make the argument that the other study has just total white cells, and that comes up with a -- if you do the math, it comes up with a value of 11 parts per billion or something. Am

I getting that right, or whatever it is?

I think that if you said what -- if you used exactly the same approach to the B cells that you used for the total white count for the study that you -- the Lan study, would you come up with 11 parts per billion too, because that would support then choosing the more sensitive -- you know, you'd say it's consistent with Schnatter. I mean, I don't know, maybe that doesn't make sense to do, but I just -- is what occurred to me as I read it, you know, what would happen? You know, therefore is it -- are you in line or would you be somewhere in between? Is it consistent? And you've done that in other documents where you've sort of done a mind experiment, and you've said, okay, but we're not suggesting we should use this endpoint, but were we to use, this is what we would...

DR. COLLINS: And you mean like all seven cell types in the end?

PANEL MEMBER BLANC: No, no. You're saying the other study doesn't have sub -- it only has total white cells.

DR. COLLINS: Right.

PANEL MEMBER BLANC: So what happens if you use the total white cell value from the Lan study?

DR. COLLINS: Oh, okay. Yeah, yeah, yeah.

No, that's using the LOAEL NOAEL things. That's using a LOAEL. I gotcha.

PANEL MEMBER BLANC: Yeah, and the same benchmark approach.

CHAIRPERSON KLEINMAN: I think it's also safe to say when you look at the white blood cell data from the Lan report versus the B cells, the B cells have a more monotonic relationship. And if you use the white blood cells, you would have a flatter dose response curve. Therefore, the B cells are much more -- not much more, but more sensitive as an endpoint indicator.

DR. COLLINS: There were at least three cell types that had a monotonic, platelets, B cells, and the C cells, I believe.

CHAIRPERSON KLEINMAN: Right. So I think that, you know, that kind of justification could be added to the text as well.

Other comments?

PANEL MEMBER BLANC: I think I have a few other comments, which I could just give you, you know, some notes that I've made on the text. But I did think one thing that became murky for me, understandably most of the literature focuses on the quinone pathway, but looking at Figure 4.1, it comes up several times in other places about the muconaldehyde pathway. And in the final

analysis, I was left confused as to whether I should think about that or I shouldn't think about that, or does that matter for -- is that some rodent-specific thing that has no human relationship?

Because then there was the description of the study, which had most potent inhibitor of red blood cell production was a mixture of hydroquinone and TT muconaldehyde, 50 to 1. So 1/50 of the hydroquinone of the muconaldehyde, but that's a different pathway, right? That's not the pathway you talk about.

So I read that and then I thought well what does that mean? Am I supposed to then be thinking about this other pathway too and the genetic variability?

DR. COLLINS: Maybe there's not data on that pathway. The data is on the other pathway for genetic variability. I don't know. There may be differences to muconaldehyde pathway. I don't remember seeing it. We sort of --

PANEL MEMBER BLANC: But you see what I'm saying about why -- that's an example. That's a good example of you throw something out there and I read it. And I say, "Oh, my God. That must be important", because it's not -- and then it's like it never appears again. Well, that little pathway appears, but -- I don't know. Did anybody else have that take on it? Maybe I just misunderstood it.

I don't know.

PANEL MEMBER GILL: No. Actually, I looked at the metabolic pathway that -- it's a bit dated, I would say. You know, it may be good to update all the pathways that are involved in what you describe in the description. But in the figure it is actually just taken out as a figure from 1992 document. I think it would be nice to either self-generate one or get one which has all the pathways involved in metabolism.

PANEL MEMBER BUCKPITT: Rappaport has one in his recent chem bio interactions paper. It's pretty complete.

DR. COLLINS: Thank you.

PANEL MEMBER BLANC: Just another general comment. And this came through even in the slide show, I mean, yes, benzene is a solvent, but most of the exposure doesn't occur in its -- it has solvent properties, but it's a naturally occurring molecule that's present in petroleum. And so most of the exposure, or much of the exposure, is either through its intentional use as a chemical intermediate and synthesis not as a solvent or because it is an inherent contaminant in petroleum feed stock and petroleum in commercial use, right? Isn't that -- leaving the cigarette thing aside, but it's not because all that much people -- or it's a contaminant of other solvents, but not because people are that much,

certainly not in the United States, using benzene as a solvent.

DR. MARTY: In the U.S.

PANEL MEMBER HAMMOND: I think that's an important distinction, in the U.S., because an awful lot of the data -- I think the Chinese data is where it's being used as a solvent.

PANEL MEMBER BLANC: Yeah, but their -- in their introductory -- they're talking about what is what matters in California --

PANEL MEMBER HAMMOND: In the United States.

PANEL MEMBER BLANC: In California, where are people?

PANEL MEMBER HAMMOND: Yeah, in California, I think it's absolutely true. You're right, that's where it's more important. But I do think that the -- most of the data we have, upon which this is based, is occupational data that does use benzene as a solvent. So I don't think that's inappropriate to say that.

PANEL MEMBER BLANC: Oh, I don't think they should not say that benzene is used as a solvent, but I that to say benzene is a solvent is --

PANEL MEMBER HAMMOND: But say in California, the most frequent sources of exposure are.

DR. MARTY: And we could just amend that first

paragraph on page three. I mean, we say benzene is emitted in large quantities from oil refineries and petroleum storage facilities. And that's the major source of exposure for the general public in California.

PANEL MEMBER BLANC: And just where you, you know -- and on the Air Resources Board data you have these data from the Bay Area Air Quality Management District, which has maximum and minimum average. I'm assuming that's an arithmetic average, although you don't actually say that.

And then the southern California stuff is the mean and standard deviation. And it's like are you kidding me? I mean, what I want to know is what's the 90th percentile?

PANEL MEMBER HAMMOND: The maximum.

PANEL MEMBER BLANC: Or the maximum if you can't get it. So this was something that was on their website. Can't they give you the data? I mean,

DR. COLLINS: We can ask.

PANEL MEMBER BLANC: Anyway, I don't think -- I don't think you should present it in this way.

PANEL MEMBER HAMMOND: I had exactly the same comment.

Sorry. I had exactly the same comment as Paul, that it is really important, if we're talking about acute

RELs, that we be talking about what are the maximum. I think if we were talking, you know, lifetime exposures, the average would have a meaning. But here, we really need the maximum. And I think there's several other kinds of information that needs to be given. I understand it may not be available, but I think it needs to be identified that it's missing.

