MEETING

STATE OF CALIFORNIA

AIR RESOURCES BOARD

SCIENTIFIC REVIEW PANEL

SCHOOL OF PUBLIC HEALTH

UNIVERSITY HALL, ROOM 150

UNIVERSITY OF CALIFORNIA, BERKELEY

2199 ADDISON STREET

BERKELEY, CALIFORNIA

FRIDAY, JANUARY 21, 2011

9:11 A.M.

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

APPEARANCES

PANEL MEMBERS

John R. Froines, Ph.D., Chairperson

Jesús A. Araujo, M.D., Ph.D.

Paul D. Blanc, M.D.

Alan R. Buckpitt, Ph.D.

Ellen A. Eisen, Sc.D.

Sarjeet S. Gill, Ph.D.

Stanton A. Glantz, Ph.D.

S. Katharine Hammond, Ph.D.

William W. Nazaroff, Ph.D.

REPRESENTING THE AIR RESOURCES BOARD:

Mr. Jim Aguila, Manager, Substance Evaluation Section

Mr. Jim Behrmann, Liaison, Scientific Review Panel

Ms. Janette Brooks, Chief, Air Quality Measures Branch

Ms. Susie Chung, Staff Air Pollution Specialist

Mr. Richard Corey, Chief, Stationary Sources Division

Mr. Bart Croes, Chief, Research Division

Mr. Peter Mathews, SRP Support Administration

REPRESENTING THE DEPARTMENT OF PESTICIDE REGULATION:

Dr. Marylou Verder-Carlos, Assistant Director

Mr. Randy Segawa, Manager, Environmental Programs

APPEARANCES CONTINUED

REPRESENTING THE OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT:

Dr. George Alexeeff, Deputy Director

Dr. Robert Blaisdell, Supervisor, Environmental Modeling Section

Dr. Daryn Dodge, Staff Toxicologist

Dr. Melanie Marty, Chief, Air Toxicology and Epidemiology Branch

Dr. Andrew Salmon, Chief, Toxicology and Risk Assessment Section

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PROCEEDINGS

CHAIRPERSON FROINES: I'm going to formally begin the meeting -- I'm going to formally begin the meeting of the Scientific Review Panel on January 21st, and we can get started from here.

What I'd like to do, since this Scientific Review Panel in the last few months has had its ups and downs, and there was periods of time when nobody knew who was appointed. What I'd like to do at the outset -- I'm John Froines for those that don't know me, and I'm chairing the SRP. And that will come as a surprise to an awful lot of people out in this room.

And so what I'd like to do is to go around the room first and have people introduce themselves and say what their disciplines are, but say also what their research interests are, so that we have a sense not of just who you are, but a little bit of substance.

And so --

PANEL MEMBER BUCKPITT: Shall I start?

CHAIRPERSON FROINES: I'll go to my left.

PANEL MEMBER BUCKPITT: I'm Alan Buckpitt. I'm from the University of California at Davis. I'm in the Department of Molecular Biosciences in the School of Veterinary Medicine. I'm sort of a toxicologist within an interest in xenobiotic metabolism. I've spent my career

looking at chemicals that produce lung injury by virtue of their metabolism in those tissues.

Is that long enough?

CHAIRPERSON FROINES: Sure. And he's quite well known for his work on naphthalene.

PANEL MEMBER EISEN: Okay. My name is Ellen Eisen. I'm at UC Berkeley in Environmental Health Sciences. I've been here for about five years, before which I was in Boston for many, many years at Harvard School of Public Health and at University of Massachusetts.

I'm an occupational epidemiologist trained in biostatistics and interested in dose response models in human populations.

PANEL MEMBER GLANTZ: So I'm Stan Glantz, a professor of medicine at UC San Francisco. I also direct the Tobacco Center there. My research is in cardiovascular function, secondhand smoke. I wrote a couple of textbooks in biostatistics, which is why I'm on this committee.

CHAIRPERSON FROINES: If I can say one thing about Stan --

PANEL MEMBER GLANTZ: And I'm his straight man.

(Laughter.)

CHAIRPERSON FROINES: Let me explain, because

this is actually quite serious. Stan and I have had over time a back and forth joking behavior. And when we were sued on the diesel case, they made a big deal out of the jocularity between Stan and me.

And so one of the things I'd like to say is that please hold down the joking and/or say I'm joking. And that will keep us -- that will keep those remarks from becoming litigative.

Kathy.

PANEL MEMBER HAMMOND: I'm Kathy Hammond from the School of Public Health, Division of Environmental Health Sciences, UC Berkeley. And I'm a chemist and industrial hygienist, and mostly I'm an exposure assessor for epidemiologic studies.

My studies include secondhand smoke, environmental sciences. We're doing a big study on asthmatic children and the environment in Fresno. And occupational studies in a variety of settings.

PANEL MEMBER ARAUJO: I am Jesús Araujo. I'm an Assistant Professor of Medicine in the Division of Cardiology at the School of Medicine in UCLA. My training, I'm a cardiologist and a molecular biologist. My research interests are currently in assessing the cardiovascular effects of air pollutants, understanding some of the molecular mechanisms and pathways and some of

the things that can be involved in either protecting us from those effects or conferring more sensitivity.

PANEL MEMBER GILL: I'm Sarjeet Gill from the University of California at Riverside. I'm in the Department of Cell Biology and Neurosciences. My training has been basically in toxicology. And currently, my project is looking at bacterial toxins and their mode of action on the cellular level.

CHAIRPERSON FROINES: I'd like to welcome the two of you, because the three of us constitute southern California, and that's not always the case.

PANEL MEMBER BLANC: No, previously other people have constituted southern California.

(Laughter.)

CHAIRPERSON FROINES: Now you see what I mean. We just got sued.

PANEL MEMBER BLANC: By southern California, Chamber of Commerce.

I'm Paul Blanc. I'm from the University of California at San Francisco --

PANEL MEMBER GLANTZ: Which is northern California.

PANEL MEMBER BLANC: -- which is Northern California titularly.

PANEL MEMBER HAMMOND: It's actually Central

PANEL MEMBER BLANC: And I'm Chief of the Division of Occupational and Environmental Medicine at the Parnassus Heights Campus. My colleague, John Balmes, who many you of know from the Air Resources Board is Chief of the Division at San Francisco General Hospital.

And my areas of research include respiratory conditions in relationship to occupational environmental exposures, including COPD, asthma, fibrotic lung disease, and pulmonary vascular disease, and they include outcomes, such as disability and quality of life. And I'm also Clinical Attending in Internal Medicine and an Attending at the San Francisco Division of the California Poison Control Center. And I have training in medical toxicology as well as Occupational Environmental Medicine and Internal Medicine.

CHAIRPERSON FROINES: And Paul is a genius, and you'll see, at asking questions that make for a good record for the proceedings. He really has a sense of what we need on the record and is quite skilled at asking those questions that are going to be beneficial to our ultimate decisions.

PANEL MEMBER NAZAROFF: Good morning. I'm Bill Nazaroff. I am trained or educated as a physical scientist and engineer, especially environmental engineering. I'm on the faculty here at UC Berkeley in

the Department of Civil and Environmental Engineering.

My research interests center on the dynamic behavior of air pollutants, the chemistry and physics with a particular emphasis on understanding the relationship between emissions from sources and what humans are exposed to. Application areas have included motor vehicle exhaust emissions and inhalation intake from that exposure to environmental tobacco smoke. I have a particular current interest in semi-volatile organic compounds from sources and materials that are used in indoor environments and are indoor exposures that result.

I want to apologize at the outset right now because I have a teaching commitment at 11 up the hill, and so I'm going to step out for about an hour and a half starting at about 10:40.

CHAIRPERSON FROINES: Okay. Oh, me

I'm John Froines, and I'm at UCLA School of Public Health in the Department of Environmental Health Sciences. And I'm going to be the Chair of this committee for the foreseeable future.

I'm a chemical toxicologist. And I am particularly interested in the notion that there are two primary mechanisms of toxicity, one of which is pro-oxidant activity, and the other is chemical -- is a electrophilic activity.

And so we have been particularly interested in where Bill leaves off in a sense, where we've been interested in the first steps of toxins binding with proteins and DNA and what happens from that point on, from that point of chemical reactivity to down through the long process of disease development till we reach the downstream point of apical outcome of disease.

And so we're interested in -- we do cellular biology. We do in vitro assays. And we're really interested in the road map of toxicity.

So I'll stop there. And then I thought it was appropriate -- we're going to hear from representatives from the three agencies that we work closely with. And I should say that that relationship, over the years, has been very, very positive. And so just so it's on the record, we have had an extremely positive relationship with the various agencies. And so that's a good starting point.

I'm going to go -- sorry, Paul.

PANEL MEMBER BLANC: It would just help me to know if people would say what constituent appointment they have, whether it be as the designated oncologist or --

PANEL MEMBER GLANTZ: That's on the sheet.

PANEL MEMBER BLANC: Is it? Does everybody know that?

Okay, thanks

CHAIRPERSON FROINES: So do you want people to go around --

PANEL MEMBER BLANC: No, as long as -- I just wanted to call it to people's attention so that they're actually aware of that, but that doesn't tell us who's an Assembly appointee and who's a State Senate appointee.

CHAIRPERSON FROINES: Well, let's just do it. I'm Speaker of the Assembly. Who else is the Speaker of the Assembly?

PANEL MEMBER BLANC: You don't mean Speaker of the Assembly. You were appointed by the Speaker of the Assembly.

CHAIRPERSON FROINES: Speaker of the Assembly. Who is the other person?

PANEL LIAISON BEHRMANN: Dr. Gill is.

CHAIRPERSON FROINES: Who?

PANEL LIAISON BEHRMANN: Dr. Gill.

CHAIRPERSON FROINES: Oh, good. That's a good group.

(Laughter.)

PANEL MEMBER HAMMOND: As opposed to the rest of us?

(Laughter.)

CHAIRPERSON FROINES: No. I knew I had fallen

into that trap. But, okay, the Senate.

(Raised hands.)

CHAIRPERSON FROINES: Stan and Paul.

PANEL MEMBER GLANTZ: And I just got reappointed this week, last week.

CHAIRPERSON FROINES: Let's leave the reappointment discussion out of this conversation. It hasn't been exactly fun.

And everybody else, Paul, is appointed by the Secretary of CalEPA.

PANEL MEMBER BLANC: (Nods head.)

CHAIRPERSON FROINES: And they will have varying tenures, so that issue will come up in the future, because there has been controversy, and we would like the members to be reappointed. And we'll see how that plays out with the University of California.

So I would like to go through a number of points.

(Thereupon an overhead presentation was Presented as follows.)

CHAIRPERSON FROINES: I noticed that I'm now about to take the points -- some of the points that the other agencies are going to mention, but I don't think repetition is a problem.

I think it's very important for everybody to recognize that a toxic air contaminant means an air

pollution which may cause or contribute to an increase in mortality or serious illness or which may pose a present or potential hazard to human health.

So this is a very general statement of a toxic air contaminant. And so what it takes to meet the criteria of a present or potential hazard to human health is something that we'll have to think about, because everything isn't super serious. Some things are more vague, but the definition is vague. And so I wanted you to be aware of that.

Now, I don't need to do the next one. We're a nine person committee and we've covered that.

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CHAIRPERSON FROINES: So SRP history, the creation of the Panel derived from the fact in 1983 that California was fed up with U.S. EPA. U.S. EPA was not moving ahead on toxic air contaminants. They still haven't moved ahead on toxic air contaminants. And that the State of California wanted to take up toxic air contaminants and so decided to pass legislation that would enable them to do so.

So AB 1807, in a sense, was California's attempt to move California ahead across the United States at the federal level so we could get started on this particular issue.

Now, the Panel has followed historically the policies identified in the 19 -- the National Academy of Sciences risk assessment document or the so-called Red Book. But I wanted to point out that the National Academy of Sciences has issued a new document for the risk assessment process.

Now, please, everybody realize that we have a new National Academy document and we will, in the next meeting, discuss that document rather than now, because it changes the criteria from what is in the Red Book, and I'll show you. As I say, it changes the underlying philosophy and recommends changes in the relationship between risk assessment and risk management.

And the point here is that historically this Panel has dealt solely with risk assessment issues. We have not dealt with risk management issues. And there was some sense that there's a prohibition that we don't. And whether that's true is something that's worth discussing.

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CHAIRPERSON FROINES: All right. Here's the Red Book. So you have the classic hazard identification exposure assessment, dose response relationship, and risk characterization. And this is what we have done since 1983 is to conduct risk assessment that dealt with the terms identified in Red Book, the NAS Red Book.

So this is the classic risk assessment process, and everybody needs to be familiar with it, and I don't think that's a problem.

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CHAIRPERSON FROINES: But now we have the new risk assessment. And as you can see, it's far more complicated, the old -- the old process is in the box in the middle. But what I want to point out to you is Phase 1 comes before hazard identification. And because none of you can read this, I did this.

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CHAIRPERSON FROINES: That Phase 1 says the following, "What problems are associated with existing environmental conditions"?

If existing conditions appear to pose a threat to human or environmental health, what options exist for altering these conditions?

Now, ladies and gentlemen, that second point is fundamental to the new direction. That means that we -- if we followed this, and this is up to us, we can look at risk management issues at the start of the process, and we don't have to deal with risk -- and risk management, which usually comes after risk assessment. This gives the Panel the option of looking, at the outset, of what options exist. And this is something that we're

going to want to talk with the agencies about, so that we are in synch on this new criteria.

And give context what risk assessments are needed to evaluate possible risk management options. So I say this, and this is something we'll take up at the next meeting, but this is a fundamental change in the risk assessment process from 1983, yes.

PANEL MEMBER EISEN: I have a question. So does that include considering alternative?

CHAIRPERSON FROINES: Yes.

PANEL MEMBER EISEN: Okay.

CHAIRPERSON FROINES: That's the point. That's -- I should have said that, in fact. That gives us the option of doing -- well, this is something we're going to have to talk about with the agencies, so we don't end up in a fist fight. And that the -- but the issue, as far as I'm concerned, tells us we can do alternatives analysis at the front end. And you realize the significance of that in terms of that historically we've started with hazard identification, so we're not limited to the traditional means.

Now, we have to adopt this. We have to get opinions from the agencies. And so this is not trivial, because what this means, as Alan said, is what does that imply? I can't tell you how important this is.

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CHAIRPERSON FROINES: Okay. We've done -- according to this, I think we've done 29 toxic air contaminants since the beginning. Jim, is that right?

Melanie?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: It's 23 that went through the SRP Tanner process. And then as you point out, the hazardous air pollutants were all identified at the same time, I think, in 1990 or '91.

CHAIRPERSON FROINES: So this is the Clean Air Act amendments of 1990 that named the 189 HAPs, and they were grandfathered in as TACs.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Right.

CHAIRPERSON FROINES: But that doesn't mean that there were risk assessments done for all 189. And I should say something that's very important, the law says that this process has to include a risk assessment. It's a requirement that this Panel review risk assessments and not just the scientific data. In other words, the law says that there is a requirement for a quantitative estimation of risk.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: John, I forget to mention -- or I forgot to

add the pesticide TACs. Slightly different process involving DPR, but there's 23 that went through the Air Resources Board and there's an additional that went through DPR.

CHAIRPERSON FROINES: Randy is here, so he can fill us in.

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: There are --

CHAIRPERSON FROINES: Let me finish and then you guys can have your turn.

(Laughter.)

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CHAIRPERSON FROINES: And there have been other things that the Panel has taken up. There is a legislation called AB 2588, which is the Hot Spots Program, and we have risk assessments brought to us in the context of the hot spots program. And Melanie will talk about that.

We have had, I think it's two, but there have -- but the rule is that a company, presumably anybody I guess, can request that we reconsider a decision that we've made, that there is new evidence that requires us to relook at what the decision of the SRP was. And so the Air Resources Board sends us that new so-called new evidence, and we decide is there new evidence to take up

that chemical once again?

So it's a, what would you call it, it's a --

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: It's a petition.

CHAIRPERSON FROINES: It gives you a second chance to have your chemical looked at.

And we did formaldehyde and benzene. And we rejected the industry position both times. In other words, we said that the new evidence was not sufficient to reopen the chemical. And that's the only two that I'm aware of. Melanie, is that the only two?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: That's the only two that went all the way through the process.

CHAIRPERSON FROINES: Yeah. But industry can come back to us and ask for a relook at the evidence.

We were sued once, and that was diesel. And we -- I guess, Jim, we can say we won.

PANEL LIAISON BEHRMANN: (Nods head.)

CHAIRPERSON FROINES: We won. So out of all these hundreds of chemicals that we've done since 1983, we have only been sued once, which I think speaks well for this panel.

And this was a really quite unequivocal decision rejecting the industry position, fair?

Somebody tell me if you agree.

PANEL LIAISON BEHRMANN: Yes.

CHAIRPERSON FROINES: Yes.

PANEL LIAISON BEHRMANN: And the Panel, John -- this is Jim Behrmann, the liaison to the Panel. The Panel was not the sole defendant. The agencies were also defendants.

CHAIRPERSON FROINES: I don't want to get into all the detail. It's too complicated.

I mean, the Panel was sued. I was sued, and, you know, it was a mess.

So we also have focused on prioritization of TACs as disproportionately impacting children. And I'll come back to that.

And we also -- was MTBE a 2588?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Yes.

CHAIRPERSON FROINES: So we did MTBE not as a toxic air contaminant, but the controversy over whether it should be used in gasoline was a hot topic. And we took it up. So there are times when we can take up hot -- issues of significance.

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CHAIRPERSON FROINES: All right, and that's SB 25, which requires OEHHA to assess whether current air

pollution standards are protective of infants and children. I won't read it all. Melanie is going to talk about it.

But basically this has been very important to identify chemicals that have a greater effect in children than adults. And I should say that we picked six or five chemicals and -- for the purposes of science. The literature on this topic of whether a chemical has a greater impact on children than adults is an issue which has virtually very limited literature. This is a hot topic, but the literature is vanishingly small, and that leads us into -- sometimes into controversies about it.

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CHAIRPERSON FROINES: Okay, now I'm going to do the -- this is nuts and bolts. We appoint -- for each chemical, we appoint two members of this Panel to be leads on that chemical. One person deals with exposure. One person deals with health effects.

And so everybody here get ready to be assigned to chemicals. And it's sort of voluntary, but it's voluntary with some pushing going on. Who's been a lead on the last chemicals. Kathy and --

PANEL MEMBER HAMMOND: Not the last chemical. In the last year.

CHAIRPERSON FROINES: What have you been leads

on?

PANEL MEMBER GLANTZ: The last thing I was the lead on was the risk assessment procedures, so it wasn't a chemical. It was sort of the process.

CHAIRPERSON FROINES: Kathy.

PANEL MEMBER HAMMOND: At the moment I don't remember. I'm sorry. Certainly tobacco smoke.

CHAIRPERSON FROINES: Who was ETS?

PANEL MEMBER HAMMOND: Well, we two.

CHAIRPERSON FROINES: Those two. So what happens is --

PANEL MEMBER GLANTZ: I was on diesel, I remember.

CHAIRPERSON FROINES: These two -- Kathy and Stan were leads on ETS, Environmental Tobacco Smoke, and they work with the agency to try and get the document that comes to the Panel in good shape, so we have fewer controversies and differences of opinion, so that by the time we get the document, we're closer to completion than we might have been without the input from the leads working with the agencies.

And it's been successful throughout our history and the leads have played a very important role. I should say that selecting leads is not always the easiest thing to do, but there's always been two people who played the

role of the leads.

And the relevant agencies -- I don't need to go through all of this. The relevant agencies present their risk assessment and information on toxicity and exposure. And then the Panel, in general, has found issues with the documents. And usually what happens is if there are issues, we tell the agencies to go back and make changes and then bring them back to us.

We have -- I think it's fair to say, we have seldom accepted a document on its face. And we have seldom completely rejected a document.

We try and work collaboratively, so that we send them back with specific suggestions, and they then meet those suggestions and bring it back to us. So it's a collegial process that occurs.

Forget the next one.

At the end, we vote and we don't have to be unanimous. And we then write our findings and then we send, with a transmittal letter the findings and the transmittal letter to the relevant agency.

And these findings we -- on some occasions, we have written the encyclopedia Britannica, but the general view of everybody is that these should be short, is that fair?

PANEL MEMBER BLANC: Yes.

CHAIRPERSON FROINES: I'm old people.

(Laughter.)

PANEL MEMBER GLANTZ: Old people, yes.

PANEL MEMBER BLANC: Yes.

CHAIRPERSON FROINES: Experienced

PANEL MEMBER HAMMOND: We've been moving in that direction.

PANEL MEMBER BLANC: Yeah, I mean, I think that consistently we've tried to not reiterate the document or writing the Executive Summary of the document, but rather make the bullet points that are key, and perhaps explicitly the logical progression from exposure through health effects as appropriate.

CHAIRPERSON FROINES: It's very easy to write an encyclopedia. And it's the last thing we want to do at this point. And so the leads write the first drafts of the findings and then it comes to -- and then I take a look at it and then it comes to the Panel for general discussion.

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CHAIRPERSON FROINES: So we review -- this is very important. We review written submissions to the agencies, which you've all got a whole bunch of it recently. And I want to emphasize that we take that testimony very seriously. And I want it on the record

that the Panel takes seriously comments from the public, so that everybody knows everybody's getting a fair share.