So these -- this doesn't even say what the averaging time is. I'm going to guess it's 24 hours for the sampling, but we should include what the averaging time is. But the RELs are based on 6 and 8 hours. So those might actually be different, and those might be extremely important. Absolutely, I think the maxima need to be listed. We need to find those.

DR. COLLINS: From The South Coast.

DR. MARTY: That was from the MATES Study.

PANEL MEMBER HAMMOND: Yeah, I'm on page six. Page five does have the maxima values for the Bay Area. And I noticed that several of them are above 1 ppb, which certainly is a relevant -- and these were not necessarily designed to sample the hot spots for benzene. So I think that also needs to be noted.

Now, I'm not clear on Table 3.3 on the micro scale samples, if those were designed to sample hot spots for benzene?

DR. COLLINS: Not necessarily benzene.

PANEL MEMBER HAMMOND: It's anything.

PANEL MEMBER HAMMOND: No, I understand. And so I think -- I think to interpret tables like this, we need to know the maximum. We need to know the sampling time, and we should know, if something is purportedly where there is a high value, there's a source, we need to know is this the high source for benzene?

So there are many other toxic hot spots for other chemicals. And if it's designed to do 3,4,5-trimethyl-chickenwire, you know, and not benzene, then its benzene value doesn't inform us. Certainly, if some of these are near what we think are the major hot spots for benzene, such as a refinery, that should be pulled out and identified as such.

So I think in order to understand what we are, but I think even looking at Table 3.1, where we do have some maxima, and these were not designed to be sampling those hot spots, and they probably are more than 8 hours, that the time period of the RELs, all of those things lead one to some concern.

And I think that needs to be spelled out a little more. It's really an interpretation of the tables and what the data are there. And I understand that Tables 3.2 and 3.3 came from a website, but the underlying data, when

there are hundreds of samples, do exist and should be accessible to you.

DR. COLLINS: Very good.

PANEL MEMBER HAMMOND: But thank you. I mean, I think it's great to get this.

CHAIRPERSON KLEINMAN: But on that point, MATES 4 is now completed, and so there may be, you know, additional data that you can include.

PANEL MEMBER HAMMOND: And perhaps an explanation of MATES, what MATES is, what it's intended to be sampling, in the document, I mean.

PANEL MEMBER RITZ: Since we are at these tables, can I make one more point?

So it took me awhile to figure out what Table 3.3 really means. And I think it's because I was having a hard time finding which of those stations should be looked at together, fixed and micro scale. It might help if you delineate that a little more easily. It's clear after, you know, you study this for a while, but the reader would have --

PANEL MEMBER HAMMOND: Dotted lines.

PANEL MEMBER RITZ: Yeah, something.

PANEL MEMBER BLANC: I had mentioned earlier -- this is on the -- back to the topic of making sure you're really careful about your language and consistent, but if

you look at the opening paragraph of the introduction to chronic toxicity to adult humans.

PANEL MEMBER HAMMOND: What page?

PANEL MEMBER BLANC: Page 17. So that's another example where you say hematotoxicity, and I guess you mean bone marrow effects, but -- or stem cell effects or whatever, but if you want to use the word hematotoxicity throughout, okay, but that's your choice. But the next sentence hematologic lesions in the bone marrow can lead to peripheral lymphopenia and/or pancytopenia.

Well, it's -- you can't have lymphopenia and pancytopenia, so it's or, if that's what you mean. I mean just little things like that are jarring, but it's -- I would just -- I mean, I would maybe have some -- if you have an internal medical editor that can help you with -- this is a highly medical kind of thing, but it's

DR. COLLINS: We could bend Craig Steinmaus's ear.

PANEL MEMBER BLANC: Yeah, I think Craig would be great to just -- things like bone marrow punctures revealed. I mean -- you mean, bone marrow biopsies. You mean, bone marrow aspirations. I mean, I don't know what a bone marrow puncture is. Maybe that's a British term or something, but in America, we wouldn't talk like that.

(Laughter.)

DR. MARTY: Andy, are you responsible for that term?

DR. SALMON: No, I'm deny all knowledge of that term.

(Laughter.)

PANEL MEMBER BLANC: And I think this is place where, by the way, if you're going to talk about myelodysplasia, you should talk about that. And I wouldn't -- I would not say severe benzene exposures can also lead to aplastic anemia. I'd just say benzene exposure can also lead to aplastic anemia. It doesn't -- I don't know what you mean by severe. I mean, over the exposure limit or -- I don't what you mean, but I wouldn't -- because basically you're saying, unless it's severe, you couldn't possibly have aplastic anemia, which isn't correct at all.

DR. SALMON: Well, possibly that if it cause aplastic anemia, then by definition it's severe.

(Laughter.)

PANEL MEMBER BLANC: Yeah. So that's just -- I'm just harping on that, because I think it's a -- to me, it was a clear example of a, you know...

PANEL MEMBER RITZ: In the same vein, I had stumbled over on page 7 the second paragraph about metabolism, because it kind of goes back and forth between

benzene being absorbed and neurotoxic, and then its metabolites. And if we talk about inhalation as the main route, then there's a lot of non-metabolized benzene that could reach the brain, and therefore be neurotoxic. But the whole paragraph is kind of as if benzene is mostly metabolized before it gets anywhere else, which I think we need to clarify.

And it's very lipophilic, so it definitely goes in the brain.

PANEL MEMBER BLANC: Have Craig, by the way, look at that section on -- the little brief section that's on people who died from, you know, basically respiratory depression or CNS depression, I should say, because it's -- you talk about, you know, they died from anesthesia. Well, they didn't die from the anesthetic effects, they died because they stopped breathing, I assume.

I think -- by the way, I think that's probably more important than cardiac dysrhythmia. But you say something about cardiac failure, which is not the right term either. If you mean that it's -- you talk about it's sensitizing the myocardium to catecholamines, which is true. Although, certainly the chlorinated solvents are more potent sensitizers. But I would suspect that people die from respiratory depression, from CNS depression and

respiratory depression, in -- the people who go down into the tank, you know, the closed space events.

PANEL MEMBER ARAUJO: Where was that?

PANEL MEMBER BLANC: It was in the beginning of the acute section, I think. I mean, you know it is worth noting that apropos of a non-cancer health effect, the aplastic anemia of benzene, you know, was recognized 10 years after the introduction of benzene as a commercial solvent, and it took another 40 years for leukemia to be accepted, even though sporadically it was reported maybe 30 years after.

But, you know, we've dealt with the non-cancer severe health effects of benzene for a lot longer, in terms of medical recognition, for what it's worth.

CHAIRPERSON KLEINMAN: One other issue on the chronic study, the Lan study, when you look at the control population, and you look at their exposure, they're exposed to a much higher baseline level, or a higher baseline level. They don't really quantitate it, but they say it's less than 40 ppb, which is considerably above our baseline levels.

But I think that that would tend to reduce the overall sensitivity of the analysis. And again, it goes in the direction of arguing for a larger uncertainty factor in --

PANEL MEMBER HAMMOND: It would certainly underestimate the effect that is there. So the fact that they do see an effect is more sustained and the effect is probably greater than that's reported following that, yes.

CHAIRPERSON KLEINMAN: But I think it would be useful to, you know, put that into the discussion, you know, as you're going along.

PANEL MEMBER BLANC: So what else do you need from us before you go back to work on some serious revisions of this?

DR. MARTY: I guess we should have a comment on our recommendation to add it to the list of toxic air contaminants that disproportionately impact children and whether the Panel views that as appropriate.

PANEL MEMBER BLANC: Yes.

DR. COLLINS: Is that a motion?

CHAIRPERSON KLEINMAN: I'd like to hear from the other Panel members on that.

PANEL MEMBER GLANTZ: Well, I think, yes the answer to the question about disproportionate affect on kids. I was just looking at your charge questions, and I thought, just for the record, I do think the approach to characterizing the dose response relationship was fine, and that the choice they used for the LOAEL was appropriate. So just since you asked, nobody has talked

about it.

I mean, the question I would raise, I think that there have been lots -- and if anybody disagrees, feel free. But I think there have been a lot of suggestions for editorial changes to improve the document, but none of them, except for this question of the uncertainty factor, are substantive in terms of the bottom line of the report.

And so if people agree with that, we, the Panel, has a tradition of tentatively accepting a report, subject to making the editorial changes that are in the record, and then having the Chair, and in consultation with the appropriate members, approve it.

But I do think the substantive issue is the uncertainty factor. And, I mean, my -- again, my sense of the discussion from the panel is that people -- everybody was saying it should be bigger. And so I guess a question I have for OEHHA is, is that something that you think can be resolved today or maybe if we break for lunch and they go think about it or no? And if not, then we'll have to come back.

PANEL MEMBER BLANC: I would not feel comfortable. There's enough. I think this is one situation -- Dr. Kleinman is new in the Chair position. We don't have leads assigned to this document.

PANEL MEMBER GLANTZ: Oh, we don't?

PANEL MEMBER BLANC: No. And in all fairness, it's not -- you know it shouldn't be a carrot and stick approach, where if you -- we badger you to say yes, we'll approve it now.

(Laughter.)

PANEL MEMBER GLANTZ: Oh, no, I'm not thinking of it as a carrot and stick approach. You've been remarkably restrained actually.

(Laughter.)

PANEL MEMBER GLANTZ: But I mean, I'm just asking the question.

PANEL MEMBER BLANC: So I would not agree with that.

PANEL MEMBER GLANTZ: Well, then never mind. But I mean I do think that's the only substantive issue on the table of all the things.

DR. MARTY: Well, you know, I can say that we did go back and forth on that uncertainty factor a lot. And there are good arguments for making it bigger. In fact, I kind of -- the first time I saw it I wanted it bigger. Then the staff talked me out of it.

PANEL MEMBER GLANTZ: I guess have you been talked back into it?

DR. MARTY: I've been talked back into it.

(Laughter.)

PANEL MEMBER BUCKPITT: Can I make one more comment that might help you with that uncertainty factor? You know, 2E1 is really susceptible to alcohol. So for people like me, you want to protect me from benzene. Okay.

PANEL MEMBER BLANC: Because? Would you be more explicit? That's

PANEL MEMBER GILL: Because he drinks wine all the time.

DR. COLLINS: He goes to the pub in Davis.

PANEL MEMBER BUCKPITT: I like my wine at night, Paul.

PANEL MEMBER BLANC: But on the same vein, I don't know the list of prescription medications that may also come into play there, and what their relative density of use is in the population. Do you know?

PANEL MEMBER BUCKPITT: It's actually mostly solvents that affect cytochrome P450 2E1. They essentially decrease the degradation. So it's things like purity of these. Can we get into that? The big one is alcohol. So I suppose cough syrup.

PANEL MEMBER RITZ: Yeah. And they do mention toluene in many places. But that's the --

PANEL MEMBER BUCKPITT: But that's an inhibitor.

PANEL MEMBER RITZ: Yes.

PANEL MEMBER BUCKPITT: That's a competitive inhibitor.

PANEL MEMBER RITZ: Yes, right.

PANEL MEMBER BLANC: And also in terms of your arguments for uncertainty, what is -- there is data on B cell subsets in the key paper, correct? Is that right, CD4?

PANEL MEMBER RITZ: Yes.

PANEL MEMBER BLANC: Is there a negative effect on CD4 in that paper?

PANEL MEMBER RITZ: Yes.

PANEL MEMBER BLANC: In what percentage of the population in California is HIV positive with impaired CD4 counts? To begin with, do you think that's an argument for --

DR. MARTY: Yes.

PANEL MEMBER BLANC: I would say specifically also, in terms of the yes for the childhood exposure. First of all, clearly, you use a key study for the acute REL, which is looking at that. So that, to me, is prima facie, but also there's a nice new paper -- I'll give you the abstract, so it's too recent to have been in your review, which compares the toxicity of the hydroquinone metabolite in hematopoietic stem cells derived from the embryonic yolk sac as opposed to the adult bone marrow

showing that the effect is stronger in the embryonic yolk sac.

And there may be others if you look specifically. So I'll give you that, but I don't -- I really don't think that's a vulnerability of your analysis.

CHAIRPERSON KLEINMAN: So on the point of is the evidence adequate to identify benzene as a contaminant that disproportionately impacts children's health?

I'm hearing a sentiment that we agree to that, but, you know, are there any -- you know --

PANEL MEMBER GILL: While I agree with that. There's only one study that I see here, that that's the Keller and Snyder study that is a justification for that on pregnant mice actually correct, female mice?