And the last thing on that bullet point is we do not take verbal testimony. In other words, the agencies will present their cases, but we don't have industry, environmentalists, whoever, do not present testimony. We get their position from their written testimony.

Now we have new people on the Panel. If you wanted to change that and have written -- have verbal testimony, we can do that. I think the people who have been on for a long time would recommend against verbal testimony, but we can take that up at another time.

But that has been a bit of an issue. There are obviously -- when I chaired the subcommittee on carcinogens, we took public testimony. And it was a mess, because you would have 20 people all of whom were consultants arguing their case, and it was like being beaten in the head with a hammer.

So I'm for no verbal testimony. Written testimony can be submitted any time. Jim Behrmann is our liaison. I assume that you've all met him.

And Jim and Peter Mathews, who addresses logistical issues, both are very experienced, so that you're working with a good team. And keep in mind, and this was a controversy at the beginning, a big controversy

that was quite contentious that Jim and Peter work for us. They don't work for the agencies they come from. They are to meet the needs of the Panel, so that if Mary Nichols tells Jim to do something, Jim has to tell Mary Nichols to talk with me and the Panel itself. So that the -- it's important for us to have an independent staff and not one where we're getting orders from the agencies that we're supposed to be reviewing their documents.

Does that make sense?

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CHAIRPERSON FROINES: Okay. And here are just a few -- others are going to speak to chemicals, but just to name some important ones benzene, methylene chloride, perchloroethylene, diesel particulate. Let me emphasize this, because I think this is something that we have to take up if we can convince the ARB to do it. And that is when we name diesel as a toxic air contaminant, we did not name diesel exhaust. We named diesel particulate.

And it's clear now, at least from the research in my laboratory, that vapors are very important toxins. And so it's not just particulate matter. And so the Panel, I think, should take up identifying as toxic air contaminants vapors as well as particulate. And that's -- that will be quite an interesting discussion about how we will -- how we'll do that.

But it's -- in our lab, we find that the largest number of electrophiles are in the vapor phase. And so we are not regulating some of the chemicals that are by far the most toxic.

Naphthalene is a vapor. It's not a TAC. And I would argue -- I don't know that Alan thinks -- but it should be.

All right. Perchloroethylene, diesel, metam sodium is DPR. Chloropicrin. Chloropicrin is, in my view, deserves a second look, but we'll talk about that later.

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CHAIRPERSON FROINES: This is just examples. This was our first risk assessment we had to decide upon. You can see different dose response models. The most risky is the Mantel-Bryan Mouse Preputial Gland. Then you have mouse leukemia and lymphoma. Human leukemia. And down there in seven, you have mouse preputial gland with a probit model.

So this is the first risk assessment we ever dealt with. And so we had to decide which one of those to choose. Were we going to be conservative and pick the preputial gland? We were going to be conservative -- not conservative, health conservative, and pick a probit model.

So this is an example of we -- I don't think we've had anything like this, Melanie, in years, but this was the starting point. And our Panel had to pick it. And we picked the mouse leukemia multi-stage model and the human leukemia Rinsky data as the choice. We did not pick the preputial gland, because we thought we would be ridiculed for it.

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CHAIRPERSON FROINES: All right. This is just methylene chloride. I just want to show you. You have two metabolic pathways. This was the first time this Panel ever took up PBPK modeling. I won't go further. But PBPK modeling is now much more common in terms of risk assessments. Although, there are still significant uncertainties. But this was the first one where we had to look at a process where you have one pathway, which is presumably safe and one pathway which causes cancer. And so we did -- industry did PBPK models and that started that.

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CHAIRPERSON FROINES: This goes without saying.

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CHAIRPERSON FROINES: And this just says -- this is Garshick's work, where we indicates that lung cancer and diesel exhaust is real. And since then, as Ellen

knows, there have -- these are -- I just named three Garshick papers, but the evidence on diesel has grown and grown and grown. So I don't know if we're up to 50 -- see, there they're talking about a meta-analysis on 35 studies. I don't know what it is now. It could be up to 50, for all I know. I just got a paper that says the same thing to review.

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PANEL MEMBER GLANTZ: John.

CHAIRPERSON FROINES: All right. Perchloroethylene, you can look at this at your own --

PANEL MEMBER GLANTZ: John, you left out an important fact about the diesel story.

CHAIRPERSON FROINES: What?

PANEL MEMBER GLANTZ: And while John is correct that we don't take public testimony at the meetings, we have, on a few occasions, held public workshops, where the public can come. And the diesel people hired Garshick, who came to the meeting -- I remember it was at UCLA -- who then proceeded to trash most of his own studies. And one thing we did get in the record there was I remember I read the definition of a toxic air contaminant and asked the room -- this was the high point of my career on this Panel -- and said is there anybody in this room who doesn't think diesel exhaust meets this definition?

And there was complete silence, including from Mr. Garshick.

PANEL MEMBER BLANC: Dr. Garshick.

PANEL MEMBER GLANTZ: Mr. Dr. Garshick, yes.

CHAIRPERSON FROINES: Well, I think just to clarify a little bit what you said. Eric basically took the position that the evidence was not yet sufficient for a risk assessment. And so he wanted to wait till the evidence was more clear. And Tom Smith and Eric are coming out with a paper very soon which I'm told is going to be devastating on this issue. And so we'll see.

Are you on that?

PANEL MEMBER EISEN: No, but I was on the 2009 paper.

CHAIRPERSON FROINES: You were?

PANEL MEMBER EISEN: I was.

CHAIRPERSON FROINES: And so diesel is going to be with us -- as long as you're on this Panel, diesel will be with us, because it's going to come back and back and back and back. I was accused of the American Trucking Association of misconduct professionally and scientifically, because of diesel. And so this is one that I think will be with us as long as we live.

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CHAIRPERSON FROINES: Now, I just put this up.

This shows -- you can look at this. I won't go through it. We did Perchloroethylene. All sorts of things have happened basically banning Perchloroethylene. And so Perchloroethylene now is, as you can see at the bottom, require all machines to be removed when they become 15 years old or by 2023. So that we did the risk assessment. And the risk management basically bans Perchloroethylene.

--o0o--

CHAIRPERSON FROINES: And the future is what compounds should form the highest priorities for the future?

Children's protection, pesticides. And whether we take global climate change, I don't know what the plans are.

But let me finish by saying one thing. As I said earlier, our research focuses on chemical reactivity as the first step, for example, electrophile, Michael addition reactions with proteins for example. And we're interested in electrophiles and pro-oxidant.

And so there are hundreds, if not thousands, of chemicals that fit the Michael addition category for example. And that's important because when you have an adduct with a protein form with a Michael addition reaction, that's an irreversible process. And so the irreversibility is quite important.

So as I said, there are hundreds, if not thousands, of electrophiles and pro-oxidant chemicals. And I don't know what it's going to be said today, but we'll hear, but I believe that we do not receive enough chemicals. And that it's worth our having a meeting where we discuss chemicals that we go back to the agencies and suggest that they bring forward.

And I would argue, for example, quinones, Michael addition compounds, that there's a whole range of chemicals that should be dealt with as a class of compounds. And normally, all chemicals are brought to us from the agencies. And I would argue that that time should be passed, and that we should make recommendations to the agencies for chemicals that they -- that we consider appropriate for consideration as toxic air contaminants.

That's totally up to you. If you just want to do the chemicals they give us, that's fine. But if you want to deal with classes of compounds or compounds that have -- for example, electrophiles that have irreversibility.

So keep in mind that we should have a discussion amongst ourselves about our -- what are chemicals that should be brought forward to be considered as toxic air contaminants? And I think it's quite important, because

EPA is now doing something called ToxCast, where they're looking at about 400 chemicals, and they have another new chemical review process where they're looking at hundreds of chemicals. So there are, in terms of toxicity testing -- there is a wide range of activity going on. And the question is where should we be in that activity?

And as I said, we can punt, and not do anything, or we can take a more assertive position and suggest to Melanie and ARB that there are these chemicals we think should come forward.

PANEL MEMBER GLANTZ: Since we're sort of bringing all the new people up to speed with the old people, I mean I don't want -- I think what you said though could be misinterpreted, as to say that this Panel doesn't have anything to do with what comes before us. And that's not correct. I mean, we've had two or three rounds of priority setting. And there are priority documents. There are documents that try to establish priorities for what should come forward, which the idea for the priority setting came from the Panel a long time ago.

CHAIRPERSON FROINES: Yes.

PANEL MEMBER GLANTZ: And the agency has more or less paid attention to that. And so I would take your suggestion and frame it a bit differently. And that is,

maybe it's time to reopen that issue and relook at the priorities.

CHAIRPERSON FROINES: I think --

PANEL MEMBER GLANTZ: But it's not fair to give the impression to the new members that we play a passive role in this.

CHAIRPERSON FROINES: No. Stan, what I was doing was not saying what you said, precisely because I can see a woman over there who may be talking about this today. And so I was leaving it open for her. I think that -- and I apologize for what I'm about to say --

(Laughter.)

CHAIRPERSON FROINES: -- but that process has been going on for more than 12 years, right?

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: We had an SRP meeting in 2007 on a proposed prioritization methodology change, and we're still working on that.

CHAIRPERSON FROINES: But this was going on even before that?

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: Yeah, but then that's how all the compounds that came before the Panel were.

CHAIRPERSON FROINES: So what I'm saying is the methods that they're using do not take into account

Michael addition compounds, electrophiles, irreversible pro-oxidant compounds. We know a huge amount about compounds that are highly -- that we would argue are highly toxic, and we need to work with the agency to show them that their priority listing can be updated. Is that fair?

PANEL MEMBER GLANTZ: Well, I think -- I mean, I think if that -- if people think that makes sense to do, which I was the one who started the prioritization process back before the beginning of time. So I think that's great, but I don't think -- I don't want the new members to get the impression that we don't, from time to time, deal with the agency and work up prioritizations.

And in addition to the specific compounds or chemicals that we've dealt with, there have been a series of documents dealing with process, and, you know, what are the standards for doing a risk assessment, how do you do stochastic modeling, you know, things like that, where this Panel has basically worked with the agency to write the ground rules for the risk assessment too. So it's more than just sitting here passively, you know, accepting chemicals.

And I want to second what John said though. I think that in working with the people, you know, at ARB and OEHHA and DPR, I mean, they've been quite responsive

to suggestions that have come from this committee by and large.

CHAIRPERSON FROINES: And she's right, we have had -- I don't -- I've lost track, but at least two or three meetings.

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: Yes, with leads.

CHAIRPERSON FROINES: And those were very good meetings. That there has never been a note of dissension or disagreement in -- well, maybe some disagreement, but --

(Laughter.)

PANEL MEMBER GLANTZ: Don't get too carried away here.

(Laughter.)

CHAIRPERSON FROINES: But the point is it's been a collegial process. But as far as I'm concerned, the process has to move, because, folks, we did diesel in 1998. We did environmental tobacco smoke in when?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: 2005.

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: 2006.

CHAIRPERSON FROINES: 2005. So since 1998 we have had -- forgetting -- sorry, Randy. We've had two ARB

chemicals. And my view is we've got a lot of smart people putting a lot of time into this Panel, and we should be taking up important compounds and working ourselves to death. And that's a joke for the new people.

(Laughter.)

PANEL MEMBER GLANTZ: It is?

I mean it is, yes.

CHAIRPERSON FROINES: And so I think that this is a very important issue about how do we deal with prioritization, because the law requires ARB to follow up what we do and the Board does and set in motion risk management decisions. And so it's not a free lunch.

Just because we name something a toxic air contaminant, doesn't mean -- should mean that the risk management efforts go forward.

And what I wanted to do to finish, and I don't want to bore the new members to death, and I may have done that already. But the point is, Stan, you just made a cogent comment. Can we get comments from people who have been on the Panel before, if you have anything to add to what I've said.

Kathy and Paul?

PANEL MEMBER BLANC: No.

PANEL MEMBER HAMMOND: No that's good. I'm sure I will speak later.

CHAIRPERSON FROINES: Yeah.

PANEL MEMBER BLANC: I mean, I think it's very confusing, because there are different reasons why substances come to the Scientific Review Panel for comment. And inherent in what John was talking about is that the bulk of what we have been dealing with in recent years are substances which have already been identified as toxic air contaminants, if it's coming from the OEHHA side.

And we are commenting on whether within that designation a particular risk assessment applies in terms of specific levels of exposure that would trigger various kinds of actions. And I think we have a chemical like that on the menu today. That is to say, we're not being asked to comment on it being a toxic air contaminant, it's already been listed, but rather to comment on a risk assessment in terms of exposure limits that might be dealt with.

And that's been the bulk of what we've dealt with rather than taking up a chemical which is not already listed as a toxic air contaminant and recommending it that it be -- recommending that that substance be so designated. Am I correct in --

CHAIRPERSON FROINES: Yeah, but I was asking a different question, and you followed up what Stan was

saying. I was asking is I went through a lot of stuff. And --

PANEL MEMBER BLANC: I'm just trying to --

CHAIRPERSON FROINES: Do you have any comments --

PANEL MEMBER BLANC: Well, I do, but I just want to put that in context, because I think it was -- it would be easy to lose that in the discussion. So, yes, I don't disagree that, in fact, the pace at which a potential new designated materials as toxic air contaminants has been slow and perhaps not driven as much by rationale priorities as they might be, but I think that the most glaring category has not necessarily been materials from -- coming through OEHHA, but rather our dual role in reviewing substances that would come to us from the Department of Pesticide Regulation.

And I think in that area, it's been woefully slow in both materials that are already recognized as toxic air contaminants or should be recognized as toxic air contaminants. And so I would only amplify what you're saying in terms of that.

In terms of a more nuanced prioritization of materials, frankly, I see the bigger problem is that the pace of what comes to us is so woefully slow that the issue of what should be ranked 17th versus 13th is irrelevant if we're going to get one chemical every two

years.

It really -- that kind of effort and prioritization, absent someway of making the pace of what comes to us different, which is really partly because the regulatory requirements for each tiny thing that's done require hundreds and hundreds of, you know, personnel hours of work.

So I don't see an easy solution to the problem, but I don't think the entire issue is in what order they come to us if they come to us so slowly that it's a moot point.

CHAIRPERSON FROINES: Kathy.

PANEL MEMBER HAMMOND: I want to thank you for this overview, because I actually didn't get such a thing whey I was newly on the Board. And I would like to just say some things to the new members who may not be so clear. Maybe it's clear to you, but it took me awhile to see it.

And that is that the way this actually comes to us is that the agencies have actually done a huge amount of work in the beginning. They've done the background work and they have performed a risk assessment that's been published. And there's been opportunity for public comment. There often is public comment. And so there's a list of public comments and questions. And then the

agency responds to those questions. And it's at that point that we actually receive the materials.

So we actually have seen both the -- you know, we've seen the risk assessment. We've seen the public's response to that risk assessment and then the agency's response to those responses. And then we're working from that. So that gives us a huge amount to work from. We're not starting de novo trying to do those.

CHAIRPERSON FROINES: Kathy just -- Stan, just before we go to you.

I just wanted to -- you raised an important question for the Panel. We tend to -- and tend may not be the right word. We emphasize in our review peer reviewed documents. We get a lot of documents that are done by the affected industry. And so there is always the issue of the classic chicken in the kitchen --

PANEL MEMBER BUCKPITT: Wolf in the hen house.

CHAIRPERSON FROINES: -- wolf in the hen house. And the requirements for testing by U.S. EPA are -- I can honestly say because I'm doing research on this right now. The EPA testing requirements are, to some degree, too a large degree, inadequate. So we don't get -- if we find a compound that is neurotoxic and also has results in development -- miscarriages, resorptions in animals, and the industry doesn't do a neurodevelopmental test, it's

ludicrous what gets left out.

So we need to be prepared to say what has been left out of the testing protocols and were they adequate. We need to look at the chemicals that we take up from an academic standpoint. We are not regulators. We are scientists. And so that's why there's an emphasis on peer reviewed documents.

And there is a paper in Environmental Health Perspectives on Bisphenol A, where a group of scientists criticized EPA requirements and industry requirements for testing compared to academic requirements. And it's a very good paper to read -- it's EHP -- and it clarifies the differences between how regulatory agencies sometimes see things and how scientists and universities see things.

And I think it's a very important paper, because we're going to see documents come before us, in which DPR is going to say this meets FIFRA requirements. Well, FIFRA is at least at the Brontosaurus stage. And so that we need be to aware Of what FIFRA is, and then be aware that that's not sufficient from an academic point of view.

PANEL MEMBER GLANTZ: Well, just to -- again, I -- I'm like the second longest member serving. John's been -- you've been here from the very beginning, right, when the Committee was set up?

CHAIRPERSON FROINES: I couldn't get another job.

PANEL MEMBER GLANTZ: You couldn't. Well, anyway. But there's a couple of other -- just kind of getting to things that I think are important that John didn't mention.

While we do apply a high scientific standard, you know, I'm reluctant to use the word academic, because academia you always feel more research is needed. That's always the conclusion of everything.

And one of the things that I think makes this process work, and very important and influential and one reason I've stayed on the Panel so long, is we do reach conclusions based on the information -- the available information.

And there's a couple of things in the law that I think were very forward looking for when it passed in the early eighties. And one thing is that we do not require certainty to draw a conclusion. In fact, the law explicitly recognizes that there is often uncertainty and all probably always uncertainty.

And if you look at the findings that we've adopted, I don't know if all of them, but certainly most of them, have a statement as to the certainty with which we can reach the conclusions that we reach.

And so in drawing conclusions about the information that's put in front us, we're not looking for

perfection. We're looking for a good strong defendable decision.

The second thing, which is explicitly in the law, which I think is very, very important, and, in fact, it comes up in the chemicals that are on the agenda today, is the question of whether there's a threshold. And that's something we explicitly are charged with drawing a conclusion on, whether there's evidence for a threshold.

And so those are a couple of, I think, important kind of things about how thinking about this, while we want to apply very high scientific standards, I don't think it's quite an academic standard in the sense of sitting around a seminar. In the end, we do try to reach conclusions.

The other thing, just as a practical matter, the way -- and John alluded to this a little bit, because these are actually pretty thin compared to what we usually get dumped on us. You know, I was -- some of them are like this thick, and --

CHAIRPERSON FROINES: That wasn't what you should say in the --

(Laughter.)

PANEL MEMBER GLANTZ: Okay. Well, no, this is really -- it's like reading a really fast-read novel, but anyway. That's a joke.

(Laughter.)

PANEL MEMBER GLANTZ: But the way I approach these personally is to read the executive summary in the first part of the report, and then read the public comments and the response to comments, because these reports are often very long. They're very detailed. And I find that gives you -- because, I mean, most of these things are areas I'm not, you know, working directly. And sometimes, like tobacco smoke it was, but that was the exception for me.

And in going through the comments, you can see what are the issues that people who have spent a lot of time thinking about this and who have a stake in the outcome, you know, think are the issues, and you can judge how well you think the agency dealt with them. And, you know, sometimes they do a good job and sometimes we raise questions about it.

And then I go back and look at the rest of the document with the public comments in mind. And I think that's something that makes the job manageable when you start getting a lot of very technical material dropped in your lap.

And while -- you know, as John said, I mean, I think we've had, at least in recent years, a very good working relationship with the agencies. That, by no

means -- this Panel is not a push over. And some of the meetings have kind of reminded me of where we've had the agency staff a five hour doctoral dissertation with a nine person committee and a court reporter.

So this is not a shy -- or historically has not been a shy group in terms of raising issues about these reports.

CHAIRPERSON FROINES: I wanted to follow up on some something you said.

PANEL MEMBER BLANC: John, can we work towards a break.

CHAIRPERSON FROINES: Yes, of course.

(Laughter.)

PANEL MEMBER BUCKPITT: I think you just did.

CHAIRPERSON FROINES: I want to follow up on something that Ellen Eisen said. And that is that, in my view, this Committee -- this Panel should basically be operating from a position of the precautionary principle, where we deal -- we make decisions based on certainty and we decide what our policy is going to be on those decisions, and that the -- so there are questions of causality. There are questions of uncertainty. There are questions of variability and susceptibility. And how we -- and default mechanisms that are applied.

And so it seems to me that we have to have in the

back of our mind what Ellen said is the idea of precaution, uncertainty, and alternatives. Is that something that we should have as being relevant to our deliberations? And it's a decision of the Panel, but I would argue that's what we have done historically.

PANEL MEMBER EISEN: Just to be clear, I never used the term precautionary principle. I would not use the term precautionary principle. All I did was raise the question about whether or not we could consider alternatives.

CHAIRPERSON FROINES: Okay. I think precautionary principle has so many problems with it, I think that she's right, and that -- but the issues of uncertainty and how you deal with that, issues of how you deal with variability, how you deal with causality, those issues -- and how you make decisions when you don't have the world's amount -- you know, enormous amount of data, that's what I meant. And I can leave out -- you know, we've had pollution prevention, toxics reduction, precautionary principle. And all those terms to me are, at some level, out of date and don't tell you what you need to know.

So anyway, that's -- is that okay with you?

PANEL MEMBER EISEN: Um-hmm.

PANEL MEMBER GLANTZ: But you know, at the risk

of dragging this on and delaying the break, you know, I think if you look at the chemicals before us, these issues are there in spades. You know, is there a threshold? You know, do you like the way things are being modeled or described? You know, what assumptions are reasonable to make in dealing with, you know, limited sometimes messy data?