DR. MARTY: That's the study that we have in here that's the basis of the acute REL, but it's not the argument for why.

PANEL MEMBER GILL: So what's the argument for it?

DR. MARTY: Okay. So this goes back now to our -- in 2001 when we laid out reasons that toxic air contaminants might disproportionately impact kids.

So one of them is it -- and it's not related to the REL. It's a carcinogen. Okay, so we actually weight early life exposure to carcinogens, because they are --

the potency is greater early in life than it is when you're exposed later in life. So we have a bid document about that.

But one of the -- aside from the carcinogenicity, something that is toxic to blood forming cells -- to blood forming organs. It's -- our argument is it's going to be worse in a growing child than it is in an adult, because of the demands for basically hematopoiesis during growth. So that, in itself, to us is enough reason.

PANEL MEMBER GILL: No, I buy the argument. That's not of our concern. The concern is I see very little documentation in front of me that I can say, yes, that would be -- I would support that particular argument right now.

I mean, if I see the document in front of me, the only ones I see is that particular study, and then your suggestion that it be put as a substance under that -- for affecting infants or children.

DR. MARTY: So we have a couple of paragraphs on page 47 and 48 that describe benzene as a TAC, especially affecting infants and children. So, you know, we layout our general argument there, including that it's leukemogenic. And although people will argue that the occupation -- that the adult leukemias associated with benzene exposure in the workplace are different leukemias

than in children. You don't necessarily expect site to site concordance. We see that with other carcinogens, where the cancer induced by early life exposure is different than the cancer induced by later life exposure. So, I mean, we did -- we can add more in here.

PANEL MEMBER BLANC: I think the point being made is that, you know, you have these -- the generic arguments that you have, but since in this case you could marshal some more specific evidence, in addition, or to the extent that you can, you should do it, not -- that's not an argument that it's -- that you don't have sufficient grounds to say it affects.

For example, probably very quickly, you could ascertain whether the incidence of aplastic anemia is higher in children than in adults. I believe that it is, but that's -- I can't tell you for sure.

But let's say that were the case, then I would say this is something which causes aplastic anemia. We know that children have more aplastic anemia than adults. That's different than -- you know, that gets you off the sort of generic cancer argument, and it's quite relevant to benzene.

PANEL MEMBER HAMMOND: And I think to carry that further, you have, in the document earlier, evidence about pregnant mice and the effects, and the fact that, you

know, there is this effect on the different blood cell types. So I think that that just needs to be added to that, you know -- just -- it makes us stronger, so it's not just the cancer part, but because the RELs themselves are based on these others, and you have evidence that that's important for children.

PANEL MEMBER GILL: No, I'm not arguing against it. I'm just saying that the case for making that in this document is not evident to me.

DR. MARTY: Okay. So we need to flesh out that section. I mean -- you know, one of the obvious endpoints that we had in our 2001 document, if it's a developmental toxicant, it should get listed, and benzene is a developmental toxicant.

PANEL MEMBER HAMMOND: It comes back again.

CHAIRPERSON KLEINMAN: Yeah. And I think somewhere in one of your responses -- I don't remember exactly where -- you also speak to the issue that B cell formation is much greater in children than in adults.

DR. COLLINS: B cell?

CHAIRPERSON KLEINMAN: Yeah. And that would indicate that they might also -- if the B cells are targeted, then they would be also more sensitive possibly.

PANEL MEMBER BLANC: Well, if you can find any data on toxicity of benzene to the thymus, that's

obviously a developmental issue, because all that thymic stuff happens early in childhood, and then involutes. So I suppose -- I mean, I wouldn't -- I don't think anybody is suggesting you have five pages of new text here, right? We're --

DR. MARTY: Yeah, we could though.

(Laughter.)

PANEL MEMBER RITZ: So I'm a little bit confused by this chronic toxicity in infants and children and then finding the cancer effects there listed. Is it because they are blood cancers or --

DR. COLLINS: It's because we wanted to show that benzene probably has effects in children, but we don't have the data on noncancer effects. But it doesn't mean they're not affected, it's just there's not data on it.

PANEL MEMBER RITZ: Okay.

DR. COLLINS: So I think we tried to explain that at the beginning.

PANEL MEMBER GILL: The reason --

PANEL MEMBER HAMMOND: But I do think you have effects for animals, right?

DR. MARTY: Right.

PANEL MEMBER HAMMOND: So you could pull that in. I mean, not human children, but I mean, you do for animal offspring, so that again there's -- one would expect that

in humans. It just hasn't been studied.

PANEL MEMBER GILL: Melanie, I think the way that you want to say is you want to put this benzene as a toxic air contaminant affecting children, these are the reasons where you need to do A, B, C, D, whatever it is, and logically put through the panel of justifications and supporting arguments. Then I think it's easier to say, yeah, that's clear in that case, because here it is actually not precisely stated, and you have to go back to information prior. You are familiar with it but, I am not familiar with it, so it's become sort of difficult.

DR. MARTY: Good point.

CHAIRPERSON KLEINMAN: Just one other item that we hadn't really touched on, but just looking at the form of the acute REL. In the text it says a level at which infrequent 1-hour exposures are not expected to result in adverse effects.

However, in this particular case, even with the chronic levels that you have currently at 2 ppb, if you exceed the acute REL more than once in any 8-hour period, you'll exceed the 10-hour or the 8-hour and the chronic. So I think the form of the standard has to be more explicit as well.

DR. MARTY: Okay. So the way these numbers are used is maybe not familiar to everybody. But when the

risk assessments are conducted for stationary sources, they -- the assessment involves air dispersion modeling estimates of exposure. And the air dispersion models will look for the peak 1-hour max, and it's generally with five years of med data applied to the stationary source. And that is what the acute REL gets compared to in the risk assessment.

The chronic RELs get compared to the annualized average over the number of years that they have med data for that's applicable to this stationary source.

The 8-hour RELs, they have to do some fancier modeling to come up with the 8-hour max within a 24-hour period, which is -- I don't understand the air dispersion model, so I can't really comment on how that's done.

So just to give you an idea, that's how the numbers get used. They're the comparison point for those -- the results of the dispersion models.

So I don't know if we need to say more about that. We had discussion of that in the technical support documents that underlie the whole risk assessment guidelines. So it's -- I mean, we could put a couple sentences in there defining the acute REL, the 8-hour REL, the chronic REL, and how they're used. That might be useful, because, you know, unless you guys have recently read those technical support documents, which are real

sleepers, you may not remember. I mean, no remembers all this detail, unless they're doing this kind of stuff all the time.

DR. SALMON: It might be a good -- I mean, in terms of the document structure, this is actually going to -- assuming you eventually approve it, it is going to eventually appear as one section of an appendix listing all the REL derivations. And it might -- you know, in terms of convenient access, it might not be a bad idea to make sure that we've got a clear statement of the definition and use of the RELs, as part of the preamble to that appendix, where those documents are presented. You know, rather then putting the same preamble in all '68 REL documents that we --

DR. MARTY: Why don't we just cut and past it, because they might not get the REL document.

DR. SALMON: Well, yes, but what I'm saying is that that could be something which we have as a generic statement that we could -- you know, anytime we hand out a REL document, we could add that in as a cover page, but it would be provided in -- you know, as part of the intro to the appendix, where these things will eventually appear, if that sounds like a good idea.

PANEL MEMBER BLANC: Sure.

CHAIRPERSON KLEINMAN: Thank you.

Are there any other comments?

Then I guess --

PANEL MEMBER BLANC: We don't have a motion -- it's not really a motion. It's just you're going to be coming back to us with a revised document, so there's no motion specific to this document at this time, correct, right?

DR. MARTY: I'm sorry. I was distracted by my boss's boss, so I did not hear that last comment.

PANEL MEMBER BLANC: There's no motion at this time. You're going to be coming back to us with a revised document.

CHAIRPERSON KLEINMAN: Well, I guess going back to the other question about whether the Panel feels that other than the, you know, editorial changes in terms of the children's sensitivity and increasing, you know, the documentation on that, do we feel that the case is sufficiently strong to say that it should be added as a TAC that does affect infants and children?

PANEL MEMBER BLANC: I think we've already said that everybody feels that part of it's okay, but in terms of now taking a step back in terms of the document we have before us, we're not taking a motion on the document as a whole, at this time, because we're going to wait to see the revised document before we make a motion to accept the

document.

As Stan points out, there have been times where we've said we tentatively accept the document, presuming the certain changes that we've discussed or made. I just think given where we are with this and we don't have a lead, and, you know, there are a lot of new people here. And I think it's -- discretion is the better part of valor on this one.

CHAIRPERSON KLEINMAN: All right. I guess then we'll close this off with the understanding that the document will be revised. The issue on the uncertainty factors will be discussed, and revised, and then the document will be sent back to the Panel for review.

PANEL MEMBER GLANTZ: I mean, the -- I didn't realize we didn't have a lead. Since you're new, usually we have one or two people who are designated as leads who work with the OEHHA people to try to knock the rough edges off a document before it comes back.

I mean, I wonder if it's worth designating somebody to do that to just help wrap this up. I think the document is very close. I mean, would -- Paul, do you want to do that?

PANEL MEMBER BLANC: No, I actually think it would be good, in this case, to have two people, one of whom has just joined and perhaps one who's been on for a

while, because it is close, and so it would be a nice way to get your --

PANEL MEMBER GLANTZ: Yeah, we usually have two.

PANEL MEMBER BLANC: -- feet wet. And I don't need to be one of those people, but...

PANEL MEMBER HAMMOND: I could do it.

PANEL MEMBER GLANTZ: So Kathy is old. Is there a new person --

PANEL MEMBER BLANC: Seasoned.

PANEL MEMBER GLANTZ: An old person -- well whatever.

(Laughter.)

PANEL MEMBER ANASTASIO: As a new person, I'm happy to do it.

CHAIRPERSON KLEINMAN: All right. So Kathy and Cort will be the leads on the revised document.

I guess the next item on our agenda is consideration of any administrative matters, that we --

DR. MARTY: Mike, sorry. Before we adjourn the OEHHA people, I just wanted to throw in a couple things for the Panel to think about. We, at OEHHA -- and this has been brought up by the Panel as well -- are trying to make our reviews more efficient. You know, the Panel doesn't meet terribly often. It's hard to get you guys all scheduled.

And it would really be helpful, and we couldn't -- we didn't have time to do it this time, because it -- you know, Mike just got appointed recently, and -- but if we have the Panel review the document and provide us with comments in advance of the meeting, it would help us come to you with already even some revisions in there, or proposed revisions. And that would be a lot more useful, I think, and make the whole process more efficient.

PANEL MEMBER BLANC: Well, that's typically what the leads have tried to do. So I think it plays back into having leads who circulate something to the other members, if they can, in advance. I think we have had -- we have seen that, and that would make things more efficient.

And I think that having all of us act as a committee of the whole writing memoranda before the meetings is less efficient frankly, and not likely to be as focused as giving us a chance for -- look, for example, if Dr. Ritz writes -- is the lead and, you know, has been quite detailed in a particular area, it helps me, because I could say one thing is I'm not going to revisit this question she's clearly done, but I can see that there's this other thing that really has, you know, not been as much on the radar screen.

So that's just the way of me saying that I think

the lead approach we've done is the right way to go, but with that refinement could be even better. But I don't want to be in the position of having to write you a memo before the meeting on every document.

DR. MARTY: Yeah. I think we have to be a little careful about -- maybe Gina is going to bring this up -- the Bagley-Keene thing where you guys can't be talking about stuff outside of the Panel meetings. So you can't like send your comments all over the place. That's not what I'm saying.

PANEL MEMBER HAMMOND: Right. No, I was going to suggest the same thing that Paul suggested, but let me take another step further. I know that in the past, individuals from the Panel have met with people from OEHHA, you know, have come about particular questions and dealing -- working through different sections and our thoughts and concerns. Is that the kind of help that you think would move this along?

DR. MARTY: I think it would definitely help.

PANEL MEMBER HAMMOND: Right. And so I think it's not a meeting of the Panel in any way at all, it is really -- it is specifically talking, you know, one on one or, you know, a couple of members from the OEHHA meeting with an individual Panel member among the leads. You know, that's -- and I think the -- it probably -- I'm just

realizing that one, perhaps, weakness in the two leads we just selected is that we're both -- neither of us are medical people or toxicologists, and we probably should have someone who is that as part of what's going on now to make sure that we get that balance.