And I think those are the questions -- you know, on one hand you want to be concerned, I mean, of protecting the public health, but you don't want to be -- go to the point where you're imposing or estimating risks that are just not defendable.

And I think one of the reasons the Panel has such a good record over all of these years of the reports being upheld is because this is something people take very seriously, and, you know, come up with science, which is defendable.

You know, and these are -- I mean, I think these are thin reports here, but a lot of the issues which routinely come up are embodied in them.

CHAIRPERSON FROINES: I think --

PANEL MEMBER GLANTZ: We should take a break.

CHAIRPERSON FROINES: Yeah, we're going to take a break. Kathy wants to say something, and I was just going to say one comment. I don't know about Peter and Tim, but

I think it would be useful for this Panel to have a copy of the new NAS risk assessment report, because it is where things are at at this point.

And I think that we need to be aware that people are proposing significant changes, while keeping some of the stuff from the past. And it will affect how we view. Because I mean the issue of defaults is a policy decision. And so when we get into -- like when we got into mitigation on methyl iodide, the default --

PANEL MEMBER HAMMOND: We did not get into mitigation in methyl iodide.

PANEL MEMBER BLANC: The SRP did not deal with methyl iodide.

CHAIRPERSON FROINES: No, I'm sorry.

PANEL MEMBER BLANC: So can we drop that?

CHAIRPERSON FROINES: Yes, my fault.

Kathy

PANEL MEMBER HAMMOND: I was just going to comment. I actually don't think the Panel has a articulated strong viewpoint about things that you mentioned earlier, such as pollution prevention or precautionary principle. I think we are nine individual people, individual scientists with individual perspectives, and we're brought here to bring all of that together. We do come to some consensus of particular

documents and things, but I think that it's very important to bring the different perspectives, and that's what we try to do.

CHAIRPERSON FROINES: You missed what I've said. What I was saying was I was responding to Ellen, and I was saying that there are these terms that have been used widely, namely precautionary principle, toxics reduction, pollution prevention, toxics use reduction. And in my view, we should not use those terms. We should use terms that have actual scientific meaning, like the concept of uncertainty.

So let's take a break.

PANEL MEMBER BLANC: How long?

CHAIRPERSON FROINES: Fifteen minutes.

(Thereupon a recess was taken.)

(Thereupon an overhead presentation was Presented as follows.)

CHAIRPERSON FROINES: Can everybody hear me? Can you say something, Janette?

PANEL MEMBER BLANC: Can we reconvene?

CHAIRPERSON FROINES: We can reconvene. We are reconvening.

PANEL LIAISON BEHRMANN: Janette will be able to speak as soon as she has the microphone. This is Jim Behrmann, the Panel Liaison.

CHAIRPERSON FROINES: I'm going to say one thing while we're waiting. This new Panel can keep everything the same as has been done before. I personally believe it's time for a change, and that we should be thinking about how to improve the efforts of our Panel, and specifically how do we improve the number of chemicals we deal with, and how do we improve the processes that we pursue.

So this is something to discuss at a later date. But I think that we've been going successfully for a long time, but I think it's worth discussing, at least, how we want to operate.

And so, ARB, are you ready to go?

PANEL MEMBER BLANC: Yeah, Jim wanted to speak first, I think.

CHAIRPERSON FROINES: Oh, yes. I'm sorry.

PANEL LIAISON BEHRMANN: John, I'm going to give some brief introductory remarks.

CHAIRPERSON FROINES: Sure.

PANEL LIAISON BEHRMANN: If I may?

CHAIRPERSON FROINES: I'm sorry, I knew that and was looking at Janette.

PANEL LIAISON BEHRMANN: Thanks, John. Just to reintroduce myself, I'm Jim Behrmann, the staff liaison to the Panel. And also just to clarify, I believe that my

role is to serve both the Panel as well as the staff of the three departments that the Panel advises. I act as a conduit for information, a point of contact and try to facilitate the communication and the actions of both the staff in the Departments as well as the Panel.

So any of you can feel free to contact me in whatever way I may be able to help. I wanted just to make --

CHAIRPERSON FROINES: And if there are disagreements between an agency and the Panel, Jim will act as a go-between often.

PANEL LIAISON BEHRMANN: That's correct.

And if I might just take a minute briefly. I wanted to acknowledge at least two individuals that are here today. First of all, is Bart Croes, who is my Division Chief within the Air Resources Board. He's Chief of our Research Division.

And in that capacity, he's responsible for our extramural research program, which includes research into the health effects of not just toxic air contaminants, but other pollutants as well. The climate change program, stationary source controls, motor vehicle controls, and the likes. So it's a very broad extramural research program that Bart's responsible for. Any he probably does much more than that as well. I just want to limit it.

The second individual is Richard Corey, who is Chief of our Stationary Source Division. And I won't begin to list the programs that his division is responsible for, but they include the toxic air contaminant program, both the identification as well as the risk management side of that program, as well as fuels, diesel regulations, and the like.

So anyway, thank you both for being here today.

CHAIRPERSON FROINES: Can Rich say something about his role. Oh, there you are.

PANEL MEMBER BLANC: He'll be speaking I think as they go down the Panel.

CHAIRPERSON FROINES: Oh, you are.

PANEL MEMBER BLANC: John, I'd suggest that we let them just do their thing for awhile.

CHAIRPERSON FROINES: It's okay. I'll decide.

PANEL LIAISON BEHRMANN: With that, John, just a few brief remarks. You had mentioned the what led to the Panel being created. And I just wanted to give a couple examples of that.

The Panel, having been created in 1983 when the passage of Tanner legislation, AB 1807, has a rich history, over a 25, 28 years of meetings and activities. In fact, I think it's over a hundred meetings.

But looking back to the late seventies, just to

give a couple of examples, there was a very clear concern about toxics in the air, possible carcinogens in the air, and these were reflected in a couple of examples that were meaningful to me.

In 1977, the Board learned of emissions of vinyl chloride monomer and vinyl chloride itself from manufacturing facilities in southern California. And those of you, especially on the occupational side, know that in the mid-seventies a physician working for BFGoodrich had identified a very rare liver cancer associated with employees that were working for his facility.

And so within a year or two we learned, the Board learned, that there were emissions from facilities, including here in California, not just in other states, but here in California, including an elementary school located in southern California immediately down wind from a facility.

And the Board -- if you look back at the documentation from that time, the Board was struggling with what to do, because they did not -- the Board did not have the statutory authority to regulate emissions from that facility, other than the nuisance provision in State law.

And a very interesting outcome, the Board chose,

in 1978 to -- it may very seem odd, but they adopted an ambient air quality standard for vinyl chloride. Ambient standards generally are considered to be levels that are safe. The Board may it very clear it was setting this level in order to be able to push for emission controls.

And they made it very clear that this was not necessarily a safe level. It was being set at the level -- the lowest detectable level by the measurement method that was in use at the time.

Concurrent with that action that the Board took, the Board clearly had a concern about toxics, because the Board requested and initiated what was called an Ad Hoc Panel on Atmospheric Carcinogens, which was chaired first by Bob Sawyer from UC Berkeley. And then when he left to accept another appointment, it was chaired by Jim Pitts, who, of course, we know chaired this Panel for a number of years.

That panel met four or five times over a year and a half, and issued a report in 1979. Seven recommendations, which became the basis then for an initial set of toxics regulations that the Board adopted in December 1982, which were then superseded by the AB 1807, the Tanner legislation.

So just to give you a brief history that in the late seventies there clearly, over a number of years, was

a concern about what people were being exposed to.

CHAIRPERSON FROINES: Jim?

PANEL LIAISON BEHRMANN: Yes.

CHAIRPERSON FROINES: Can I interrupt you just for 30 seconds.

PANEL LIAISON BEHRMANN: Certainly.

CHAIRPERSON FROINES: The vinyl chloride issue I think is something that this Panel may want to discuss and consider. Vinyl chloride was originally recognized as causing angiosarcoma of the liver, and everybody knows that.

And that's the problem that we have too often taken a chemical and identified an endpoint. But if you look at ETS, there must be 25 endpoints or close to it. And the issue of multiple endpoints from a single -- from a chemical is something that has gotten way too little attention and is worth discussion in this Panel over time.

PANEL LIAISON BEHRMANN: Certainly. I'll leave that to the Panel.

Just to finish my remarks. The legislation that established the Panel. In your binder there is a section that is excerpts from State law. I think I will also provide you later with the longer version, which is the complete laws that will be discussed by the staff.

Right now you just have the excerpts where the

Scientific Review Panel is referred to. So you don't have in the binder the declaration of the legislature in the introduction to the Tanner ledge.

And I just wanted to touch on a couple points, because to me, Stan, I think already referred to it, or alluded to it, and I think it's helpful to just reiterate them.

The Legislature now speaking in 1983 stated that its their declaration that public health, safety, and welfare is being endangered by the emissions of such toxic substances, that persons may be exposed to a multiplicity of toxic air contaminants. It's the public policy of the State that emissions of toxic air contaminants be controlled to levels that prevent harm.

That the best science should be used, and that it should be reviewed by the public and a Science Review Panel.

That there is a need for a statewide framework and statutory authority that's needed. And for that reason, they were adopting this law.

And then finally, this was the point that Stan made, and I think it's very important, because it expresses the public health focus of this law. It says that while absolute and undisputed scientific evidence may not be available to determine the exact nature and extent

of risk from toxic air contaminants, it is necessary to take action to protect public health.

So we don't wait until absolute understanding or knowledge is available.

CHAIRPERSON FROINES: The thing I think you -- one thing that's equally important as to what Stan and you said is the word "prevention", and that's the guiding light.

PANEL LIAISON BEHRMANN: Yes.

With those brief introductory remarks, let me turn the microphone over to Janette Brooks from our Stationary Source Division, who will then be followed by Melanie Marty from OEHHA, and Randy Segawa from DPR.

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS:

Good morning, Dr. Froines and members of the Panel. Again, I'm Janette Brooks. I'm Chief of the Air Quality Measures Branch in the Stationary Source Division at the Air Resources Board.

And with me here at the table is Jim Aguila, Manager of the Substance Evaluation Section in my branch. And then you've already met Richard Corey, who is Chief of the Stationary Source Division. And I think Richard would like to say a few words.

ARB STATIONARY SOURCE DIVISION CHIEF COREY:

Thanks, Janette. Thanks, Dr. Froines, and Panel,

really prestigious Panel. In fact, I did want to make one comment. About 25 years ago, when I was with the Board interacting with the Panel quite a bit, in terms of the early stages of the identification program.

So and now I'm going to move to the impact that the Panel has had significant in terms of the ultimate actions that have been taken to reduce emissions and the ensuing health benefits.

But two points I wanted to make. One is I wanted to go back to Dr. Froines' question, in terms of just overall role. The Division that I oversee is primarily a regulatory division. So really what it's focused on are the actions to -- primarily regulatory actions to reduce emissions of ozone precursors, range of toxic substances, diesel particulate. We talked about that as well.

Recently, major regulations we've adopted, renewable electricity standard. Thirty-three percent renewable electricity standard that we worked with the energy agencies on. And the low carbon fuel standard that we're working to implement that is a GHG measure, but yields other benefits as well.

Overall observation that I wanted to make was touched on here, but -- and Janette will go back to it, but I think it's important enough to -- and it's one that's on my mind honestly often, and that is when I saw

the line item as diesel PM being identified as a TAC, what I see on my end is ultimately the development of a needs assessment, basically where are the emissions, where are the opportunities for reductions, where are the opportunities for the greatest benefit from a public health standpoint?

That needs assessment ultimately translated into about a dozen regulations through a public process that took a few years for each of those and ultimately to effective implementation and oversight and hundreds of tons of reductions, and in many cases co-benefits, not just diesel PM, but reductions of NOx, SOx, and a number of cases GHGs as well.

And what we find in terms of the implementation of those regulations is staying on point, staying on top of them from an implementation standpoint requires periodic adjustments, amendments. In fact, this year I'll be going back to the Board three or four times to make sure that adjustments are made to continue to ensure efficient implementation.

So my point was that, you know, the ultimate identification does translate into the serious evaluation of opportunities for emission reductions, and, in many cases, the adoption of regulations and the need to make sure that we get the reductions that we anticipated, which

requires the ultimate effective implementation, and in many of these serve as a model both nationally and internationally.

So the actions here, they do go somewhere in a significant way.

CHAIRPERSON FROINES: I don't want to get into asking a lot of questions, but people should feel free to ask questions to any speaker. I was just going to say, are you, in any way, addressing ultrafine particles?

ARB STATIONARY SOURCE DIVISION CHIEF COREY: In fact, Bart has a lot of background on this issue, and certainly something that we have been looking at. And I think the actions that we've taken, what are the reductions of ultrafines that those actions are already taking, which they do.

But we have been looking closely at the work of the EU and its motor vehicle standards, and, you know, exploring even the possibility of expanding PM regulatory work.

But clearly, the regulatory actions that have been taken speak to that issue in part. There certainly is developing science. We need to continue to stay on top of and be aware of it with respect to that issue as well, but it partly goes back to my point about co-benefits. As the science unfolds, we're finding several of the actions

we're taken already are yielding benefits.

CHAIRPERSON FROINES: The reason I ask it is because we know from our work that in the Caldecott Tunnel and elsewhere that when you reduce PM2.5 and PM10, the number of ultrafines increases dramatically.

So you have a contradiction. You have a standard for PM2.5, but as it goes down -- as the emissions go down, the number of particles goes up. And so the question is what is it that's causing disease and illness?

ARB STATIONARY SOURCE DIVISION CHIEF COREY: Very fair question, and a number of researchers are looking at this. I think most would agree that there are clearly irrefutable benefits of reducing mass. But to the extent that we can do that in away that doesn't have an impact on the number of fines, yeah, point well taken.

Back to Janette.

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: Okay.

CHAIRPERSON FROINES: We always appreciate Janette attending. She's our good friend and articulate spokesperson.

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: All right. Well, on this slide it shows the outline of the presentation.

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ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS:

I'd liked to give a few background slides on the Air Resources Board's Air Toxics Program and then talk about some current work that we're doing that Dr. Froines alluded to. And then close with some next steps that we would suggest for moving forward.

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ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS:

This was covered briefly too, but for the Air Resources Board, our Air Toxics Program is multi-faceted. There's two major components, the Toxic Air Contaminants Program and the Air Toxics Hot Spots Program. The Hot Spots Program Jim was telling you was first adopted in 1983. And it established a two-step process for control of toxic air contaminants, one of which started with substance identification and then the second phase is a control phase.

And then in 1999, Senate Bill 25 amended the Air Toxics Program to include consideration of infants and children's health in the program.

I will be talking about in later slides a little bit more detail about the Toxic Air Contaminant Program, particularly the identification phase.

For the Air Toxics Hot Spots Program, this program was first adopted in 1987. And it required

facilities to report their air toxic emissions and had other community right-to-know provisions. And then it too was a amended in 1992 to add a requirement that any high risk individual facility should reduce their significant risks.

And I wanted to say that OEHHA has responsibilities under SB 25 that they'll be discussing in their presentation. And they also have many responsibilities under the Air Toxics Hot Spots Program that are relevant to the Panel that they will be discussing as well.

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ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: In this slide, it just shows a little bit more detail about the two programs that make up our overall umbrella program for air toxics. And for the Toxics Air Contaminant Program, and I'll cover this in more detail, because it really is relevant to the Panel and their role, there are specific steps for the identification of a toxic air contaminant. And I will go through those in a minute.

But there's basically two elements to the program, toxic air contaminant identification or risk assessment. And then once a substance is identified as a toxic air contaminant, then there's a needs assessment and a risk management phase to the program.

In the control phase of the program, when we do the needs assessment, we are looking to see whether, you know, what are the costs of controls? Is it feasible to control? How much is the risk going to be reduced? And then if those controls are justified, we move forward.

As OEHHA carries out their SB 25 work, it's relevant to us, because we may need to revise a control measure we've already adopted or review -- or develop a new control measure. And so that is work that we would need to do.

The Air Toxics Hot Spots Program, I'll just go through a few of those steps, because it's very relevant to, I think, even the topics you're going to be discussing later today. That program required facilities to report their air toxic emissions to the local air pollution control districts. And then the air pollution control districts report that information to the State, and that became our air toxics hot -- our air toxics inventory for the State, which we'd never had before.

The air districts use that data -- emissions data to prioritize the facilities. And if they feel that that facility may potentially have high risks -- health risks to the nearby residents, then they require the facility to prepare a health risk assessment.

And the risk assessment results are used if it

turns out that facility really is a high risk facility, then there's a requirement that the public be notified of those risks.

And then as we mentioned, Senate Bill 1731 amended the legislation to require that those individual facilities with significant risks will have to reduce those risks, and they'll have to repair a plan that lays out how they're going to do it.

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ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: And I won't spend any time on this, because Dr. Froines already covered it, but the definition of a toxic air contaminant is very fundamental to the program. So I just wanted to make sure you saw it, but he's already done though, so we'll go on.

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ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: CHAIRPERSON FROINES: Janette, I saw a slide -- maybe you're going to get to it -- but where the five or six chemicals that we identified were listed. And then there was another slide that lists another five or six, that I don't know what -- we never looked at those.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: I'll cover it.

PANEL LIAISON BEHRMANN: It's Melanie's.

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: This slide shows the process that is used to identify a substance as a toxic air contaminant. And also it shows the role of the Scientific Review Panel in the blue boxes there.

And Jim mentioned to you that it was the intent of the Legislature that the identification and regulation of air toxics utilized the best available scientific information. And that that information should be gathered from the public and others that do research. And that the, and I'll quote, "The scientific research, on which decisions related to health effects are based, should be reviewed by and Scientific Review Panel and members of the public". And this process diagrams shows that this program reflects that legislative intent.

And it begins with the selection of a candidate toxic air contaminant. And we are required by law then to go out to the public and request information on the health effects of that compound. And once we get that data back, and many times we do get lists and lists of references, we would make -- the next step would be we would make a formal request to OEHHA to prepare -- begin preparation of the health evaluation. And we would provide them with all of those references that we got in the information request that we went.

And then the next step is that the Air Resources Board develops an exposure evaluation and concurrently OEHHA is working on their health evaluation.

And as Dr. Froines mentioned, we have assigned SRP leads for each of the chemicals, and we work with the chemicals -- we work with the leads in developing the report. And once it's in good shape, we release the report for public review and we hold public workshops, and we get those comments back. We summarize the comments and respond to the comments. And then all of that information goes -- is submitted to the Panel for their official review.

CHAIRPERSON FROINES: Janette?

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: Yes.

PANEL MEMBER HAMMOND: Just a question kind of comment. What you just mentioned, which I think is a very important part of the process, is not actually reflected on the slide, correct?

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: No, I've just added that, because the law --

PANEL MEMBER HAMMOND: I think it's very --

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: -- doesn't require it, but it's part of our process that has worked well in the past.

CHAIRPERSON FROINES: What is this?

PANEL MEMBER HAMMOND: And that's always been done?

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: I think for the most part it has been done.

PANEL MEMBER HAMMOND: I mean, since I've been on, it has been.

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: Right, it has.

PANEL MEMBER HAMMOND: And I think it's an important part of the process. And I just wanted to point that out. I know you were saying it, but it wasn't on the slide.

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: Yeah, it's not on the slide.

CHAIRPERSON FROINES: Can I just comment on what Kathy just said. The history of the Panel is that when somebody's making a presentation, the Panel can interrupt to ask questions under two criteria, one of which is, as Kathy just did, to clarify something or if there's a major issue they can interrupt. But otherwise, we tend to let the speaker finish their talk and then have questions.

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: Okay. Well, so I got to the point where the SRP reviews the identification report at a public meeting.

And typically there are revisions and questions and clarifications and editing that needs to be done. And so, ARB staff and OEHHA go back and we work with the assigned leads to be sure that we respond to all the comments that we've received from the Panel.

And then if the -- and it goes back for reconsideration at another Panel meeting or however many meetings it takes. But once the Panel determines that the health effects report is based upon sound scientific knowledge, methods, and practices, then the Panel would prepare formal findings that they would submit to the Air Resources Board.

And when those findings come to the Board, we use those findings as a basis for our rule-making to list the substance as a toxic air contaminant. It becomes a part of our justification. And also, the peer review aspect leads, you know, -- it leads credibility to the program and what we're doing.

So the next step would be that we would hold a public hearing where the Board would consider listing the substance as a toxic air contaminant. And in the past rule makings an SRP member has come to describe the findings to the Air Resources Board at that hearing, and any other comments that they'd like to make about the chemical.

And then the last step is that the Board would decide whether or not it would be formally listed in regulations as a toxic air contaminant. And along with the listing goes the decision on whether or not it's a threshold or no threshold compound. And that does make a difference to us, because the requirements for control are a little different for a chemical that has a threshold versus one that doesn't have a threshold.

CHAIRPERSON FROINES: There's a new EHP paper on the issue of linear low dose response as a policy in science. And I think it would be useful if Peter could make that available to the Panel.

PANEL MEMBER GLANTZ: Can I just say something?

I just -- one other. Could you go back to the previous slide for just one second.

I'm just trying to kind of -- for the new people, I think it's very important. This definition is really integral to everything we do. And the important word is "may" I think. It's, "...an air pollutant which may cause or contribute to an increase in mortality...", "...or which may pose a present or potential hazard to human health".