PANEL MEMBER BLANC: I would agree with that little part of if, if we hadn't just had the discussion that we had.

PANEL MEMBER HAMMOND: If you think that's sufficient, then that's fine.

PANEL MEMBER BLANC: I think it's for this purpose, because we've outlined what we're -- but if it were -- if we were starting, then yes.

PANEL MEMBER GLANTZ: Yeah, I mean, typically when the leads are picked, which are done much earlier in the process, that's considered in who does it.

But the other thing I would just say, because we can't have -- we can't act as a Committee outside of a meeting. That's illegal. So having like the blizzard of emails is a problem.

But, I mean, it's not at all unusual for either to have the kind of one-on-one or one-on-two meetings Kathy mentioned, or like I, yesterday, was on the phone with people, you know, talking about -- I had a bunch of very detailed questions about the model.

And rather than taking everybody's time, you know -- and I had -- and we gave them some suggestions on how to clarify things. So there's also nothing wrong with people just calling them up and having a phone conversation. If there are specific issues that people have to, you know, to try to get it worked out before the meeting, or at least make them aware of what the questions are, so they can be addressed in the presentation, some of which was reflected in the presentation today.

But I do think -- I would hope that we can wrap -- I mean, again, I just see one important substantive issue here, and so I would hope that we can wrap the document up quickly. And, I mean, if people want to bring it back to the group, that's fine with me too, but I hope it won't take a really long time.

And we may, -- I would also suggest, if there's no other business, other than this, we should just -- we can do a telephone meeting to do the final review of this document, which would make scheduling a lot easier, because wouldn't have to travel. And we've done that also when we have things like this that are very close, but where the Committee wanted to, you know, consider it as a group before approving it.

CAL/EPA DEPUTY SECRETARY SOLOMON: Just to follow up -- this is Gina Solomon. Just to follow up on the

request that Melanie made. That is modeled on the approach of the NTP's Board of Scientific Counselors. And so for every document that they review, they ask each of the members of the Panel to send some just very short preliminary thoughts in advance of the meeting.

And that doesn't necessarily conflict with the idea of having leads who would get engaged in more detail. And it isn't intended to be a lot of work. I mean, generally, you know, it's just a few quick notes.

The main purpose is to avoid having someone who is not a lead, you know, have some major issue that the staff is not prepared to address, and then it sort of, you know, delays the whole process.

PANEL MEMBER BLANC: I have to say, Gina --

CAL/EPA DEPUTY SECRETARY SOLOMON: And so it's only to flag significant issues.

PANEL MEMBER BLANC: -- I want to take exception a little bit to this line of argument. I do -- not that I object to what you're describing, but the major thing that has not had us have work product is not getting work product. And that -- you know, it's very slow the material that comes to us. It's not because, for one particular document, we stretch it out another 12 months with re-revisions. That's not been the history generally speaking of what happens.

Yes, in fact, more commonly it's what Stan suggested, that something comes to us and we say, okay, we've tentatively approve it, but you've got to do this, this, and this. Sending something back and having have to come back again, that's not the big delay. The big delay is that we get one document every year, you know, and that there are lots of new chemicals that are not coming to us at all, or perhaps potentially important chemicals. And that's, of course, more true of the Department of Pesticide Regulation than of OEHHA.

So what you're suggesting, you know, within the parameters you're suggesting is okay, but that's not where I see the efficiency issue.

CAL/EPA DEPUTY SECRETARY SOLOMON: Understood. And we are trying to make changes at a number of levels and address, you know, a variety of issues. And there end up sometimes being chicken and egg problems, where, you know, the -- you know, in some cases perception that the Panel, you know, is a slow process can discourage, you know, speedy action on the part of staff. You know, these kinds of things happen.

So we're trying to address both ends of the issue. And we also are trying to just help staff out by putting them in a position where they have a general sense what to expect before coming into the room and talking

with the Panel, and they're prepared for those -- you know, the issues that are most likely to come up. Obviously, additional issues can come up at the meeting. That happens all the time, but you know, it really would help us out a lot.

And, you know, we don't intend this to be a lot of work, but we do feel that -- and honestly, you know, sometimes it can be hard getting leads. That was very much the case for this document.

PANEL MEMBER BLANC: Why? Who was asked to be the lead on this document? I don't remember anybody being asked.

PANEL MEMBER HAMMOND: I think that a request was sent to me, but it was when I was on my honeymoon, so it didn't work. Sorry.

PANEL MEMBER BLANC: Mazel tov.

PANEL MEMBER HAMMOND: My apologies.

CHAIRPERSON KLEINMAN: Well, I think, you know, one of the issues is that this is a document that came up awhile ago, and had been looked at and then we now, you know, have a new version. And I think this is a good starting point to, you know, to try to get this on track.

And the idea of the Committee, you know, letting OEHHA know when there is a substantive issue in advance, I think, makes a lot of sense. And I think that can come

from everybody on the Committee, not just from the leads. But I think when you do that, the leads should be informed. As long as, you know, it's a one-on-one sort of thing and we're not deliberating as a group, I think we're covered.

PANEL MEMBER GILL: I see the processes actually a bit more stream -- can be more streamlined. Say once a document is -- a chemical is being suggested to be actually looked at, then I think once the leads are involved, the revisions can be quite substantive, maybe.

So once that is done, it then goes onto the Committee, and then all can -- everybody can comment. I don't see anything with that, and actually -- but it's a two-step process, not just one step. So I think that would be better, and I think we can accommodate all of that.

And I don't see anything wrong with it, but I think it's best to have a lead, because I think the leads would spend much greater time. And also, if the leads are of two different expertise, then I think it's likely to pick up more than less.

So I don't see anything wrong with the two-step process really, and individuals commenting on that. And I think if it helps the staff, I'm all for it. I don't see any problem with that.

PANEL MEMBER GLANTZ: Yeah, I want to though just second what Paul said. I think the slow activity has been the slow production of documents, not the Panel. And the lead -- the lead we -- I mean, now as the oldest, longest serving member, I mean, that's why we instituted the lead process somewhere back in the Pliocene age. And I think it's worked very well. I mean, having been the lead on several of these or -- it's usually two people from different disciplines.

And, you know, I -- you know, I, both as someone who's worked as a lead and then worked not as a lead, I mean, I think that the record is that the lead people, who often will reach out to other members of the Panel, does work pretty well with the staff at knocking the obvious rough edges off these reports. And the speed of deliberation did speed up quite a lot when we instituted that process.

DR. MARTY: Okay. I, with all due respect, have to disagree somewhat, because if we come to the meeting prepared because we know what the major issues are, it's going to go a lot smoother and it's going to go a lot faster. By not -- by coming to the meeting not knowing what the issues are, you're guaranteed to have at least two meetings on everyone of these.

PANEL MEMBER BLANC: But that's not true, because

we have done exactly what Stan says. And furthermore, that's quite -- all this discussion is somewhat disingenuous, relative to the praise that was heaped on John Froines for saying the science, the science, the science.

This is a meeting where we review the science, and we do that as fellow scientists. And we can be as hard on you as we want, because that's in the scientific spirit. It is nothing about, you know, let's be nice to each other, and let's not surprise you, and let's not be tough. You know that we're doing this out of scientific rigor. This is not -- this is nothing personal.

DR. MARTY: I totally understand that, and I'm actually really appreciative of the comments that come from the Panel, because we do have great scientific debate. It would -- all I am saying is it would help us to know in advance what the major issues are, so that we can bring some solutions forward to the table. Right now, we're just -- you know, we have to sit here and think about it on the spot, and is not efficient to do it that way. That's the point.

PANEL MEMBER GLANTZ: Except, Melanie, if you take -- I mean, that is what we always have tried to do through the leads and the other feedback that you've given. But I mean every single one of these meetings I've

ever attended things come up out of the discussion of the group that wouldn't have come up with people individually. You know, so I think people are trying to do that.

And I also think you need to, you know, recognize that in terms of this document, there's really, for all the discussion, one issue of substance that I think emerged from the discussion. And I think that had one person just simply communicated that to you before the meeting or even a couple of people individually, probably it wouldn't have had much impact on what happened at the meeting, because it was the discussion of the Committee that, you know, really led to the issue crystallizing.

So, I mean, I know -- I felt like we should have had a picture of John banging you guys on the head before he left --

(Laughter.)

PANEL MEMBER GLANTZ: -- but the -- but, I mean, you know, we're all friends here. And, you know, I think everybody is trying -- I mean, this is a fairly simple document actually. And, you know, I think the process of working with the leads and getting informal feedback before the meeting, I mean, it's happened for a long, long, long time, and I -- but it's never -- that will never replace the discussion that happens at the meeting.

DR. MARTY: Oh, I agree there.

PANEL MEMBER GLANTZ: And it's not done to like be mean to you guys or anything. My skin is so thick by now, Stan.

PANEL MEMBER GLANTZ: I know.

(Laughter.)

DR. MARTY: You need a 10-inch hypodermic now.

(Laughter.)

PANEL MEMBER ARAUJO: You know, may I say something. So I concur in a way with both Stan and Paul on how is it the mechanism has worked so far in having a lead, and having these frank discussions and at the moment of the meeting.

At the same time, I understand your points, and -- of just being -- like having some warning, you know, what are the biggest issues that could come out. And the problem that I see in just having something structured in a way of emailing or writing some of these ideas is that, you know, it is difficult, especially like when we're dealing with something that could have like, you know, legal consequences, you know, putting just anything in writing or just having the whole Committee to start writing things or writing emails, because what would happen is that you're going to have to take your time and really be very careful in what you write, so in the future if those emails leak out, you know, things are not

misinterpreted.

As opposed to, how about something -- having something that it could be a lot more flexible, so the leads could be the venue of the Panel, so the Panel could actually just ask -- just send some points to the leads, you know, or even something that the leads doesn't really have to share with outside themselves.

And some things could come up like, you know, these are the factor of the -- the factor of 20, instead of a factor of 10. So it took really like about 45 minutes of the whole meeting, probably the largest amount of discussions, about something that they having -- they have thought a lot about. Certainly but if they had known that this was going to be really like a, you know, the biggest issue, they could have even thought more, researched even more, even come up with some ideas.

Maybe, they could have even come up and said, well, we actually have thought about it, and we think that the factor of 20 makes more sense than 10, so we probably changed that. So the 45 minutes could have been reduced to 10 minutes, because they have already thought about it, you know.

So I do see an advantage of some previous communication, but I couldn't go for something that is too structured or too, in a way, that, you know, could lead to

having trails, you know.

CAL/EPA DEPUTY SECRETARY SOLOMON: Just to clarify, the -- the way the NTP, the National Toxicology Program, does it, the preliminary comments are not considered official statements unless you say them into the record again at the meeting.

And as you all know, every word that you're saying here, and all the -- including all of the wise cracks and jokes, are on the official record and recorded. So, you know, I think an email is hardly the thing we would -- you know, from one Panel member with preliminary thoughts is hardly something to worry about in that context.

So that's not something I think that we're terribly concerned about, and we see some benefit to adopting that model. It sounds like there's some willingness to give it a try, so we're hoping that -- and we will certainly come around and ask for leads in the future as we did this time around, and we're hoping that we will get leads for future documents. And, you know, we understand, people's schedules, you know, your schedules are all super busy, and sometimes it's just not a good time for anybody to take on a lead.

PANEL MEMBER BLANC: Speaking of recording, we've been having our stenographer type for two hours without a

break. And I think we're very near to adjourning, but I'd to have some reassurance, just so that I don't cause carpal tunnel syndrome.

THE COURT REPORTER: I'm fine.

PANEL MEMBER ARAUJO: May I ask something, also in -- how would you feel comfortable in saying what would be the time, you know, when you're going to receive some comments, and indicates -- or in case like we feel more comfortable in saying the comments to the leads. So for the leads to communicate with you, and you know what could be some of the biggest issues that we anticipate or we already perceive.

DR. MARTY: Yeah. There's one thing that's floating around and that's the Bagley-Keene Act. We have to be careful about that. Unfortunately, there's not an attorney here, but you have to be careful of rolling meetings, so that you guys -- you know, three of you send comments to one person, that might not be --

CAL/EPA DEPUTY SECRETARY SOLOMON: No, that counts as a rolling meeting.

DR. MARTY: I think that counts as a rolling meeting.

PANEL MEMBER ARAUJO: Oh, really?

DR. MARTY: Yeah. Yeah.