It doesn't say "which does". We just need to be reasonably convinced that it does. And that's very different. And I know for the people -- there are several

people here who are -- who work in biostatistics and epidemiology. And those are people who can spend endless amounts of time debating about causality. And that's really -- the standard in the law is not an epidemiologic causality beyond all shadow of a doubt kind of standard.

And so I think when you're reviewing these documents, when you're reviewing the public comments, the response to comments, the discussions with the agency, I think it's very important to keep this definition that's in the law in mind. And if -- I mean, it's true anything might cause something. It doesn't say which might, but the standard in the law is actually a health protective standard.

CHAIRPERSON FROINES: But I think that one needs to recognize something else, and that is it makes it a little apples and oranges, which is the law requires the agencies to develop quantitative measures of risk. So this may be not vague, but may be very general, but the requirement that there's a risk assessment is not vague at all. So that the agencies may recognize this, but they work at developing a quantitative risk assessment.

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ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS:

This slide I just -- we just wanted to leave it with you. I'm not going to go through it, but it is the

Health and Safety Code citations that list out the specific charge of the Panel in reviewing the identification reports.

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ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: Dr. Froines kind of covered this, but I think it is an important point where we have in the program comprehensive risk assessments for 23 toxic air contaminants that were peer reviewed by the Scientific Review Panel. And then when Assembly Bill 2728 required us to automatically adopt the 189 toxic air contaminants, then the majority of those did not have a comprehensive risk assessments.

And the way we translate that is in our risk assessments, there's non-cancer health values for the chemical and there's potentially a cancer risk number for the chemical. And so, you know, we were left in a place where there's risk assessment requirements under the Hot Spots Act. And these things are listed as toxic air contaminants, but there aren't any health values.

So it is a lot of work that the Panel has been going through to look at the health values for already identified TACs, but I think it's kind of just what we got handed when we had to automatically adopt all of those substances at once.

CHAIRPERSON FROINES: I think that one other thing is I talked at some length about developing new chemicals for our review. And I just want to point out, the second chemical we ever did was ethylene dibromide and ethylene dibromide, at that time, was not used in California. And we complained, as a Panel, that we should be given relevant chemicals, and ethylene dibromide was irrelevant.

And so the issue for us should be that when something comes forward, it has been vetted so that we know that there is potential exposure and it's not a trivial issue.

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: We would agree. We would definitely agree with that.

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ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS:

And Richard had alluded to this, but following the identification of a substance as a toxic air contaminant, then we're required to assess the need for control. And the control measures that we develop reduce regional, community, and near source health risks.

And many control measures have been adopted. And just on the slide I wanted to point out for the diesel measures, I kind of summarized just the general categories of controls. But there's in the order of about 14 air

toxic control measures that have been adopted by the Board.

And we have been expending significant resources on both the adoption, and as Richard mentioned, the amendment of these measures and also implementation of these measures.

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CHAIRPERSON FROINES: And this is a serious problem. Go back, please.

We don't have control measures for vapors that derive from diesel. And that's a serious issue, and I could show you the science, but it just -- if you'll trust me, that we are going to need to deal with the vapor issue and not just the particulate issue.

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS:

Okay. I wanted to -- this slide is where I wanted to talk a little bit about our work on the -- we're working on an identification program plan. And in addition to formally identifying substances as toxic air contaminants, we have ongoing efforts. And Dr. Froines alluded to this. We have periodically a need to look at the prioritization methodology. The last time it was looked at was in 1993, and I think we've seen that there's a need to make some changes to it.

But in this program plan, these are the list of

things that we would be looking at. We would be updating and applying the prioritization methodology once it's updated.

We would be periodically updating the list of candidate toxic air contaminants, which also was alluded to. Are there some substances that they're not identified as toxic air contaminants, but they are a serious public health concern and we're just -- they're just not on our radar screen. Well, that's something that's important for us to look at.

And then for us to look at our top priority candidates. And then come up with a list for recommended formal identification, and then also are there some toxic air contaminants that need health values.

And in 2007, we had met with the Panel and we began working on an update to the prioritization methodology. And our goal for this year is to get approval from the Panel on the methodology, so that we can recommend changes to the program plan.

And in the next two sides, I'll give you an overview on how candidate TAC's are prioritized as well as planned revisions.

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ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: In this slide, we show that we apply a methodology that

examines aspects of health effects and data on public exposure in California. And those six criteria that are listed there are criteria that the Air Resources Board and OEHHA are required by law to give priority to for the identification and evaluation of a substance.

And you can see -- you can see those six things. The two main applications of the prioritization are as a screening tool to rank candidate toxic air contaminants, but we also use it for the toxic air contaminants that have already been identified that may need health values.

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CHAIRPERSON FROINES: I think that you have to add structure activity relationships to that list.

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: Okay.

CHAIRPERSON FROINES: So if you have a Michael addition chemical, that should be on a list no matter what the health effects literature says.

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: Okay. And I should have said that the prioritization methodology mostly -- mainly covered these six criteria, but we have been looking at other things as well.

So I'll just spend a minute. I don't want to go into a lot of detail, because that's not a topic of this

meeting, but we do have planned revision to the prioritization methodology. It had originally been approved by the SRP in 1990 and revised in 1993. And over the years, there have been revisions that we have seen needed to be made. We hadn't accounted for mobile source emissions. We felt that exposure was weighted too heavily, that carcinogenicity was weighted too heavily and non-cancer effects were not. The prioritization didn't account very well for children's health effects. So there really is a need to change and to make some changes.

So we do meet with the Scientific Review Panel in December of 2007 and proposed some changes. And there were a lot of comments and suggestions that we should consider in updating the prioritization. And we did have a meeting in May of 2009 that Dr. Froines alluded to, where we got a pretty good draft of changes, so what we would like to do is have the Panel identify some additional leads, because the original leads were Dr. Froines -- well, not the original leads, but the most recent leads were Dr. Froines, Dr. Atkinson, and Dr. Byus. And we don't have those two members anymore. So if the Panel wants, we'd appreciate, you know, knowing who our new leads would be, so that we can get started again.

And just in general, the revisions that we're working on have to do with changes in the point

distribution for the scoring, and new evaluation criteria and children's health effects.

CHAIRPERSON FROINES: Is there any two people who -- are there any two people who are new or old and would like to become the leads?

PANEL MEMBER GLANTZ: For the prioritization?

CHAIRPERSON FROINES: Yes.

PANEL MEMBER GLANTZ: I thought I was doing that, no?

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: We always talked to you about it. I know that you're very interested in it.

PANEL MEMBER GLANTZ: Yeah. I'll do it. I do it all the time, don't I. That's just my hobby. That way I don't have to know that much chemistry.

CHAIRPERSON FROINES: I would recommend that I ask at a break Bill Nazaroff who knows some chemistry.

PANEL MEMBER GLANTZ: Yes, that would be good.

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: Okay. Great.

CHAIRPERSON FROINES: Or Janette talk to Bill Nazaroff and he'll more likely say yes.

(Laughter.)

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: I don't know about that. I know that he's a very busy

person.

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ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: All right. So for the next steps that we would suggest, of course the first goal would be to have the Scientific Review Panel review the prioritization methodology. And we would work with the leads to prepare the draft, so that it's in shape to present to the Panel.

And then once we do have approval of the methodology, then we can utilize it, and we can finalize our plan and come up with a list of top priority candidate toxic air contaminants, and a list of toxic air contaminants needing health values.

And we would -- what we would do is consult with OEHHA and the SRP leads in preparing this report that would be based -- you know, once we have our conclusions, we would prepare a draft report, and we would send it out for public review. And we would take all the comments, summarize them, respond to them, and then the program plan report with the comments and the responses would go to the Panel -- the entire Panel for review at a meeting.

CHAIRPERSON FROINES: Janette. Melanie, are you working with them at all in the context of 1879, 509? And secondly -- I forgot what I was going to say -- so that -- and also ToxCast and the EPA Chemical Review

Program?

So there a four laws that are relevant to this.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Yeah, the laws that John referred to AB 1879 and SB 509 are the green chemistry statutes in California, which OEHHA has a role in. And we have been working with ARB on the prioritization methodology, focusing more on updating for children's health issues.

Of course, the green chemistry concepts are in our minds. And from that perspective, we have talked about ways to get those kinds of information into the thinking about prioritizing chemicals. But I can't say that there's anything off the shelf that you could use at this point in time.

And even the structure activity modeling is -- it's great for a limited set of chemicals, because it's very chemical domain specific. So it may not be -- I mean, it could be used, but it may not be as useful as we would like it to be. But having said that, we are thinking in those terms.

CHAIRPERSON FROINES: There's a new law that requires industry who have to identify chemicals that are used in cosmetics. And that's one that probably should be looked at, and -- but also the ToxCast system is going -- is the hottest thing in Washington, and that's

worth looking at.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: We're looking at all of those in the context of our role in SB 509.

PANEL MEMBER GLANTZ: Yeah, one other thing. The process historically has been heavily weighted toward cancer. And now we have like an environmental cardiologist on the Panel. And the evidence linking environmental toxins to cardiovascular disease has really exploded in the last 10 years. There have been a couple of really good reviews and circulation, and circulation research.

And so I think in developing the prioritization, I think you need to take those effects into account too, particularly because a lot of them are probably a lot faster than the cancer things, where you're -- I mean, there are no doubt chronic effects, but, you know, if you look at tobacco smoke, for example, the great bulk of that effects are acute.

And C. Arden Pope published a really nice paper about a year and a half ago now in circulation, where he looked at particulates and heart disease risk and showed that air pollution, passive smoking, and active smoking all fell pretty much along a single curve.

And so I think strong oxidants are very

important. So I hope, in developing the prioritization scheme, you'll work that in.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Well, the acute and chronic systemic toxicity is definitely considered. It's not just carcinogenicity. And we are very well aware of the number of chemicals that impact the cardiovascular system.

CHAIRPERSON FROINES: Is there any look at endocrine issues or neurodevelopment prenatal issues?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Yes, all of the above, in as much as there is information on the chemicals. Remember, that it's nice to be able to say yeah we're going to cover all these endpoints, but generally, and on the whole, we are dealing with chemicals for which there aren't regulatory requirements for testing. So therefore, there are gigantic data gaps.

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS:

And that basically concludes what we had prepared for you today.

CHAIRPERSON FROINES: Okay. Thank you. Are there questions from the Panel?

Jesús should be required to have a question after what Stan said.

(Laughter.)

PANEL MEMBER ARAUJO: But actually I do have a question, which is in relation to the prioritization. So you're talking about there are like about 200 compounds that are considered toxic air contaminants, but only 23 or 29 has been reviewed by the Panel.

So so far, what have been the criteria to select those 23 or 29? Is there an intention that all compounds that appear or some leads to another will eventually be evaluated? Or there has to be like a specific or State need that is very specific in order to do that?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Yeah. I think to clarify, there's 23 that came through the Air Resources Board under the original process, which required what Janette just laid out, the exposure assessment and the risk assessment.

Of the 189 HAPs, there wasn't an automatic risk assessment that came with them. But for many, many of those, we have cancer potency factors and have developed reference exposure levels for non-cancer endpoints. Those things have gone through the Panel over the years.

So it's not to say that those 189 have no health values associated with them. There's still lots of work to do within that group of chemicals.

CHAIRPERSON FROINES: Just for future reference for the Panel, just going to his point, there is a

substance that is listed in the 189, which is polycyclic organic matter. And that there is -- and what's not listed is polycyclic aromatic hydrocarbons. And I think we need a discussion about how we're going to deal with both the individual compounds, as well as the collective group, because PAHs -- polycyclic organic matter doesn't mean anything to anybody. Whereas, PAHs means a lot to a lot of people. And how we deal with that, both in terms of individual chemicals or a collective body, is really quite important.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Okay. Just a couple comments on that. The PAHs are subsumed under POM. They're part of it. We also have listed benzo[a]pyrene. And we have 24 potency equivalency factors for polycyclic aromatic hydrocarbons. We did that under the regular TAC process some time ago, 1990.

CHAIRPERSON FROINES: Melanie, I agree with you. But the question that I have, and I don't want to go back through that history of benzo[a]pyrene, because it was unpleasant. The issue is how much how many regulations and control measures followed, because I don't believe you.

I think that PAHs are not subsumed under polycyclic organic matter. And that's rhetoric. And that

we need to deal with chemicals that people are writing papers about that are about their toxicity.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Yeah. I'm not being rhetorical. I'm just saying that polycyclic aromatic hydrocarbons have been identified TACs when we identified benzo[a]pyrene, and the 24 other potency equivalency factors that we had. So that's only 24 of them. And there are many others, as you know, that are atmospheric transformation products that we would like to deal with when we actually get data.

So it's -- you know, I understand that. And from the Air Board perspective, Richard will talk about the control measures.

ARB STATIONARY SOURCE DIVISION CHIEF COREY:

Yeah. I was just going to go back to the point I touched on earlier. And it is the fact that even though a given substance, Diesel PM may have been the TAC, the fact of the regulatory action to reduce PM yields benefits of a whole host of substances ID'd or otherwise, not to mention co-benefits of other pollutants related to them as well, so that many of these co-benefits that are yielded through those actions that are not explicitly called out here.

CHAIRPERSON FROINES: Well, I think there's an issue of -- this is an important issue, and that is we identify -- we have 200 TACs. And the question is to

what -- and theoretically the Panel isn't involved in this, but the question remains, how many of those 200 have had control measures initiated to address risk?

ARB STATIONARY SOURCE DIVISION CHIEF COREY:

Right. And I think that kind of goes back to I think the discussion when we moved forward, in terms of the whole prioritization, is going to be a fairly -- I think it will be a useful discussion.

But even for those measures that have been adopted, traditionally that was a fundamental question, in terms of what do we know about the health impacts, what do we know about the emissions, what do we know about the exposure, and then going to the cost effectiveness technological feasible options for reductions from that exercise. And I think this has been repeated multiple papers and analyses, Diesel clearly rose to the top and several of those diesel measures have. Benzene, the benzene measures have.

As you reach down into other substances, there are a few where there are regional benefits certainly, but a number it's a local issue. It is a local high-risk near-source exposure. Not that it's not necessarily a candidate for regulatory action. Some of them are, but that's the kind of analysis that's really necessary as we look at these things. It's, one, what's the toxicity of

the substance. Two, what's the nature of the exposure. Is it a regional related issue? Is it a near-source issue? What are the options for actually getting the gains, getting the benefits?

And that clearly is a -- that risk management process as it plays itself out for the public and ultimately before the Board in balancing these policy considerations.

CHAIRPERSON FROINES: Paul.

PANEL MEMBER BLANC: I just had a question, agenda question. My sense is that we've sort of drawn to the end of your session. And I think the next thing on the agenda is the dioxin question and whether or not, Melanie --

PANEL MEMBER HAMMOND: Melanie.

PANEL MEMBER BLANC: You're still going to talk, Melanie.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Yeah, and then DPR.

PANEL MEMBER BLANC: Well, there's no hope that we could do dioxin before the lunch break. But I would suggest then that we move forward, because otherwise we're never going to finish in any appropriate fashion what is we want to do today.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH

CHIEF MARTY: We'll be very fast.

CHAIRPERSON FROINES: I'm the person who's spoken the most, Paul. And I'm doing it on purpose, because I'm doing it so the new Panel members see the issues that we have to deal with. So you may find it slow, but at least I thought it was relevant.

PANEL MEMBER BLANC: I was just talking prospectively. I wasn't talking retrospectively, and just if we can go forward.

PANEL MEMBER GLANTZ: Okay, let's move forward.

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: We'll move forward. I just have one really quick thing to say, because we do have new Panel members, and I don't want them to think that there's not control measures for the HAPs, because the federal government does have national emission standards for hazardous air pollutants. They've 121 of them that address a majority of the HAPs.

But, I mean, we know that of the control measures we have in California, if we have an overlapping one with the federal government, we're typically more stringent. But there are these other NESHAPs that are in place that the facilities in California have to comply with.

CHAIRPERSON FROINES: Are there max standards that fit as well?

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS:

There probably are, but I'm not a real expert on the max standards. I think the max standards were more for criteria pollutants.

PANEL MEMBER GLANTZ: I think we -- I want to agree with Paul, though, I think we do need to -- I agree with you that we need to sort of help the new people learn, but I also think we want to let them finish, so we can get to the two compounds.

CHAIRPERSON FROINES: That's fine.

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: I'm assuming we're dismissed? And Melanie is next.

(Thereupon an overhead presentation was Presented as follows.)

OEHHA DEPUTY DIRECTOR ALEXEEFF: Hi. I'm George Alexeeff. I'm Deputy Director of Office of Environmental Health Hazard Assessment. And I wanted to welcome the reappointed members and the newly appointed members. And you know, to us the Scientific Review Panel is a very important Panel for our Department. A lot of our work is reviewed by this Panel. And we get a lot of useful suggestions on how to improve our assessment process from this Panel.

And just as from my -- I thought I'd mention a couple of things. I started working in the Health

Department on this program in 1986. And my first task was to develop a health assessment document for this program. So I've been involved with this for quite a long time. And I note that for -- there's a slide that Dr. Froines put up about benzene, the benzene assessment, and that was done in 1984.

And in our other programs that we have, we often come across the same chemicals. And when we reviewed those chemicals, we try to determine whether or not we need to change our assessment. And so like, for example, for benzene, I believe it was in 2003 or 2004 we reviewed it under their water program, or Public Health Goal Program. And, at that point, in addition to the Rinsky data, we now had all the data from China, from the NCI studies.

So we reviewed all that to see if there was a reason to bring benzene back to the Panel. And it turned out that the current assessment held up. I mean, the Rinsky data held up. So there was no reason to bring it back to the Panel.

And I wanted to mention there was -- I brought a copy of this one. This is our hexavalent chromium document, which was approved in 1985. And that one we've just released our second draft of the hexavalent chromium document for drinking water. And in that process, we

reviewed the more recent Gibbs studies and other epidemiologic studies that have occurred on hexavalent chromium to see if that suggested a bringing back hexavalent chromium to the Panel. And we found the number that had been reviewed and suggested by the Scientific Review Panel was right within the range of the Gibbs data, so there was no reason to bring that hexavalent chromium back to this Panel.

So that is something we're continually doing. And I just want to let you know that. So even though some of these -- it's actually -- I'm amazed how well every number has held up from the Scientific Review Panel so far.

That's not to say -- you know, so we keep checking them. The other one I wanted to -- Dr. Froines mentioned about methylene chloride. And that was one where the Panel had suggested that we use pharmacokinetics. We had been reluctant to use it. We were suspicious of it at that time. And they suggested that we had to consider it in our assessment, which we did, which actually was an improvement.

And then we went on to perchloroethylene which Dr. Froines also mentioned. We used pharmacokinetics again, but then we even went a step further and did a special analysis on the variability of the kinetic

parameters.

So that was something that was a another thing that the Panel reviewed and gave us useful feedback on. And then, of course, diesel exhaust was suggested -- mentioned earlier several times actually. And again, that was one that the Panel worked with us through a very long period of time, about eight years for a lot of different reasons. But, you know, we had some workshops and a lot of -- well 10 years for you, eight years for me, I guess, eight to 10 years, let's say.

And there was a lot of useful discussion. And we did a lot of additional analyses, in part response to public comments on our document. And the Panel ended up suggesting a proposed number, which is actually the number that is used for the program here.

And so that's something that -- you know, so the Panel has been very important to us and to, you know, the State as well as the country, because, as it turns out, UCP doesn't have a quantitative number, so they use our number for their mobile sources program.

CHAIRPERSON FROINES: George, can I just say one thing. And that is that we -- Stan mentioned it earlier, we had at least one, if not three or four, workshops on diesel. And so I think it's important to let the new members know that one option we have is to hold workshops

and bring in high powered scientists on specific substances. And that I think is very valuable.

We did an organophosphate, and we did an exposure, and we did diesel. And that's an option that is very -- is particularly valuable, in terms of raising the level of scientific discussion.

OEHHA DEPUTY DIRECTOR ALEXEEFF: Agreed. It was very helpful to kind of breakdown the science into the actual specific issues and to see what people agreed upon and what they didn't. And as Dr. Glantz had pointed out when he'd mentioned did everybody agree about that it was a TAC or not.

Anyway.

And then on environmental tobacco smoke, the Panel was very helpful in, first of all, suggesting that we work on it. And there was reluctance upon the state, because it was unclear how one would control that.

But we had released a document, which ended up becoming an NCI volume in 1999. This was not officially part of the TAC program, but it did go through the SRP. And then after continued suggestions from the Panel, we did take the environmental tobacco smoke through the SRP process. And the document has been very instrumental in not only helping address the issue in the state, but nationwide and around the world. And our lead scientist

has been giving presentations in South America and other places to help support their local regulations in other countries. So the work here, I'm just trying to let you know, it's very important.

And we also, you know, a lot of these things are kind of ground breaking. Then I wanted to mention we'll be talking about SB 25. And that was the children's health bill. And in that case, we have developed some guidelines which came through the Panel, and the Panel has reviewed. And again with the hexavalent chromium public health goal that we just released as a draft, we incorporated in there an application of the cancer guidelines, which was approved by this Panel. And that's an age-adjusted cancer risk assessment.

And so the work that's done by this Panel is used not only in the air programs, but in all of our programs in OEHHA. And I just wanted to underscore the importance and, you know, thank you for willing -- your willingness to serve on this Panel. And the work that you do is very important. So I just want to thank you for that.

PANEL MEMBER BLANC: George, do you want to comment specifically on two parts of that. You had mentioned that follow-up data had tended to reconfirm the original quantitative estimates for -- I think you alluded to benzene and --

OEHHA DEPUTY DIRECTOR ALEXEEFF: Hexavalent chromium.

PANEL MEMBER BLANC: Yeah. Any comment on the subsequent epidemiology on diesel risk for cancer, which has tended to reach a similar point estimate of excess risk, and also specifically in terms of ETS the ground breaking findings of your document in terms of the association between secondhand smoke and breast cancer.

OEHHA DEPUTY DIRECTOR ALEXEEFF: Yeah. Thank you for that. Yeah, we continue to monitor the diesel exhaust literature, because as I think Richard Corey mentioned, that is in the State is considered one of the top priorities for control.

So in our assessment, it's based upon an upper bound estimate. So we are constantly looking at the data to see if the evaluation is consistent with that. And if, for some reason, it changes, we will bring it back to the Panel. But at this point, we find it to be -- the additional studies tend to support the early findings.

And the same thing with the breast cancer result, that was something that was discussed extensively by this Panel was where data that we had seen and our staff had brought to everyone's attention that breast cancer seemed to be associated with environmental tobacco smoke, but it was a little bit of a complicated analysis with age and

things like that, age of exposure.

And more recent studies have begin to confirm that. So that is something that this Panel helps identify some issues, again which may cause -- which generate additional studies and often the additional studies have confirmed the previous work.

CHAIRPERSON FROINES: On that one, I just want to stay that Kathy Hammond should get gold stars, because she really focused on the difficulties of addressing exposure assessment and that was very valuable I think. And it affected our view of the data that existed.

OEHHA DEPUTY DIRECTOR ALEXEEFF: Well, I think Dr. Hammond deserves lots of gold stars for diesel exhaust as well, and I think a lot of the Panel members do, because what happens in this Panel meeting, which is sometimes very painful to staff, is that you ask us to kind of breakdown the information a little bit more and to tease out the information to really lay it out, because, of course, sometimes we lay it out in sort of a scientific format. And for us it might be clear how it follows, but it may not be clear for people beyond this Panel.

And in order to have the assessment have its full weight, it has to be made accessible to more than just the Panel and the staff. And that's something that the Panel really helps us do.

CHAIRPERSON FROINES: I wish you would, Melanie, do me a favor and send me the one- or two-page document that you prepared that listed the range of risk and how you came to the final number. And then we can have that, and it will be a nice example of in future times.

OEHHA DEPUTY DIRECTOR ALEXEEFF: Is this for diesel exhaust in particular or --

CHAIRPERSON FROINES: Yeah, for diesel. You know, where it was --

OEHHA DEPUTY DIRECTOR ALEXEEFF: Yes, we know.

CHAIRPERSON FROINES: It was basically a mean versus median discussion.

OEHHA DEPUTY DIRECTOR ALEXEEFF: So now I'd like to turn it over to Dr. Melanie Marty who's the Branch Chief for the Air Toxicology and Epidemiology Branch.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Good morning, almost afternoon. I'm going to go through these pretty quickly, because a lot of you've already heard.

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OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Under -- and this is OEHHA's role in the Toxic Air Contaminants Program. We conduct the health effects assessments for candidate TAC's, which become Part B of ARB's report identifying a chemical as a toxic air

contaminant.

PANEL MEMBER GLANTZ: Part A is the exposure assessment.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Right. Part A is produced by ARB. It's the exposure assessment.

In order to do these reports, we evaluate all the available literature published, and gray literature. We write up huge documents presenting the available information, and we conduct quantitative risk assessments of the chemical. And the risk assessments include the -- whether it is a linear dose response, a non-linear does response, and so forth.

So it gets at this threshold issue that was brought up earlier. The documents undergo public comment. We respond to comment. And the Scientific Review Panel reviews the health effects assessment, as well as the public comments and the responses to our comments. And oftentimes, there's more than one iteration of this.

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CHAIRPERSON FROINES: Are you going to, in the future, look at the issue of upstream versus downstream effects?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: We are dealing with that in OEHHA now. And

yes, we are going to be looking at that on some of our other assessments for other programs. For example, for the perchlorate PHG were based on a relatively upstream effect that is inhibition of iodine uptake by the thyroid. So we are looking at those kinds of issues.

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OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: But Janette already mentioned the Air Toxics Hot Spots Program, where it's site specific, looking at emissions inventories, and then the air district decide which of those facilities they deem high risk.

And the risk assessments that are conducted by those facilities use risk assessment guidelines that OEHHA has developed. So we adopted risk assessment guidelines for the toxics emissions from stationary sources, subject to the Air Toxics Hot Spots Program.

This included technical support documents for how we derived the non-cancer reference exposure levels, which for the new members are similar to the EPA RFCs. You've probably seen those more often.

We have technical support documents for how we derive cancer potency factors, and that compile available cancer potency factors. And then we have an exposure assessment guideline, which includes distributional analyses of different exposure parameters, that can be

used in a stochastic assessment.

PANEL MEMBER GLANTZ: And all of those documents came through and were approved by the Panel.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Exactly. Stan is jumping ahead to the next slide.

PANEL MEMBER GLANTZ: Okay. Just so you people think that we didn't spend all these years doing 23 TACs. There's lots of other stuff.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: There's also a guidance manual, which puts it all together for the people who have to conduct the risk assessments and that also went through the Panel review.

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OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: So this is just the Health and Safety Code Section that talks about the Scientific Review Panel, evaluating the guidelines adopted by OEHHA and recommending changes in additional criteria. So that's what the statute actually says.

So the SRP reviewed the initially risk assessment guidelines in 1999 and 2000, and will review any amendments to those guidelines or revisions of those guidelines, including any new or revised reference

exposure levels and cancer potency factors that are used in the program. And this is actually one way that we're chomping through those 189 hazardous air pollutants by developing numbers that are going to be used in risk assessment. And that can be used then by the Air Board for looking at emissions of those substances.

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OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Janette already mentioned the Senate Bill 25, which was the Children's Environmental Health Protection Program. In 1999, the statute was passed, and we have a few rules in that. One is to identify toxic air contaminants which may disproportionately impact children's health. And it's existing toxic air contaminants, not new chemicals. We also are required to consider infants and children when we do quantitative risk assessments in two programs, the Criteria Air Pollutant Program, which my group also is responsible for making recommendations to the Board about the standards -- and you guys aren't involved in that process -- and the Toxic Air Contaminant Program, which you also are involved in.

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OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: So the statute actually requires that we had to consider exposure patterns of infants and children and

how they might differ from adults, and the special susceptibility of infants and children relative to adults.

So we have identified existing TACs that disproportionately impact kids. And the statute actually says that may cause infants and children to be especially susceptible to illness. That's the statutory language. The law required us to come up with an initial list of five, which we went through in 2001, I'm thinking. And then to update the list periodically by reviewing the toxic air contaminants, any of the risk assessments that were done for those, and making sure that the risk assessments are adequately protective of infants and children.

The Scientific Review Panel reviews the list, so they reviewed the initial list of five and the reasons for the listing. And as we move through our reference exposure levels and cancer slope factors, we are identifying chemicals that we think should go onto that list and the Panel reviews that while they're reviewing the risk assessment. And then, opines about whether they should be listed or not as disproportionately impacting children

CHAIRPERSON FROINES: Melanie?

PANEL MEMBER GLANTZ: And just so people know, the Panel had quite an influence on which five ended up

getting picked too.

CHAIRPERSON FROINES: Melanie, I don't know if you know Cory-Slechta's work at Rochester --

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Yes.

CHAIRPERSON FROINES: -- in which she looked at maneb and paraquat. And, in this case, it was postnatally in mice. And then dosing adults led to Parkinson's disease, so that there's this issue of fetal exposure and adult outcomes. Are you, in any way, able to look at that issue?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Yes. Actually, we have been looking at that issue, where there are data for chemicals that we're evaluating. And we specifically looked at those papers from Cory-Slechta, when we were looking at manganese.

So we are looking at that issue. It's one of the major concerns that we have. You can't predict effects when exposure occurs prenatally or postnatally by just looking at adult animals.

PANEL MEMBER BLANC: Melanie, can you clarify if SB 25 is limited in its charge to you to examine such chemicals that are already listed as toxic air contaminants or can you take up a chemical not yet listed as a TAC on the basis of its likely preferential effects

or exposure to children?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Yeah, the way the statute reads, it's specifically existing toxic air contaminants. But having said that, in a second, when we first went through the Panel talking about our prioritization of chemicals to get onto that list, everybody said why aren't you looking at ETS? It's because it wasn't yet a TAC.

But when it was brought to the Panel for consideration of the health effects assessment and the exposure assessment, we had language in the document saying this -- if this gets identified as a TAC, it should go onto this list. So that's one way that we can get chemicals onto the list.

CHAIRPERSON FROINES: It's interesting that we listed acrolein, which would immediately say to you we should list acrylamide. And that's an interesting issue about how do you structure to expand the number that are listed.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Yes.

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OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Okay. So this --

OEHHA DEPUTY DIRECTOR ALEXEEFF: I'm sorry. Just

to clarify Dr. Blanc's question. So in the criteria for identifying toxic air contaminants, we are supposed to consider the factors that were mentioned by Dr. Marty here in terms of exposure patterns that affect children and susceptibility and that sort of thing. So we are supposed to take those into account as we review a chemical for becoming a toxic air contaminant.

PANEL MEMBER BLANC: And therefore by extension, that could be one of the things that impacts prioritization.

OEHHA DEPUTY DIRECTOR ALEXEEFF: Yes. In fact, I think Janette had mentioned that that was something that we were now incorporating into the prioritization process.

PANEL MEMBER BLANC: Okay.

CHAIRPERSON FROINES: But if you listed PAHs, but the only thing we have in the 189 is the other definition -- what is it that I said earlier?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Polycyclic organic matter.

CHAIRPERSON FROINES: Is that a conflict?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: I don't think so, because the -- well, benzo[a]pyrene was done in '90. When was the -- the HAP identification was 1993.

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS:

Benzo[a]pyrene was just about that same year, like 1992 or 1993.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Yeah. So we were already in the process with Benzo[a]pyrene and the 24 to 26, I can't remember the number, potency equivalency factors.

And if I'm not mistaken, Janette correct me if I'm wrong, you guys actually sent a letter to U.S. EPA?

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: Yeah, we did.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Regarding whether PAHs were under the POM designation of HAP, is that correct?

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: We specifically asked them what -- how do you define POM. And we do have that letter. It's an old letter, but we do have it.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: So the conclusion was it is -- that all PAHs are HAPs because they're TACs.

ARB AIR QUALITY MEASURES BRANCH CHIEF BROOKS: Even though, it's a sub-category of the umbrella category, it's fine, was our opinion.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Okay, this is just listing the five TACs

that were initially identified with the first go round. Diesel PM, dioxins, lead, acrolein, and PAHs.

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CHAIRPERSON FROINES: But I'm going to quarrel with you, because we have naphthalene, phenanthrene and --

PANEL MEMBER GLANTZ: I think we need to let them finish.

CHAIRPERSON FROINES: Let me say what I want to say, Stan.

(Laughter.)

PANEL MEMBER GLANTZ: I mean, we're not going to get to this stuff.

CHAIRPERSON FROINES: It doesn't matter. The point is we have phenanthrene. We have anthracene. We have naphthalene. We have a whole bunch of vapor phase PAHs, and are they in or out by your definition?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: They are in by the definition. In fact, we developed a slope factor for naphthalene.

OEHHA DEPUTY DIRECTOR ALEXEEFF: Yeah.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Somewhere where around the 2000 time period, post NTP.

OEHHA DEPUTY DIRECTOR ALEXEEFF: If you want, Dr. Froines, we can come back at another meeting and just kind

of go over it.

CHAIRPERSON FROINES: No, that's okay. I just wanted to make it a short question.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Okay. Then subsequent to the initial listing, I mentioned ETS already when that was identified as a TAC, it went onto the list of TACs that disproportionately impact kids.

And then we recently conducted risk assessments for formaldehyde, acetaldehyde, mercury, manganese, and arsenic through SB 1731 as part of the update to the guidelines to incorporate explicitly infants and children. And while we did that, we, in the document, say that these should be listed as TACs and the SRP agreed, and so these are chemicals are also now on that list.

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OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: The Senate Bill 25 also triggered --

CHAIRPERSON FROINES: But we had reviewed them.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Yes. You reviewed it as -- remember, when you guys were reviewing the reference exposure levels for those chemicals, part of that document.

CHAIRPERSON FROINES: Okay, thank you.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH

CHIEF MARTY: The Children's Health Act also triggered us to reevaluate our risk assessment methodologies to ensure they're child protective, because we were supposed to be going through all the TACs to make sure that the assessments are child protective.

So we completed updates of those initial risk assessment guidelines, parts of them for the -- how we determine not cancer reference exposure levels and slope factors, and the six new chemicals. Those were reviewed by the Panel in 2008 and 9.

And the cancer slope methodology and application of the cancer slope factors includes a weighting by age at exposure for the carcinogens when you're estimating risk. I would also, for the non-cancer reference exposure levels, it includes considerations of toxicokinetic and toxicodynamic differences by age for developing those reference exposure levels.

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PANEL MEMBER GLANTZ: And, as I recall, the methodologies -- I was involved in that too -- the methodologies you developed were really path breaking, weren't they? Nobody had ever done the kind of stuff you guys developed working with the Panel, right?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Some of it. Yeah, I mean the U.S. EPA also

has a weighting by age at exposure paradigm, but they specifically apply it only to chemicals that operate through a mutagenic mode of action.

And to be honest with you, they're having a hard time identifying what they mean by a mutagenic mode of action. So it's been used in a few of their assessments since 2005, but not many. And they're going back and looking at that issue again.

CHAIRPERSON FROINES: What part of EPA does that?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Yeah, it would have -- the IRIS program would identify it. But they had to update their cancer risk assessment guidelines, and then they -- when they were doing so, looking at just the methodologies of dealing with dose response assessment, then they considered the weighting by age at exposure issue. And so they came out with a guidance document in 2005. But the actual application is done through the integrated risk information system process.

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OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Okay. So then in sum for OEHHA products, the SRP reviews the health effects assessments of the candidate TACs, the updates to the list of TACs that disproportionately impact children, which can happen

either through listing a TAC or through the development of new or revised reference exposure levels and slope -- cancer slope factors. And the SRP also reviews updates for our risk assessment methodologies.

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OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: So the work in progress right now that's coming to the Panel. We have the update to the dioxin TEF, which has been sent to the Panel as the next item. This is a revision to the appendix of our risk assessment guidelines, specifically the technical support document for developing cancer slope factors.

We have some reference exposure levels for non-cancer health endpoints that have been sent to the Panel for caprolactam. And then we have ones under development have already done through the public comment period for nickel, TDI, and MDI. And we hope to get those in the spring to the Panel. We have the final technical support document for our update relative to children, that deals with exposure assessment, where we reevaluated all those exposure parameters in our initial guidance document to specifically do a better job of incorporating -- we had tried incorporating kids before. There's now more information to use, so we have additional information on exposure of infants and children.

And then the guidance manual, which is the how-to. And those two things are coming to the Panel in 2011.

CHAIRPERSON FROINES: There are more isocyanates of concern than those two. Are you sure you're covering the whole waterfront?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: We're covering those two at this point. And this was in response to a request to develop RELs specifically for those two.

CHAIRPERSON FROINES: Can somebody in OEHHA prepare a list of other isocyanates that may be relevant to take up at some point?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Sure. When we do -- when we develop reference exposure levels, it's generally because we've been asked to by either the Board or an interested party or sometimes the air districts, where they have a chemical that's being emitted from a facility and they don't have anyway to deal with it, because they don't know anything about the health effects. So that's how we've been doing it in the last several years.

And we can look at the other isocyanates. But whether these reference exposure levels would be able to cover those other isocyanates or not is a -- you'd have to

do a whole assessment of the other isocyanates first to figure that out.

CHAIRPERSON FROINES: Ellen asked a question earlier, and I just wanted to ask you, do you ever -- do you have any mechanism by which you look into the question of alternatives?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Alternatives to use of a specific chemical by an industrial process?

CHAIRPERSON FROINES: Yes.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: No. OEHHA does not get involved in that.

CHAIRPERSON FROINES: Does that --

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: We're don't have -- we're not engineers.

CHAIRPERSON FROINES: Is that ARB?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: That would be the Air Board and Richard can --

ARB STATIONARY SOURCE DIVISION CHIEF COREY:

Yeah. I just wanted to add to that. It really is a measure by measure type of question. But if you go back to the example that had been put out with respect to dry-cleaning and the phase-out of perc. A key question with respect to that was, are there alternatives

available? So that clearly any mitigations effort that we pursue, part of the question is what are the opportunities for getting the emissions down. And one of those for a number of regulations that have been adopted is the fact that there are substitutes. That comes into play in the consumer products program. It came into play in perc, and has come into play in others.

And there are different ways to get at that. One is, in some cases, a substance is just banned, not allowed. Others, the limits are set so low, it effectively encourages a migration to an alternative. But assessing the viability and availability of alternatives is part of the overall assessment of mitigation options, it is.

CHAIRPERSON FROINES: We have a grant from Robert Wood Johnson Foundation to identify alternatives for lead. You guys might be interested in that.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Okay, so DPR is next.

CHAIRPERSON FROINES: Melanie, I think it would be useful if the Panel received 1879 and 905, just so they have it in their --

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Sure, I can just email it.

CHAIRPERSON FROINES: They're going to hear about

it over and over and over again, because it's the hottest topic going. And I suspect most of you don't -- haven't been familiar with it.

DPR ASSISTANT DIRECTOR VERDER-CARLOS: Good afternoon. I'm MaryLou Verder-Carlos. I'm Assistant Director for the Pesticide Programs Division for the Department of Pesticide Regulation. And I oversee the risk assessment process for the Department.

(Thereupon an overhead presentation was Presented as follows.)

DPR ASSISTANT DIRECTOR VERDER-CARLOS: We have been working with the Panel for a number of years now. Although, I have worked with them only for the last couple of years on one chemical, chloropicrin. And we look forward to working with the Panel on the pesticides that are going to come up again as candidate toxic air contaminants.

And I guess our process is different from ARB and OEHHA, where we do our risk assessments in our Department. So we do the exposure assessments and the health evaluation in DPR. Although, it's done by two different sections in our Department.

So to talk about the toxic air contaminant program in our department is Randy Segawa. He is the lead of our air program and the Environmental Monitoring Branch

of DPR.

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Good afternoon. So since now it is good afternoon, I will endeavor to get through these slides quite quickly.

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DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: This slide shows the legal requirements under the toxic air contaminant for pesticides. And it actually serves as the outline for the presentation.

The law requires the Air Resources Board to monitor pesticides at DPR's request. Then, of course, using that data and the health effects data, DPR prepares a risk assessment that is prepared in consultation with OEHHA, as well as ARB. And, of course, is reviewed by this Panel.

You had mentioned before that under the definition of a toxic air contaminant, it's somewhat flexible or inclusive. But in terms of listing a pesticide as a toxic air contaminant, we do produce a quantitative risk assessment. So there is a regulation which gives a quantitative standard for listing of pesticide. And I'll talk about that as well.

And then finally, of course, once a pesticide is listed as a toxic air contaminant, the law requires DPR to

mitigate those risks, again, in consultation with OEHHA, Air Resources Board, and other agencies.

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DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: So first thing that the law requires both DPR and ARB to do is to monitor for pesticides in air. And in general, there are two different types of studies that we will conduct.

The first type is what we refer to as application site monitoring. This is air monitoring within the immediate vicinity of a pesticide application. Normally, there are some eight to 24 sites surrounding a pesticide application at various distances. And we collect a sequence of samples, say anywhere from four to 24-hour intervals for two to 10 days.

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DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: The second type of air monitoring that we conduct is what we refer to as ambient air monitoring. This is regional monitoring in communities, where we select usually four to six communities in a high use area, collect samples for a 24-hour period, three or four days per week for several weeks. This gives us data on some longer term exposures.

PANEL MEMBER EISEN: I have a question on your

previous slide.

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Yes.

PANEL MEMBER EISEN: So it was 30 to 300 feet. So you don't measure closer into the actual work that's being done, the applicators?

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Generally, no. Primarily, for personnel safety, we tend to be back at least 30 feet.

PANEL MEMBER EISEN: You mean for the monitoring crew.

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Correct. Correct, yes.

PANEL MEMBER EISEN: So is there any monitoring of the occupational exposures?

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Not under toxic air contaminants. Under the law, we only look at what we refer to as bystander exposure. That said, we do have another program that does look at occupational exposures.

PANEL MEMBER EISEN: And that --

CHAIRPERSON FROINES: Do you actually do sampling of workers in the field?

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Yes. We have a Worker Health and Safety Branch,

and that is a big part of what they do, yes.

CHAIRPERSON FROINES: So they do do sampling?

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Correct, yes. It's just that you often do not see that data. Sometimes we will prepare, what we call, a comprehensive risk assessment, which includes all the air monitoring data, the occupational exposure, food residue data, but you are only need to review the air monitoring or the air exposure data.

CHAIRPERSON FROINES: Unless I'm way off, I think the Panel would be interested in some of that data, that occupational data. Am I -- Ellen, is that fair?

PANEL MEMBER EISEN: I think it's fair, yeah. I mean, I don't know what I'm opening up here.

CHAIRPERSON FROINES: I don't either.

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Okay.