PANEL MEMBER GLANTZ: I mean, what I would just

again suggest, which I thought -- think has worked quite well, the leads are usually picked by the Committee at the meetings. So what will happen is, you know, the CalEPA will tell the Chair we've got a report that we're getting ready to send the Panel in maybe several months, and then at the meeting we talk about who's going to be the leads. And the Chair gets some people to volunteer, and we've always gotten them.

And then I just think in terms of this preliminary feedback, again, you know, the way I've seen it working is it's -- the leads obviously are paying the most attention before the meeting in trying to deal with stuff. And again, from when I've done it, sometimes I'll reach out to other people and say this isn't my area of expertise, what do you think about X?

But, you know, some members have sent written comments to the staff before the meeting of varying levels of detail. Sometimes very detailed, sometimes not. What I personally usually do is call them and talk to them, because I get tired of writing 3,000 -- I find emails are good for things like saying like yes, no, go away.

And, you know, but when you've got a substantive issue, I find it easier to just talk to people. And so, you know, we have a long history on the Panel of people interacting with the staff in varying ways before the

meetings. And, I mean, I think that's worked pretty well, but at the same time, there are always new things that come up at the meeting out of the discussion. And I think that's why we have the Committee, you know.

So I'm less -- I would rather go with the process of just encouraging -- kind of informally encouraging communication with the staff before the meeting if issues that, you know, people have, rather than trying to have some formal structure to it, beyond having a couple of leads assigned to each document enough in advance to matter.

I mean, because like the ones I've worked on, there will often be a couple of drafts that go to the leads before it goes to anybody else on the Panel.

DR. MARTY: That's particularly true for the TAC documents and then our risk assessment guidelines, which were big and just tons of detail.

PANEL MEMBER GLANTZ: And when you said they fascinating, I was so hurt.

(Laughter.)

PANEL MEMBER GLANTZ: They're page turners.

DR. COLLINS: Can't stay too long on any one page.

(Laughter.)

PANEL MEMBER HAMMOND: Just another thought to

put out there, and maybe it's not a good idea. But would it help if we were -- when you were getting close to having a document, if maybe we had a one-hour say telephone call with the whole Committee, where you could -- where there's just a brief laying out of this is what's -- kind of what's going on, so that people can say, yes, but what about this or that, so there's some major issue that got left out.

And even though -- and continuing with the leads, not to replace the leads, but having that one hour. We could probably find one hour of time, and then everyone is a little kind of attuned to what's going on.

PANEL MEMBER GILL: But that --

CAL/EPA DEPUTY SECRETARY SOLOMON: Unfortunately, that would have to be noticed as a public meeting. It would have to be publicly accessible.

PANEL MEMBER HAMMOND: No, no, but we have done that.

CAL/EPA DEPUTY SECRETARY SOLOMON: So it would be another meeting.

PANEL MEMBER HAMMOND: No. I'm not saying -- I am saying it would be a meeting. I meant it as a meeting, a full legal meeting open to the public, but the idea still would be that it's just kind of an orientation to the topic, so the people are beginning to think about.

Now, if it's not a good idea, fine.

PANEL MEMBER GILL: No, but I think actually it's -- in my mind, it's just actually probably not a wise use of time.

PANEL MEMBER GLANTZ: Yeah, but, you know, again, because the Panel used to meet much more frequently because documents were coming forward much more frequently. And it was not uncommon to have some -- you know, when there was some document that was just entering the sort of drafting stage to have some discussion just at one of these meetings, where, you know, Melanie or somebody or George would say, well, we just want to alert the Panel that we're working on this, and you know, sometimes get some input. That's actually usually when the leads got picked, too.

So, I mean, if we had more documents coming forward, then that could just be part of the agenda for the meetings. I think a phone call, without anything in front of us, I mean, I don't think that would be very useful personally. And it would require public notice and all of that.

PANEL MEMBER ARAUJO: But if you have a phone call of the leads --

PANEL MEMBER GLANTZ: The leads is different. Having a conversation with the leads, that isn't a quorum.

That's not a meeting, and, you know, that's fine.

PANEL MEMBER ARAUJO: And if it's communicating with the leads is not considered --

PANEL MEMBER GLANTZ: No, that's fine.

PANEL MEMBER ARAUJO: If communicating with the leads is not considered a part of the meeting, so is this something that could be entertained?

PANEL MEMBER GLANTZ: Yeah.

PANEL MEMBER ARAUJO: So let's say -- you know, lets's say, Cort. So I decide to read -- you know, I read this ahead of time, let's say, and a couple of weeks prior to the meeting. So I just sent a short email to Cort and say, yeah, I found this or this or that. And then he receives some other input from some other members, and then at least 10 days prior to the meeting, so Cort -- and have a conversation, you know, about these are sort of the biggest issues. That doesn't mean that it could be the only ones.

But it's something that some of the biggest issues, they may spend time. They may be able to spend time and come out already with -- I don't want to say, like, you know -- they may already be able to address some of the issues and shorten the time of discussions.

So I'm not saying that there is a -- there's going to be a substitution of what we're really doing, but

it could certainly shorten the time in some of the things that we discussed, because they already --

PANEL MEMBER GLANTZ: Sure, but what you could do -- what I would say you should do is, I mean, you should tell the lead about what you're concerned about, but I would also just talk to them directly.

PANEL MEMBER BLANC: So listen, in view of the hour, what I would suggest is let's just defer to our new Chairman. He can give us some instructions, having heard the discussion, what he feels will work best and can -- and I'd like to make a motion that we adjourned.

PANEL MEMBER GILL: Second it.

CHAIRPERSON KLEINMAN: All in favor?

(Ayes.)

CHAIRPERSON KLEINMAN: Okay.

(Thereupon the California Air Resources Board, Scientific Review Panel adjourned at 1:17 p.m.)

C E R T I F I C A T E O F R E P O R T E R

I, JAMES F. PETERS, 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 California Air Resources Board, Scientific Review Panel meeting was reported in shorthand by me, James F. Peters, a Certified Shorthand Reporter of the State of California;

That the said proceedings was taken before me, in shorthand writing, 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 hearing nor in any way interested in the outcome of said hearing.

IN WITNESS WHEREOF, I have hereunto set my hand this 15th day of November, 2013.

JAMES F. PETERS, CSR, RPR
Certified Shorthand Reporter
License No. 10063