PANEL MEMBER HAMMOND: Well, I would point out. I agree that we'd be interested. Among other things, we sometimes have requested when we look at the health effects, we've requested information on accidents and incidents that have happened, and health effects. And so interpreting those, one would want to know something about what the exposures were.

And I think we kind of had those iterative

discussions sometimes. So maybe just starting with it in the first place.

CHAIRPERSON FROINES: But also, there's another piece of that. If they're doing occupational exposures on workers, it would be interesting to know about the effectiveness of these respirators, which is, as you know, a hot topic for the committee that I chair.

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CHAIRPERSON FROINES: Not this one.

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: So moving on. Once the air monitoring is completed, then DPR, in consultation with OEHHA and ARB, does prepare a risk assessment, includes the normal pieces you would see in a risk assessment.

The one thing I do want to point out is the last item there. Under the law, OEHHA does help us prepare this document and actually issues their own findings as a separate document. So you will also receive that as part of the package.

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DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: I mentioned that we do have some specific criteria for listing a pesticide as a toxic air contaminant. And I'm not going to read this. You can look through it. It's somewhat tricky legal language, but

basically it says that we add in an extra 10-fold uncertainty factor. And that's the criteria we use to base our listing on.

PANEL MEMBER HAMMOND: May I ask a question there? That's an extra 10-fold from what?

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: From what the normal criteria would be for determining whether or not the exposure is acceptable. For example, on the last bullet there for those that do not have thresholds for cancer risk, for instance, if our normal negligible risk standard is one in a million cancers, we would list a pesticide if it causes more than one in 10 million.

CHAIRPERSON FROINES: What?

PANEL MEMBER BLANC: Did you get that?

CHAIRPERSON FROINES: No.

PANEL MEMBER BLANC: So in other words, it would be -- if I can extrapolate to what OEHHA does, which is a different way of getting at whether something is listed. For the DPR, they would go through a similar process. They'yd come out with a risk cutoff, which takes into account a series of extrapolations in modeling. And then there's a 10-fold above that -- below that if actual ambient exposures occur, even anything above one-tenth of what would be the cutoff for any toxic endpoint that

they're looking at, then it becomes listed.

So the difference between what they do, and what OEHHA does is that OEHHA does a risk estimate, but whatever that risk estimate is, it doesn't necessarily prevent it from becoming listed as a toxic air contaminant.

Whereas, if -- depending on how they do their assessment, and then the airborne monitoring of what is actually out there, something might be toxic. But if they come up with such low levels of exposure, based on how they measure it, then it doesn't get listed.

CHAIRPERSON FROINES: Well, can't --

PANEL MEMBER BLANC: And that's not something that happens with the non-pesticides.

CHAIRPERSON FROINES: Kathy asked about what is the 10-fold below. Now, if you do it by traditional means you have you -- you said a NOAEL. And then you deal with interspecies variability -- intra and interspecies variability. And that assuming a safety factor of 10 for each, that gives you a hundred fold before -- below you're NOAEL. And are you saying that this other factor of 10 is added to that?

PANEL MEMBER BLANC: Yes.

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: That's correct.

CHAIRPERSON FROINES: So by definition, it would be a thousand. And we know that there are, like other issues like children and what have you, so that the number would be a thousand-fold below the NOAEL.

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Correct.

PANEL MEMBER BLANC: But then they have to actually show that they can detect it in the air at levels that are at that or above that.

CHAIRPERSON FROINES: Randy, but you didn't mention the margin of exposure.

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: That's what this refers to.

DPR ASSISTANT DIRECTOR VERDER-CARLOS: That is what this is.

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: In Part A, that's what it's referring to is margin of exposure.

CHAIRPERSON FROINES: Okay. The Panel may not know what that means. That is -- you tell them.

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Yeah. So the margin of exposure is the ratio of the reference concentration or the air concentration that we deem acceptable in humans, and the air concentration that is actually out there.

PANEL MEMBER GILL: Randy, how do you calculate it, because most of the toxic effects on pesticides on a milligram per kilogram basis on autodose, how do you convert it to an inhalation exposure?

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Right. And so that's a key part of our risk assessment is taking that oral data and trying to estimate what the dosage is for inhalation. And, in many cases, we do have inhalation data, but in some cases we do not.

CHAIRPERSON FROINES: So if you have a number which is your NOAEL divided by a thousand, and so that's your denominator, your numerator is exposure, right, or have I got it upside down?

DPR ASSISTANT DIRECTOR VERDER-CARLOS: You've got it upside down.

CHAIRPERSON FROINES: I've got it upside down. Okay. So what constitutes significant risk with what MOE would you --

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Where we're using animal data and we're using our normal uncertainty factors, then again we're talking about a thousand fold MOE.

CHAIRPERSON FROINES: Okay.

DPR ASSISTANT DIRECTOR VERDER-CARLOS: Well, let's see. So if the pesticide has an MOE of less than a

thousand, then it is a candidate for a TAC. So for any pesticide that has an MOE of less than a thousand, then it's a candidate for a TAC and we bring the -- and then the Panel has to review the risk assessment for that. The same thing with cancer. If the cancer estimate is 10 to the minus 7 or less, then it's a candidate for a TAC.

PANEL MEMBER BLANC: And I just want to point out, therefore that as opposed to the OEHHA risk assessments, for the pesticide risk assessments the quality of the exposure data becomes important, because it drives this ultimate ratio.

So if they have measured ambient exposure in a way that would systematically mis or underrepresent or undercapture or underestimate what the ambient exposures are, then it will drive this ratio in a direction to say something is not a toxic air contaminant, when it should be. Therefore, we end up focusing, in addition to the human health side, on issues such as what dispersion models did they use to get from levels that are at the edge of the field to levels that are in a community.

And we've had a lot of discussions with them at various times about that. And quite frequently, their unit comes to us with a great deal of frustration in terms of what their actual exposure data are, because frequently it's based on very few measurements, sometimes with

measurements that have had substantive technical compromise to them. Is that a fair statement?

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Somewhat, yes.

CHAIRPERSON FROINES: Ellen.

PANEL MEMBER EISEN: I guess I just don't understand the concept of looking for a difference between some threshold limit and an ambient level, when you worked on it statewide. I mean, is that average for the state?

PANEL MEMBER BLANC: No. It would be based on -- often, it's based on dispersion modeling. And it doesn't have to be the whole state. They just have to show there would be communities where this would occur.

CHAIRPERSON FROINES: But we tend to emphasize -- since drift is a major issue, we tend to emphasize the fence line measurements, rather than ambient. Because here's the thing, Lyn Baker who does this for the ARB once testified before us. And he said that they don't know -- when they go out to monitor, they don't know whether the pesticide in question is being used that day.

So they can go out and they can monitor and there'll be no pesticide whatsoever. So that you have a real dilemma, because what you should have is it's going to be used today, and we're going to do a fence line and that's going to give us a better exposure measure.

Does that makes sense?

PANEL MEMBER EISEN: Yeah, I mean -- and also -- I mean, why wouldn't it come up like as a hot spot rather than as a general ambient --

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Only because the law treats them differently.

PANEL MEMBER BLANC: So that's the fundamental difference, this issue. That being said, I don't recall among the very limited number of pesticides that have come to us from DPR, a case in which it ultimately was not a toxic air contaminant because the ratio came out to be so small -- so large.

CHAIRPERSON FROINES: Kathy.

PANEL MEMBER HAMMOND: Yeah, but I agree with Paul, but I'm thinking the way I heard what you said, Randy, and correct me if I'm wrong, is that the starting point is that the air measurements have to be 10-fold -- within 10-fold -- greater than 10-fold less than -- they have to meet these criteria. And so to be considered to be a toxic air contaminant -- to be considered for evaluation as a toxic air contaminant.

So in other words, if there's a pesticide out there where the measured levels are less than 10-fold under the thresholds as defined here, then you wouldn't even start the TAC process, is that correct?

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Not necessarily. In general, we don't know if the air concentrations would meet that threshold level prior to the evaluation itself.

PANEL MEMBER HAMMOND: So you don't do measurements until your -- except as part of the TAC process?

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Correct.

CHAIRPERSON FROINES: One thing that the new Panel members should know is that this -- the older SRP had -- I guess you can say it that way -- had differences with DPR over the concept of the MOE.

We took the position that a chemical can be a toxic air contaminant and not meet the MOE standard. And our position was pesticides are toxic, and so we need to not necessarily tie ourselves to a -- to what turns out sometimes to be questionable exposure assessment.

PANEL MEMBER HAMMOND: But John, isn't it true that this -- if I understand what Randy is saying that this is what's in the law, the regulation, this aspect of that?

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Yes. It's a regulation implementing the law, yes.

PANEL MEMBER HAMMOND: But I think John is correct in some of the concerns that we have had with some of that, it's that we have -- for the other toxic air contaminants, we're talking about a qualitative aspect of, you know, what -- is this material toxic or not. And then if so, what level should we set as standards.

Whereas, in this case, there's a quantitative part of its even being listed as a toxic air contaminant, which is a separate and distinct criterion from what we have for the things that are going through the Air Resources Board.

CHAIRPERSON FROINES: She said it better than I did.

(Laughter.)

PANEL MEMBER GLANTZ: The other important point here is that this is part of their regulations. This is not part of the law. And this has been hotly debated. We're having a period of relative friendliness between this Committee and the DPR, which is good.

CHAIRPERSON FROINES: Well, it's fair to say, Stan, that DPR has brought us a number of significant pesticides recently --

PANEL MEMBER GLANTZ: Yes.

CHAIRPERSON FROINES: -- and so we shouldn't -- we should knowledge that.

PANEL MEMBER GLANTZ: No, I'm saying it's good. But this whole issue -- and I don't think we should get bogged down on this, because I was just telling John we should get bogged down, but I think this whole issue, the point Kathy raised, and, you know, whether these regulations are reasonable and all of that, is an -- it's an issue which is one of ongoing discussion, I think. I think because the DPR has been bringing important pesticides to the Committee, it's receded a bit, but it is important that this is a regulation, which is something DPR decided not the law the Legislature wrote. This is their interpretation of the law.

But I don't want to bog this down anymore at this point, because it will come back a lot of times.

CHAIRPERSON FROINES: Well, we're going to also have to look at the question of what we think is a threshold. And it may be that thresholds may not be appropriate.

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DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Okay. So once DPR drafts a risk assessment, it does go through a review process as required by the law. There is a public comment period, normally 45 days. And normally DPR would hold a workshop with its Pesticide Registration and Evaluation Committee.

Once we receive all those public comments, we do provide written responses. And it was mentioned earlier, we do see that as part of the draft report, both the comments that we received and DPR's responses.

Then, of course, you conduct your own evaluation and issue your findings.

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DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: I guess another one that is just quoting from the law, which is the specific legal requirements for this panel. Again, you can look at this at your leisure, but basically, you review all aspects of the risk assessment, so the monitoring data, the exposure assessment and the health effects data.

CHAIRPERSON FROINES: We have leads with DPR, as well as the other agencies.

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DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Then assuming that a pesticide does meet the criteria for listing, DPR formally proposes to list that pesticide. And according to the law that must occur within 10 working days of receiving the Panel findings.

Then there's a formal rule-making process. We actually have to put forth a regulation to list a pesticide as a toxic air contaminant, including the public

hearing. And so that's usually a several month period.

And then once it's listed, the listing does not automatically trigger any regulatory actions. What it does trigger is the need for further evaluation to see what, if any, mitigation is needed.

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DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: And then, of course, that takes us to our risk management phase, which is conducted in consultation with several other agencies, particularly OEHHA, Air Resources Board, the air districts and county agricultural Commissioners.

In many cases, DPR and ARB will do additional monitoring and analysis of data to see if there are ways to reduce the exposures, change application methods or things like that.

And then there are a variety of options that DPR has to reduce those exposures. Some of them are listed there.

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PANEL MEMBER HAMMOND: Excuse me, Randy. If I remember, these things in red are SRP related?

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: No.

PANEL MEMBER HAMMOND: And yet -- I think you

said.

PANEL MEMBER GLANTZ: No, those are law.

PANEL MEMBER HAMMOND: Oh, that's the law.

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: That's the law.

PANEL MEMBER HAMMOND: All right. Thank you. Because I was going to say, we don't do those. Good.

CHAIRPERSON FROINES: We can.

PANEL MEMBER HAMMOND: Well, I'm not sure we want to.

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: And then just to give you an update where we're currently at.

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DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: The Air Resources Board has three monitoring studies currently in progress. DPR staff is currently working on three risk assessments that will likely come to you at some point.

PANEL MEMBER BLANC: What are those?

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Those are chlorothalonil, chlorpyrifos, and diazinon.

PANEL MEMBER BLANC: And why isn't methyl iodide one of those?

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: It's a HAP, and so it's automatically going to get listed.

PANEL MEMBER BLANC: Okay, great.

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: We have listed 45 pesticides since the law was passed, eight through the evaluation process that we've just talked about. Then there are 37 that are hazardous air pollutants. That is 37 hazardous air pollutants that have pesticidal uses. And so we've listed them administratively.

We're working on the listing of one, methyl iodide, through the administrative process. And then we have four pesticide mitigation --

CHAIRPERSON FROINES: Wait, wait, wait, wait, wait. There are three of us on this Panel who are on the other panel. And what do you mean by administrative process?

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: The law says that for a federal hazardous air pollutant, that the Director must identify that chemical as a toxic air contaminant. And we do that through a formal rule-making process.

And so since methyl iodide was recently registered and now is available for sale and use, we're

going through the process to list it as a toxic air contaminant.

CHAIRPERSON FROINES: It's not automatically grandfathered in?

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: No. Yeah, we actually looked at that recently when we were developing these presentations. And the Health and Safety Code has slightly different language than the Food and Ag code regarding pesticides.

Under the Health and Safety Code it does Happen automatically, but that's not as clear in the Food and Ag Code. And so we do go through a formal rule-making process to do it.

CHAIRPERSON FROINES: Comments?

PANEL MEMBER HAMMOND: Where are you in that process now?

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: We have that regulation package going through internal review right now.

PANEL MEMBER HAMMOND: And then it will go through the process of formal list -- public listings and hearings?

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Correct, yes. And so we will notice for public comment. By law that's a 45-day comment period. And then

we have to respond to those comments. We may or may not do a second comment period, if we significantly change that regulation, which in this case we would not, and then it gets reviewed by the Office of Administrative Law.

CHAIRPERSON FROINES: But it doesn't --

PANEL MEMBER HAMMOND: And it's currently in use now, you said? I know it's approved for use, but is it actually in use, do you know?

CHAIRPERSON FROINES: But it doesn't come to the SRP.

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: No.

PANEL MEMBER HAMMOND: Do you know if it's in use at all now?

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: Not to my knowledge.

PANEL MEMBER HAMMOND: Does it get listed with -- it would have to be listed with you, if it were in use or not?

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: No.

PANEL MEMBER HAMMOND: Now that it's been approved, you don't have to.

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: It has been approved for sale and use, yes.

CHAIRPERSON FROINES: This is such an irony. It is list as a HAP, but it's considered safe enough that we can use it.

DPR SENIOR ENVIRONMENTAL RESEARCH SCIENTIST SEGAWA: And actually that's it.

PANEL MEMBER BLANC: Great.

CHAIRPERSON FROINES: I think Randy has been with us for a long time, so he's been through the wars. And MaryLou has been through enough of the wars to know what they're about. So I welcome you for this new phase of the SRP.

DPR ASSISTANT DIRECTOR VERDER-CARLOS: Thank you.

CHAIRPERSON FROINES: Thank you.

PANEL MEMBER BLANC: So, John?

CHAIRPERSON FROINES: Yes

PANEL MEMBER BLANC: What time do you suggest we reconvene after lunch?

CHAIRPERSON FROINES: What time is it now, I'm sorry?

PANEL MEMBER BLANC: Quarter of one.

CHAIRPERSON FROINES: How about 1:30.

PANEL MEMBER BLANC: Okay. I move that we recess for lunch till 1:30.

CHAIRPERSON FROINES: That would -- all in favor?

(Ayes.)

(Thereupon a lunch break was taken.)

AFTERNOON SESSION

CHAIRPERSON FROINES: Can we get started. We're quite late.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: The next item is an update to our technical support document for cancer potency factors Appendix C, which deals with the dioxin TEFs. The presentation -- Andy Salmon is going to give the presentation. Andy is one of my section managers for the Air Toxics Hot Spots and Risk Assessment Program.

CHAIRPERSON FROINES: Melanie, procedurally, if we -- I don't know whether we will vote today, but we will vote on this issue?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Yeah. The statute actually says that the Panel will review the risk assessment guidance -- and that would include, of course, any revisions -- and provide OEHHA with suggestions and recommendations.

What we've done in the past is if you guys have approved the report. Then OEHHA adopts it, but it's not like a TAC identification. There's not a findings and a letter that gets transmitted to ARB. It's just a you guys say the document seems fine.

CHAIRPERSON FROINES: So it will -- our

responsibility is to vote when we feel that it would be appropriate?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Exactly.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: And the approval then is by the OEHHA Director.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: The adoption.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Sorry. The adoption is by the OEHHA director. It doesn't have to go beyond OEHHA to become part of the guidance documents.

CHAIRPERSON FROINES: Okay, Andy, you're on.

(Thereupon an overhead presentation was Presented as follows.)

CHAIRPERSON FROINES: We are reconvening the SRP meeting.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Okay. As Melanie has just explained, the presentation that I'm giving you today is of a revision to this particular aspect of the risk assessment guidelines, which is an appendix to the technical support document for cancer potency factors.

And I'll just, by way of explanation, say that

there is already a previous version of this appendix in the technical support document, which includes the previous version of this TEF table. And so the methodology is already something which is in place that we're not proposing anything new in the methodology, but we did take the opportunity to update somewhat the supporting documentation, in terms of citing the newer literature which was called upon by the WHO authorities. And I'll explain where all that comes from in a moment.

CHAIRPERSON FROINES: Were there many comments from the outside?

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: There were a number of comments from the outside. I will -- I have a presentation which deals with those, which I will give at the end when you instruct me to do so. But one of the, I think, difficulties we had is that we haven't actually received any comments which say the TEF 2005 version is either better or worse than the '97.

The comments we received were mainly discussing various aspects of the TEF methodology per se, which in fact is probably worth saying, that the use of some form of the TEF methodology has been in place since the SRP endorsed the TAC document on dioxins in 1986. And that was -- and then that recommendation was followed up by the

identification by the Air Resources Board.

So we've had the methodology in some form in place in the TAC program since 1986. We then, in fact, adopted -- somewhat less formally adopted the use of an international consensus version of the table of values sometime in the early nineties, and have been perhaps on a rather approximate schedule updating it from time to time as this international consensus has been updated.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Andy, you have a slide with all that.

PANEL MEMBER BLANC: Yeah, I think you should just keep going.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Okay, sorry. I'm going to start by just a brief summary of what the methodology is and what the compounds are, just in case you're not familiar with that.

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OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Dioxins are the popular name for the chlorinated dibenzo-para-dioxins, which the best known examples is 2,3,7,8-tetrachlorodibenzodioxin, otherwise known as TCDD.

The dioxin like compounds are a group of related chlorinated compounds, which fall into the chemical classes of PCBs, the polychlorinated biphenyls, and

polychlorinated dibenzofurans.

The dioxins and DLCs are ubiquitous environmental contaminants, principally derived from combustion sources. Although, there are some -- historically, there are some chemical manufacturing processes, which have created them as well.

They are toxic with wide range of different effects, including carcinogenicity, immunotoxicity, reproductive and developmental toxicity and endocrine toxicity.

CHAIRPERSON FROINES: I'm sorry, Andy, and I will not raise a lot of questions in the afternoon, but I just want to ask you, when you say ubiquitous environmental contaminants, do you have a sense that there is significant exposure in wherever that are a matter of concern?

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: The background exposures to dioxins are very much in the range of levels which we suspect may have at least -- they either approach or exceed the level at which you would consider those effects significant.

I do have to say that probably the largest single source of exposure for humans is dietary, but all routes are important. And although every effort has been made to minimize their exposure, and the amount being produced is

now, I think, considerably less than it was a number of years ago, nevertheless because of their extreme environmental persistence, the actual exposures do remain at potentially significant levels, yes.

And I'll also say in passing, and remind you and say that since 1986 the dioxins have been a toxic air contaminant. They're also identified as one of the first five priority chemicals for SB 25.

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OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: The risk assessment for dioxin like compounds has become somewhat complicated. The endpoint that drives many risk assessments is the cancer endpoint. But as I mentioned, there's a whole suite of different toxic effects. And those other effects show a mechanistic and quantitative relationship to the carcinogenic effect. And it's believed that all of these groups of effects relate to the process of a long-term and relatively irreversible binding to the AH receptor, which you may have heard this a receptor which, among other things, controls induction of some cytochrome P450 enzymes, but it also has important influences on molecular and cellular processes.

Now, usually cancer risk assessments, based on a potency value or slope of the dose response curve in

effect, which is calculated from tumor incidence in an animal bioassay or an epidemiological study. And this is detailed in the main part of the technical support document of which this document here is an appendix.

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OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: But although we have studies of a few individual dioxin like compounds and also of mixtures, which imply that the whole group shows these similar effects. Only a few have actually been studied individually in sufficient detail to allow calculations of single values for the potency.

But it's important that we have individual values for the potency of each of the dioxin like compounds, because they vary quite a bit. And real world exposures are to mixtures of many of these compounds. And the actual composition of the mixture varies quite a bit, depending on the source and the extent to which the material has been out in the environment being biodegraded or otherwise weathered.

So the idea of the TEF procedure is a methodology to estimate individual potencies from the limited amount of congener-specific data that we have, and, plus, of course, taking into account the studies of the few specific compounds, which we do have toxicity

information -- quantitative toxicity information.

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OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: So the idea is that you -- the TEF approach relates the potency of an individual congener. The word congener, by the way, is a technical meaning one of the closely related isomeric variants of the dioxin-like structures.

The idea is that you have a factor which relates the potency of the individual compound to that of a single market compound, if you like, for which you do have a full range of values. And that compound is TCDD.

And then essentially what you do is you multiply the concentration of the individual component by its TEF, or toxicity equivalence factor, and then you add up all those products for all of the compounds for which you have measurements. And that produces a total toxic equivalence, or TEQ, which has the properties of being a concentration.

It's the amount of dioxin which would supposedly have the same amount of effect as the mixture which you're examining. So that's the basic mathematical principle.

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OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: As I said, there are various forms of the

scheme have been in development since 1983. There's been a general effort to develop an international consensus set of values, which starting about 1990 was taken over by a special committee of the World Health Organization who produced their first report in 1993.

We have used the WHO tables most recently. The first one, which was adopted by OEHHA, was, in fact, the 1997 version. Prior to that, we were using an earlier version of the consensus TEF table, which had been developed in the late eighties by NATO. But the proposal here is to update the version published by WHO in 2005.

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OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: This new version includes a number of specific statements of inclusion as regards to what the type of compound to be included should be. And it is required to show a structural relationship to the polychlorinated dibenzodioxin, and dibenzofurans. It's required to bind to the AH receptor.

It's designed to be -- it's required that it elicit receptor mediated biochemical and toxic responses. And it's required that it be persistent and accumulate in the food chain. And this idea of biopersistence is considered to be a key function of the actual mechanism.

Things which bind to the AH receptor, but then

are removed by metabolism and are not highly persistent, in fact, don't produce the suite of dioxin-like toxic effects, even though they bind in the short term to the AH receptor.

CHAIRPERSON FROINES: Andy, you said earlier that the binding to the AH receptor was reversible, if I understood you correctly. And so how does that reversibility come into play when you're looking at potency of a carcinogen, as an example?

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Well, maybe I should clarify what I may have said about reversibility. I mean, I think any binding process is at least, in theoretical chemical terms, reversible. But actually one of the features of binding of dioxin-like compounds to the AH receptor is that it appears that that binding is somewhat difficult to reverse, in comparison to things like the polycyclic aromatic hydrocarbons, which show a somewhat freely reversible binding.

So part of the uniqueness of this chemical group is that they do bind very tightly. And that getting them off the receptor, although probably not impossible, is quite difficult.

PANEL MEMBER GILL: What's the affinity?

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: Well, the KMs are down in the picogram range there.

PANEL MEMBER GILL: You mean KD?

PANEL MEMBER BUCKPITT: KD, yeah.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: Yes. The binding is extremely tight. And that's one of the reasons why we're concerned about the admittedly fairly low background levels of dioxins, because these effects start to come into play at astonishingly low levels.

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OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: But I think the concept which, you know, has been explored in various places. You know, there's been a huge amount of discussion about that. But I think in terms of the potency, the idea is that basically you have a mechanistic impact, which is disturbing cell growth control any time you have these dioxin-like compounds bound to the receptor.

And with a half life of eight to 10 years in people, they're around for a long time, even after a single exposure. So even after a brief exposure, you have a long-term perturbation of cell growth regulation.

And it's during that period of perturbation that the carcinogenic initiation can occur. It's also during

that period that things like developmental toxicity, and the other adverse impacts can occur.

PANEL MEMBER BUCKPITT: Can I ask a question on the persistence. You said that that was -- and as I read this document, that you were taking that into account. Could you expand on that a little bit, to tell us what you would consider a persistent chemical and which you would consider not?

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Well, I think -- I mean, obviously, there's a scale of persistence at work. But something which, like the dioxins, has a half life in humans of eight to 10 years, would clearly be considered persistent. It's also a question of what would be considered a persistent chemical in the general environment.

And these compounds have the ability to persist in sediments and other relevant areas for many decades.

PANEL MEMBER BUCKPITT: I guess what I'm trying to get to, those are the extremes.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON? Yes.

PANEL MEMBER BUCKPITT: But where is the middle ground, and where do you say, well, this really is not persistent.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: I think that well the middle ground is probably something which would have a half life of a few weeks would be my guess. But, you know, as I say, there are definite sort of shades of severity here.

But the key thing, as regards to the dioxins, is that they're way down at the far end of the them, as you know.

PANEL MEMBER BUCKPITT: Oh, yeah.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: There's also the WHO committee listed a series of different endpoints, which relate to AH receptor bindings, which they would use as markers for the effectiveness of the individual congeners.

And the idea is basically if you've got one of these endpoints, and you've got a measurement on congener X and on dioxin, then you can use those two measurements to develop a candidate value for the TEF. And they have a number of specific criteria, but the key thing is obviously the endpoint has got to be about AH receptor binding.

They only used studies for which they had some sort of dose response information. And they did not use studies unless they appeared in the peer reviewed scientific literature. They normally only looked at results which had statistical significance. Although,

they may have taken marginal findings into account at a qualitative level. And they did include structure activity considerations in the database.

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PANEL MEMBER GLANTZ: My only including statistically significant findings, isn't that going to buy us the results?

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Well, when you're looking at experimental data, it's rather hard to make anything of something which doesn't show, I mean, a reasonable -- in quantitative terms, it's hard to use anything that doesn't have reasonable statistical significance. But I think -- I think your point is taken that the Panel specifically said they looked at whatever the data were, and if they thought there was some kind of a flicker there, then they would certainly take that into consideration in their overall deliberations, even if it didn't provide something that, you know, gave them a good solid numerical result.

PANEL MEMBER GLANTZ: Right, but theoretically what if the dioxins weren't having any effect? Then you wouldn't find a statistically significant --

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: No. Well, if the endpoint was not -- you know, was not one which the dioxin like compounds

affected, then it wouldn't be considered as part of the basis for developing a TEF. This is only about endpoints which are an indicator of that suite of toxicological responses which is elicited by the dioxin like compounds.

I've listed out a number of the endpoints here. These run the range of biochemical changes, such as enzyme, induction, messenger RNA production, a variety of toxicity endpoints, including developmental neurotoxicity, immunotoxicity, and marker enzymes for tissue damage particularly in the liver.

And also carcinogenicity including tumor induction, promotion, and impacts on various measures of cell growth regulation.

So these are among the endpoints used in evaluating the TEFs. And this publication, Haws et al. 2006, essentially put together a database of candidate endpoints and results, which were then used by the WHO Expert Committee to finalize their recommendation of the TEF table.

PANEL MEMBER BLANC: And just to clarify, if I understand the point correctly, it's not that you're trying to say that these criteria or this approach is substantively different from what they did the last time around. What they did was simply take the literature that had emerged in the interval and assess it using very much

the same approach they'd used the first go round, isn't that correct?

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: That's absolutely correct.

PANEL MEMBER BLANC: Okay, just to clarify.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: They have done quite a lot of work identifying new data improving the systematic approach to all this.

PANEL MEMBER BLANC: And we'd previously reviewed a document --

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Yes.

PANEL MEMBER BLANC: -- which subsumed this. And therefore by --

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Well, you and your predecessors in title have reviewed three or four such documents.

PANEL MEMBER BLANC: And therefore, in principle all of this part is a given that we've already --

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Yes. Yes.

PANEL MEMBER BLANC: And what we're going to get to in the next slide is having --

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: Precisely.

PANEL MEMBER BLANC: -- updated the literature that's analyzed by the same approach what differences have emerged.

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OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: Precisely. So this is the --

CHAIRPERSON FROINES: Andy, can you use upstream, for example, AH binding as a -- for regulatory purposes in that sense?

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: There is a sense that that is basically what we're doing here, that we're taking measures of AH binding as a way of assessing the upstream input to the appearance of the suite dioxin-like compound toxicities. So, in effect, that's what we're doing. This is one of the early poster children of the upstream approach in fact.

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OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: So this is the table of the new values in contrast to the old. There are two pages to this. So this is the first half of the table. This half of the table shows you the recommended values for the polychlorinated dibenzodioxins and dibenzofurans.

And, in fact, there are relatively few changes in this table. There are a couple which have gone up or down by a factor of three. And there are a couple where in the previous version of the table, they said we're not going -- you know, one of the things they said in the original version of the method was that these were really not super precise. These were estimates and they decided that the values they would quote would be order of magnitude or half an order of magnitude. In the previous version they decided that they would report the TEFs as, you know, 1 or 0.5 or some decimal up or down from that.

Whereas, the latest version they spent some time discussing the mathematical implications of that, and decided that since it was essentially a logarithmic scale, it made more sense to cite the intermediate potencies as 0.3 or whatever as opposed to 0.5. So there are a couple here which are basically the same point, but they've moved from 0.05 a to 0.03 or 0.5 to 0.3.

So that change there is a somewhat systematic change from the last version. Although, as you can see, not quantitatively a very huge one.

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OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: There's been quite a bit more change in the values -- in the number of values for those shown on the

second half of the table, which are the values for the dioxin-like PCBs. By and large the dioxin-like PCBs are the ones which adopt a coplanar configuration. And these evidently bind to the AH receptor in the same way as the dioxins and PCDFs, and elicit the same kind of responses.

Non-coplanar PCBs, particularly where the ortho positions are occupied so that the molecule has difficulty in adopting a coplanar configuration by and large don't produce the suite of dioxin-like toxicities. Although, they do have other toxic effects which are characteristic of that class of compound.

But the WHO committee first included the coplanar PCBs in their table of TEFs, in fact in 1993. That then we adopted this inclusion when we adopted the 97 version of the table. And they have been reassessing these. And they changed a number of the values. Although, by and large, not by a substantial amount. So this is the revised table.

PANEL MEMBER NAZAROFF: May I just ask a question at this point, just to better understand the context. The number of congeners for dioxins and furans is much larger than the number that appear in the table. And so is the inference -- is there any basis for inferring, one way or the other, that those are compounds that are not -- that have not been studied and not evaluated or is the default

zero?

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: As far as the dioxins and dibenzofurans are concerned, basically what you see there is the more -- well, among the more heavily chlorinated species. You've got the various geometrical possibilities. But the ones with only 1, 2, or 3 chorines are not included.

PANEL MEMBER NAZAROFF: But even among the 4, 5, and so forth, chlorine molecules, there are many different ways to configure the chlorines. And so the question I'm trying to understand is from a health risk, exposure risk management point view, is it safe to assume if a compound is in the family, but doesn't appear on this list, that its TEF is zero?

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Yes. The assumption is that if it's not on this list, its TEF is zero. And that's particularly true for the PCBs --

PANEL MEMBER NAZAROFF: Yes.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: -- where, of course, the vast majority --

PANEL MEMBER NAZAROFF: The planar configurations --

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Yeah, that vast majority are not on the TEF

list.

PANEL MEMBER NAZAROFF: Right.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: They have to be chlorinated at least in the 2, 3, 7, and 8 position to be included.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Yes. And they have to have at least four chlorines.

PANEL MEMBER BUCKPITT: And isn't that partly do to environmental persistence? Because if they're not heavy chlorinated, they're going to get metabolized.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: That is true. But the reason why they're on table is mainly a question of how they interact with the AH receptor. But it's also true, as you say, that the less heavily chlorinated ones are much less persistent.

And it's also in that context worth pointing out that although octachloro has a relatively low TEF, it's actually a very important compound, because it is extraordinarily persistent and winds up, you know, on a mass basis forming quite a substantial proportion of environmentally degraded mixtures, I mean, given the relative persistence of the different congeners.

PANEL MEMBER BLANC: Okay.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: So our proposal is that we adopt this table. We've put together a supporting document, which was -- which is an expansion of the previous supporting document we had, mainly just to cover some additional literature, which the WHO committee pinpointed in their update. We haven't attempted in the supporting document to write a textbook on the subject or reinvent the work that the WHO committee does. We're basically citing WHO, but we feel that it's good to have a little compendium of data to orient people who are using the table.

PANEL MEMBER BLANC: Okay.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: So that's the proposal.

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OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: I have some slides on the responses to comments, which I can go through --

CHAIRPERSON FROINES: Please, please.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: -- now or after your discussion. Which would you prefer?

CHAIRPERSON FROINES: No, no, no. Now.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Now, okay.

We received comments from two interested parties.

One set of comments on behalf of the Chlorine Chemistry Division of the American Chemistry Council. And one set of comments on behalf of the General Electric Company.

The detailed responses to -- the detail of those comments and our responses to them are in the written package, which you have in, I think, the black folder. But I'm just going to give you a brief summary here. The comments are actually quite voluminous in their detail.

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CHAIRPERSON FROINES: But you will cover what the comments -- if they're voluminous comments, you'll cover reasonably full --

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: I propose to tell you the areas of which the comments are addressed, yes.

CHAIRPERSON FROINES: Okay.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: And I will, at times, refer to the written comments for the details, like exactly which papers we did and didn't include in the revised version of the document and things like that.

The first comment, which appeared in several places in both sets of comments was basically that they wanted us to include a lot more literature relating to the reliability or otherwise of the TEF methodology.

And we basically wanted to emphasize that, firstly, we are not asking for there to be any change in the regulatory status of the use of the TEF methodology, which is established. And so any comments relating to that topic are not actually -- you know, don't have a bearing on the proposal that we're putting before the Panel.

But we felt that it was nevertheless useful to include some of the additional literature that was cited to fill out the supporting document that we provided. So we have added quite a number of additional references in response to these comments. There are also others which we chose not to include, because we didn't think they added to the discussion, but we have responded by including additional references.

One in particular that I will point out is that we do cite what was -- when we wrote the document, this was a draft from the U.S. EPA, but has now been finalized. They have an essentially similar proposal to update their use of the TEF table to the 2005 version. And, in fact, the final version of this just came out earlier this month. The U.S. EPA is now using the 2005 version of this table.

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OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: Another more specific comment says that we should cite the paper by Haws et al. which was the background paper laying out the database of endpoints and some analysis which the WHO expert committee used.

Our response to that is we do actually cite this paper, but we're not -- we didn't see the need to, in effect, rework what the WHO committee had done in using those data. The authority we are citing is the WHO committee's deliberations. And the Haws et al. paper is background to that. So, yes, we cited. But one difference in particular is that Haws et al. presented a statistical analysis of the distribution of TEF values for different endpoints, things like that, which the expert committee looked at that and said, yes, that's very interesting. We take it into account. But in the final analysis, we're going to use expert judgment to determine what is the most appropriate value for the TEFs rather than simply relying on a statistical analysis.

And our proposal is to endorse the decision of the expert committee and use their values, which were, as I say, chosen ultimately by expert judgment with input from various types of information, including the quantitative analysis by Haws, et al.

CHAIRPERSON FROINES: Did you make comparisons between the expert committee and the Haws paper?

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: No. We haven't included that in our document. That's something which the WHO committee deals with. So, you know, I say we weren't thinking that it was worth, you know, essentially reiterating the entire spectrum of deliberations.

CHAIRPERSON FROINES: Okay.

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OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Another comment was that the TEFs are based on feeding studies and should be used only to assess risks from dietary intake.

Firstly, that's not true. There's, as you saw from the list of endpoints, it includes a whole range of in vitro measures. Although, most of the in vivo studies in animals are dietary. There are some fairly significant technical obstacles to doing inhalation toxicology with dioxin-like compounds, like having to demolish the facility when you finish the experiment.

So it's true that many of the in vivo measures are based on feeding studies. But in any case, the methodology conceptually and practically is not limited to merely the oral route. And it's use for inhalation has been repeatedly endorsed by yourselves and your predecessors. So we continue to use it in that way.

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OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Another series of comments saying that they're assuming that there are no differences between humans and rodents, and/or we've ignored the fact that the sensitivity of humans and rodents differs considerably for some endpoints.

While we note that there are, you know, a number of species, specific variations in response, the overall picture is that the relative sensitivity to the different dioxin-like compounds follows the same pattern across species. And within the kind of precision which the WHO TEF table is claiming, that this is a reasonable approach. And it's in line with general toxicological principles and is, in fact, supported by the data that we have available.

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OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Another question --

CHAIRPERSON FROINES: Is that true for the AH binding?

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: By and large, yes. I mean, there are, as I say, there are smaller variations and some of which is a question of how precise are the experiments. But by and large, the AH binding and the toxic endpoints do follow

the same patent, regardless of whether you're looking in rats, mice, in vitro, cultures of various sorts, including some human cells.

So there are variations, but the overall picture has a sort of general medium, which is what the WHO committee picked on as being the basis of the TEF table.

Another comment was on the assumption of additivity. The TEF method assumes that the various effects of the dioxin-like compounds in a mixture will be additive, as far as low dose exposures are concerned. And this is what we're counting on in our use of the method for assessing environmental exposures. It's recognized that when you get up to higher levels of exposure, and particularly where you get into the range where you've got substantial effects of enzyme induction, saturation, and receptors and things likes that, then, you know, the additivity does begin to break down. But it has been shown that at the lower dose levels that we're interested in, the additive assumption is valid.

And similarly, questions about the shape of the dose response curve. Yes, there are some minor variations in the shape of the dose response curve, but again at low doses particularly, the dose response curve appears to be sufficiently comparable to support the use of the method for the purposes that we propose.

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OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Another comment was saying that there isn't a reliable estimate for the carcinogenicity of TCDD. Our response to that is that we have an approved number in regulation.

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OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: The final point argued that the epidemiological studies don't support the causal association between exposure to PCBs and cancer in humans.

We disagree with that and cite a number of epidemiological investigations which support the concept. This has been dealt with at some length by IARC. And the conclusion there, which we support, is that as you would perhaps expect the actual epidemiological investigations are somewhat less than conclusive, because these -- especially for environmental contamination type studies, it's extraordinarily hard to get an absolutely, you know, irrefutable and unequivocal conclusion, but we find them certainly indicative, and also consistent with the animal studies, which are seen as definitive.

CHAIRPERSON FROINES: Why did IARC classify it to be?

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: On the basis of limited human -- well, no, sorry -- sufficient animals and insufficient but indicative in humans. So the IARC decision obviously, as they always do, takes a pretty stringent view of the human studies and finds them interesting, but not convincing in isolation, which is, I think, a fair summary.

But the overall picture was that they classified it is as a probable -- Class 2B for IARC, which is --

CHAIRPERSON FROINES: Andy, I think -- unless I'm just way off base and forgetting something, I think 2B is possible human carcinogen.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Yeah. I think that the WHO listed there is IPCS or somebody. That was quoted by van den Berg, I think. But anyway, you know, you're -- the point you make is correct, as far as the IARC 2B designation is possible.

CHAIRPERSON FROINES: But it seems like, given the data that you're talking about, that I would have guessed that IARC would have designated a 2A.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: It's entirely possible that a revisiting of the data would prompt such a decision. But, you know, I think it's, at the very least, fair to call it a strong 2B. But in any event, a 2B is more than sufficient to justify our proposal to develop risk estimates based on

possible carcinogenicity. And anything which is a 2B, a 2A or a 1, we would invariably use as a basis of a cancer risk assessment for the program.

CHAIRPERSON FROINES: I think that's appropriate. I think the problem is the one that Tomatis talked about at great length, which is 2B is kind of a purgatory, and -- but that's a general point and just drop it.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Yeah, I mean, I think the IARC risk assessment guidelines are quite a complicated issue. And I think that the preamble -- the latest version of the preamble to the monographs is a very able and illuminating commentary on that process, but it's its own thing.

Here, we don't have to do that. We have to merely decide whether or not to use a non-threshold model for risk assessment. And clearly, this meets the criteria for doing that.

And that's all I have.

PANEL MEMBER BLANC: I think we have a question over here.

PANEL MEMBER NAZAROFF: This is a general I think as we're leading into the more general discussion. But I'm trying to -- I think I know the answer, but it's not completely clear, so I want to confirm. The inclusion of PCBs in this TEF methodology is not, as I understand it,

something that's new with the proposal? That is, the existing practice in the State includes the same PCBs that wile be included in the new treatment?

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Yes, it does.

PANEL MEMBER NAZAROFF: So some of what seemed very strong criticism by GE seemed to be tied to that issue of a decision to include PCBs in the methodology at all.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Well, if it implied that, it was incorrect.

PANEL MEMBER NAZAROFF: I'm not referring so much to your response, but my reading of their questions.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Yes. Well, I have the impression that they would much rather we hadn't included PCBs in the scheme.

PANEL MEMBER NAZAROFF: Yeah, but that decision is an old one.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: That decision was taken some number of years ago.

PANEL MEMBER NAZAROFF: Right. I think what confused me was the fact that you have in the draft appendix a Table 1, which lists California TEF.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: Yeah, those were the original 1996 ones.

PANEL MEMBER NAZAROFF: Yeah. Well, and till -- what wasn't transparent to me was what is current California practice.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: Yea, the current California practice is the '97.

PANEL MEMBER NAZAROFF: WHO 97 numbers?

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: Yes, it is.

PANEL MEMBER NAZAROFF: So perhaps that should just be made more clear in the presentation.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: We could see if we can underline that somewhere in the text.

PANEL MEMBER NAZAROFF: The one other point I guess, as a comment, that I'd like to make has to do just with maybe risk communication. And in some respects it's a minor point, but I think it's an important one. In Table 4 and 5 of this draft appendix, there is an illustration of the its application for a couple of different environmental samples, San Bernardino ambient air, Marin County incinerator exhaust, I guess, and then a striped bass.

And you've emphasized in the presentations here

and it shows in the summary that the TEF numbers are very much order of magnitude or half order of magnitude precision.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Yes.

PANEL MEMBER NAZAROFF: Yet down on the bottom line there are total TEQ results reported with six or seven significant figures, which, of course one gets, but not by treating these as order of magnitude parameters.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Yes.

PANEL MEMBER NAZAROFF: And so I would just suggest in terms of risk communication, you're not doing yourself a good service by reporting numbers with what is absurd levels of excessive precision.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Yea. I mean, I think possibly what we might need to do is put the unrounded numbers in just to show the extent of change with the new numbers.

So having bold -- the proper precision, which would be like, you know, single significant --

PANEL MEMBER NAZAROFF: Yeah, or two significant figures, I mean, might be justified, so you don't propagate errors.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: Yes.

PANEL MEMBER NAZAROFF: And keeping intermediate results with some more precision is fine.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Yes.

PANEL MEMBER NAZAROFF: But if you're trying to convey a message that these are order of magnitude, which it seems as best the are --

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: I take your point, that we can --

PANEL MEMBER NAZAROFF: -- then don't --

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: We'll put in a bottom line in bold with the properly rounded numbers.

PANEL MEMBER NAZAROFF: And in that case what one sees is that there's really not a difference in a magnitude sense at all. And even at kind of --

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Even down in the weeds, it's not much.

PANEL MEMBER NAZAROFF: Right.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Yes, I take that point.

CHAIRPERSON FROINES: Paul. We're going around the room now.

PANEL MEMBER BLANC: Yeah. No, I would say that

with those two minor corrections, I find this completely acceptable. And I agree with the position of OEHHA that, in fact, the proposal of this revision is not a proposal to reconsider the fundamentals of the document. It is appropriate to be consistent and to update the document with the latest WHO findings, to the extent that they differ. And I do not see any need to go beyond that.

So I think your approach is appropriate and consistent. And certainly, I would anticipate that if in 2015 the WHO revises their document again, you would come back with further modest revisions consistent with that.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Absolutely. I should have emphasized that, you know, the WHO committee is now an ongoing activity, you know, under -- I think it's under direction of Dr. van den Berg, that is, you know, constantly working on updates, incorporating new data as it comes out, and is expected to produce a revision in due course.

One of the reasons why we structured this as an appendix to the technical support document is so we can pull it out and revise it on a regular basis as that becomes appropriate.

PANEL MEMBER GLANTZ: When I read it, my sense is that it really wasn't changing things very much.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: That's correct. The changes are not huge.

PANEL MEMBER GLANTZ: If anything, it's reducing the risk estimate a little bit, isn't it?

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: That is true.

CHAIRPERSON FROINES: We'll get to you.

PANEL MEMBER GLANTZ: Well, then what's the fuss?

PANEL MEMBER BLANC: We never said there was a fuss.

PANEL MEMBER GLANTZ: Oh, okay.

PANEL MEMBER ARAUJO: But they're making a fuss.

PANEL MEMBER GLANTZ: Well, GE was making a fuss.

PANEL MEMBER GILL: Just as a point of clarification, what is PCB 126 out of all the list, because the names are different?

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Can you --

PANEL MEMBER GILL: Which is 126?

PANEL MEMBER BLANC: It's seems to be the benchmark, prototype.

PANEL MEMBER GILL: Yeah, which is a prototype in your list of TEFs.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Have you got the list?

PANEL MEMBER NAZAROFF: 3, 3 prime, 4, 4 prime, 5

penta. It shows up in Table 1.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Yeah, here we go. Yes, I knew we had this in the table somewhere. That's right.

CHAIRPERSON FROINES: Paul.

PANEL MEMBER BLANC: But just in response to Stan's comment about, you know, what's the big deal? I think it's important that when we conclude this discussion five minutes from now, that we make sure that our findings are clear that we not only approve of what's done, but that we don't see any need to revisit the core document, because I think the nature of the critiques is why didn't you go back and revisit the core document.

CHAIRPERSON FROINES: We won't do findings.

PANEL MEMBER BLANC: Not findings. When we have a motion to approve this document, I'm sorry, that we make that clear as part of the motion.

CHAIRPERSON FROINES: Okay, Sarjeet.

PANEL MEMBER GILL: I have only one comment actually. My one comment is the public critics that were put forward actually included a number of reviews, which actually enhance the quality of the document at the end. But I come back to the core assumption that has been made basically has not changed. And I agree with that actually that the core assumptions have not changed.

So I do not see -- I agree with you that there's no need for actually revisiting an issue which has already been decided, because a key point is, is there new information that substantially changes this?

After reading all of the information, including the one that came out today, actually I don't see a reason for revisiting the issue. I agree with you.

CHAIRPERSON FROINES: Jesús.

PANEL MEMBER ARAUJO: The one problem that I may have is with your comment Number 4, which is in relation to the differences in the order of magnitude, that they're making a big deal about this. And they're actually attaching a paper, and the paper is from 2010.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: This is the comments which were received just a few days ago? I have to --

PANEL MEMBER ARAUJO: Yeah, but the issue is that if they are -- pretty much like questioning whether the standards and the methodology proposed by the WHO 2005 should be used in this case, and whether using mouse data to extrapolate to human data is valid. And they are coming with a paper that is applicable. It's a very, very important paper from that data.

So rather than just saying, what I would want to hear is that they're saying that they -- they all say it

doesn't agree with these assertions, but it indicates they relate to possible values of the TCDD potency. If you go and review the paper, some of the numbers are actually quiet significantly different. And on the PCB, 126 is more than an order of magnitude. It's like up to 23 or 34 difference.

So if we're going to dismiss this, we should have like a really good conversation or explanation of why we feel that this data doesn't really support their claim.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Two points I'd like to make. Firstly, the comment to which you refer, it was not a comment that was received during the formal comment period. We didn't -- you know, that comment was a letter to the Panel.

Our comments -- you know, we don't comment on those. We comment on the materials received during the formal comment period.

The other thing is that the W -- if you look at the distribution of values for different endpoints, which is given in the Haws et al. paper you will see that in a number of individual endpoints, the distribution is quite wide. It's, you know, an order of magnitude in either direction.

And one of the challenges which the WHO panel faced was, you know, integrating all these different

inputs, which did in fact, in a number of cases, include quite a wide spread of different estimates.

And although -- you know, I mean, one could say, you know, this one set -- one particular data set might move this number in one direction or another, or you know maybe some slightly different approach should be used. The fact of the matter is that, you know, we are deliberately deferring to the international consensus. And if and when this paper -- the new data including this paper in 2010, which I am absolutely confident will be among the materials currently being assessed by the WHO committee. You know, if and when they come to the next iteration, they will presumably take that into account along with all the other new data that they've received, and produce a recommendation which includes that.

PANEL MEMBER ARAUJO: So what you're saying is that the WHO -- that this controversy was already existing out there.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: It is an ongoing controversy. Yes, I mean, one of the reasons why Haws et al. came out with their systematic exploration of the spread of values was, you know, basically to give the Committee the ammunition to evaluate, you know, the previous version of this controversy among others.

CHAIRPERSON FROINES: If I can comment, I think that what you've just been saying to Jesús should be part of your document, so that the ambiguity is clear or is made -- the ambiguity is recognized and your response is made clear. So I think what you've just said to Jesús probably is a reasonable response.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Well, I'll --

CHAIRPERSON FROINES: Is that --

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: I'll --

CHAIRPERSON FROINES: I mean, it's a question for him really.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: I can do that if you think that.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: We'll do it. We will add additional information to indicate that.

PANEL MEMBER ARAUJO: I think that it's good just to make it more complete, right, that we're not dismissing it. Even though this piece of data was addressed to us, it was not shown or included and for you before. I mean, the comment on the paper that we're still including it and considering it.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: We can include a reference to that, as an example of the problems facing --

PANEL MEMBER ARAUJO: And the second point that -- what you want to have is perhaps when we're -- for educational or illustration is that they make a point that they're saying that they -- about the additive versus the -- agonistic versus antagonistic effects of the different doses.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: Yes.

PANEL MEMBER ARAUJO: And that you believe that what is important is that at the low doses there are additive effects, that the issue about the antagonistic effects happens is at a higher dose is that it's not really of that much importance, why do you feel that.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: Yeah. I think we explore that in the document to a significant extent.

PANEL MEMBER ARAUJO: But could you -- that's what I'm saying if you could just --

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION

CHIEF SALMON: As I say, we already treat that at some length in the version our document that you have there.

PANEL MEMBER GILL: I think that's discussed already.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: And it's also in the response to comments.

PANEL MEMBER BLANC: Kathy.

PANEL MEMBER HAMMOND: No particular comments. I mean, I think this is fine. I think this is good. And I think it's good to update it. And I like the idea of regularly updating it as WHO updates it just to have that in the plan to do that.

OEHHA AIR TOXICOLOGY AND RISK ASSESSMENT SECTION CHIEF SALMON: Yeah, that's definitely our intention.

PANEL MEMBER BLANC: Stan.

PANEL MEMBER GLANTZ: No, I got my question answered.

PANEL MEMBER BLANC: Ellen.

PANEL MEMBER EISEN: No additional comments.

PANEL MEMBER BLANC: Alan.

PANEL MEMBER BUCKPITT: Just to say I thought it was well done. It made sense.

PANEL MEMBER BLANC: John, do you have any?

CHAIRPERSON FROINES: Yeah. I was trying to resolve an issue that I feel pretty strongly about. And I don't think I said anything about it in my presentation.

In the past, going way back, the Panel took the position that comments that came in should go to the agencies, and the agencies would then write their

responses. And that's what we prefer.

Jim tells me that the public has a right to submit directly to us. Is the Panel able to set a time limit on that?

PANEL LIAISON BEHRMANN: The time is -- the public is allowed to submit comments up to and at this meeting. Now, obviously comments received at the meeting can't be given as much weight or consideration by the Panel, because you've not had time to review them.

CHAIRPERSON FROINES: I don't think the Panel should read anything that comes to this meeting.

PANEL LIAISON BEHRMANN: I don't think that's within your discretion. The law is very clear that the public may submit comments up to and at the meeting.

Now, as a practice and as policy, our notice is very clear. It says the Panel requests that materials be submitted at least two weeks before the meeting in order for the Panel to fully consider it.

CHAIRPERSON FROINES: Does it I say to the --

PANEL LIAISON BEHRMANN: Two weeks.

CHAIRPERSON FROINES: -- to the agencies?

PANEL LIAISON BEHRMANN: No. No, it's comments submitted to the Panel. Remember that the agencies have already gone through their public comment period and received comments and considered them as part of their

proposal, and responded to them. That's what you're considering.

CHAIRPERSON FROINES: So we're talking only about comments that go to the Panel?

PANEL LIAISON BEHRMANN: Come directly to the Panel. Now, the Panel -- as a practice, the Panel does ask that the agencies, to the extent that they can in the time that they have, also respond to these comments that come in relatively late.

CHAIRPERSON FROINES: Say that again, I'm sorry.

PANEL LIAISON BEHRMANN: As a practice, the Panel has directed me, when a comment comes in -- for example, from General Electric, they sent a letter in on January the 14th. I sent that immediately directly to you and also to OEHHA, but OEHHA is under no legal -- they're not legally required to respond to that, except to the extent that they can within the time that they have. It's the same as the Panel's consideration.

CHAIRPERSON FROINES: Well --

PANEL MEMBER GLANTZ: Can we have that procedural discussion after we act on this.

PANEL MEMBER BLANC: And I'd just like the record to reflect that I think that Jesús brought up the substantive content of this late arriving material and the record will show that we did, in fact, address it. And

that Andy, on behalf of OEHHA, came up with an acceptable response to that.

CHAIRPERSON FROINES: Okay. Let's continue and then we'll come back to this. It shouldn't take just a couple minutes to resolve this.

PANEL MEMBER BLANC: So I'd like to make a motion, if I might.

CHAIRPERSON FROINES: Okay.

PANEL MEMBER BLANC: I'd like to move as follows:

The SRP approves the recommended revision to Appendix C of the technical support document for cancer potency factors, taking into account the minor wording changes to which OEHHA has committed itself, as per the record, and looking forward to further periodic revisions as any substantive body of new information emerges, for example, a new WHO review.

CHAIRPERSON FROINES: Second?

PANEL MEMBER BUCKPITT: Second.

CHAIRPERSON FROINES: Any discussion?

All in favor?

(Ayes.)

CHAIRPERSON FROINES: Any nays?

It has passed unanimously.

Now, what I would propose would be, Jim, that we add to our information for the public that the Panel will

receive comments, but the Panel would appreciate receiving the comments two weeks -- at a minimum, two weeks prior to the meeting.

Now, if two weeks is not acceptable to the Panel, then we can change that.

PANEL LIAISON BEHRMANN: That's right.

CHAIRPERSON FROINES: Is two weeks okay?

PANEL LIAISON BEHRMANN: That's our current practice. You're reiterating our current practice.

CHAIRPERSON FROINES: Okay. I'm just -- because Jesús brought this up basically, and I think that --

PANEL MEMBER GLANTZ: No, that's what I says. If you read the back of the agenda. "The Panel welcomes written comments or submissions from all parties regarding the report, but does not accept oral comments from the public at meetings. Although written comments are accepted up until the day of the scheduled meeting, to assure adequate review, the Panel requests written comments and information be submitted to the Panel liaison preferably no later than two weeks prior to a scheduled meeting.

CHAIRPERSON FROINES: Okay.

PANEL MEMBER GILL: I see no need for any change.

PANEL MEMBER GLANTZ: I think that's fine.

CHAIRPERSON FROINES: Okay.

PANEL MEMBER BLANC: Okay.

CHAIRPERSON FROINES: I did not have that in front of me, and so I was following up on Jesús' comments.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Okay. The next item that OEHHA is bringing to the Panel is a set of reference exposure levels for the chemical caprolactam, which is identified as a TAC because it was a HAP when the original HAP was adopted.

So to my left is Dr. Bob Blaisdell another one of the section managers in my group. And to his left is Dr. Daryn Dodge who is doing to give the presentation of the development of our reference exposure levels, which followed the new methodology the Panel approved and OEHHA adopted in 2008.

(Thereupon an overhead presentation was Presented as follows.)

PANEL MEMBER BLANC: Can you just, Melanie, give us a sense of how long you anticipate the presentation and then how long you would like for discussion.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: I think we could probably get through the presentation in 20 minutes or so, as soon as we can get this computer to -- the computer is jammed. Hang on just a second. So 20 to 25 minutes for the presentation and then as much discussion as the Panel takes.

CHAIRPERSON FROINES: Peter?
PANEL MEMBER GLANTZ: Doesn't page down work?
CHAIRPERSON FROINES: Sarjeet?
PANEL MEMBER GILL: If we have a flight that leaves at 5:50 around, so we need to --
PANEL MEMBER BLANC: You'd like to adjourn by 4:00.
PANEL MEMBER GILL: Yeah, by 4:00
PANEL MEMBER BLANC: Yeah, I think that's reasonable.
CHAIRPERSON FROINES: I think that's possible.
PANEL MEMBER GLANTZ: What is the problem?
OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: I don't know.
PANEL MEMBER GLANTZ: Why don't you --
CHAIRPERSON FROINES: Peter, do you -- I'll give the Panel, but do they have the --
PANEL MEMBER GLANTZ: Close everything that you're not using.
CHAIRPERSON FROINES: No, stop. Kathy just said she did not have the presentation.
PANEL MEMBER HAMMOND: Do we have copies?
MR. MATHEWS: I'm bringing them.
CHAIRPERSON FROINES: Okay, two minutes.
PANEL MEMBER BLANC: If you pass out the printed

copies, he can start presenting it based on the printed copies.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Exactly.

PANEL MEMBER BLANC: While you're doing that, Melanie, can you just -- unless it's in the slides, just orient us to why this is coming up now.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Sure. We were actually asked by the Air Board to develop a reference exposure level for caprolactam. So we have been working on it for some time. And it went out for public review, and we responded to the comments, and so we're bringing it to the Panel.

CHAIRPERSON FROINES: Melanie, has Lyn Baker done any field sampling for this compound?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: No. This is actually -- Lyn does mostly the pesticides and their --

CHAIRPERSON FROINES: Well, whoever does their sampling for point source sources.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: As far as I know, no one has done any source sampling for caprolactam. It would fall under the -- it falls under the Air Toxics Hot Spots Program, because it's one of the chemicals listed as required to be -- to have

an emissions inventory if it's emitted. So that's -- you know, there hasn't been source sampling for caprolactam.

PANEL MEMBER GLANTZ: Let's hear the presentation.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Okay. You know what, since the slide show mechanism doesn't seem to be working, we're just going to do it just like this. You can see the slides.

PANEL MEMBER BLANC: Fine. Fine. We've got printouts.

PANEL MEMBER GLANTZ: Okay, just --

OEHHA STAFF TOXICOLOGIST DODGE: Thank you, Melanie.

PANEL MEMBER GLANTZ: Peter, just okay.

Let's go.

OEHHA STAFF TOXICOLOGIST DODGE: Again, I'm Daryn Dodge, Staff Toxicologist. I was assigned the task of developing RELs for caprolactam.

--o0o--

OEHHA STAFF TOXICOLOGIST DODGE: This is the chemical structure of caprolactam. It's a semi-volatile chemical with a saturated vapor concentration of 13 milligrams per cubic meter. It's a monomer used in industrial polymerization process to form fibers called Nylon 6. Nylon 6 is primarily used in carpeting.

The reaction generally isn't 100 percent efficient, so you have caprolactam monomer in new carpets. And they can measure levels of the monomer caprolactam off gassing or released from new carpets.

Other sources. It could be potentially emitted from facilities that manufacture, use, or recycle Nylon 6.

--o0o--

OEHHA STAFF TOXICOLOGIST DODGE: I'm going to go into a brief run down of the steps for reference exposure levels or whatever a reference exposure level is.

CHAIRPERSON FROINES: May I ask you a question?

OEHHA STAFF TOXICOLOGIST DODGE: Yeah.

CHAIRPERSON FROINES: The references that are in the document, did they derive primarily from academic research in universities or were they --

PANEL MEMBER BLANC: John, can I ask you to defer that question, because I have a lot of critiques of this document, and I'd like to hear the document and then come back. I view that as primarily our critique. I think it's obvious that they don't once you look at the document, so let's hear --

CHAIRPERSON FROINES: Who doesn't want to look at the document?

PANEL MEMBER GLANTZ: No, let's just let them do their presentation.

CHAIRPERSON FROINES: Hey, hey, hey guys. The two of you have continuously tried to hurry this process up, and I'm tired of the impatience. Cool it. I'm going to ask a question. I Chair this committee.

Were the papers that you reviewed in this document primarily from industry or from other sources, period?

OEHHA STAFF TOXICOLOGIST DODGE: The chronic study in rodents was essentially an industry study. The acute study that we have a comparison REL for was done by a -- let's see probably a university or a facility in Denmark or Germany, I forget which, by Dr. Triebig, who is a pretty big name in chemosensory studies.

CHAIRPERSON FROINES: Thank you.

OEHHA STAFF TOXICOLOGIST DODGE: Okay. Reference exposure levels. These are concentrations in air at or below which no adverse health effects are anticipated following exposure for specified periods. Now, we developed three RELs an acute 1 hour, an 8 hour and a chronic. And those are the specified periods. These are non-cancer reference exposure levels. So it assumes that there's a threshold for effects.

They are meant to protect most people, including sensitive individuals. In the case of caprolactam, since it's a sensory irritant, we're talking basically about

asthmatics or children with asthma.

Exceeding the REL does not necessarily result in an adverse health consequence. But as you go up in concentration above the REL, you can expect to see some of these effects.

--o0o--

OEHHA STAFF TOXICOLOGIST DODGE: The steps in a REL development. The first thing you do is go through a literature search, collect all the studies, human, animal in exposure toxicology studies, and identify the critical endpoints. And so you're going to develop a REL for each critical endpoint.

From these studies, you identify a point of departure and that can be found in a few different ways. It's shown here as on NOAEL, which is a No Observed Adverse Effect Level, a LOAEL, Lowest Observed Adverse Effect Level. And you actually prefer to have a study that has both of those, or you can use the benchmark concentration approach, which we'll talk about a little bit, because we use that approach in developing one of the RELs.

--o0o--

OEHHA STAFF TOXICOLOGIST DODGE: Following the identification of a point of departure, or POD, you apply necessary time or dosimetric adjustments and uncertainty

factors.

So here is what the equation looks like. Point of departure times the adjusted dose, times the adjusted time, divided by uncertainty factors.

Now, for inhalation exposure, the point of departure will be an airborne concentration, usually expressed in units of part per million. It should say part per billion too or micrograms per cubic meter or milligrams per cubic meter.

--o0o--

OEHHA STAFF TOXICOLOGIST DODGE: Expand on the benchmark dose concentration. Actually, the benchmark dose can be expressed as a dose or concentration. Usually, when it says concentration referring to airborne levels and a dose is oral exposure, but we interchange the two continually.

The benchmark dose is a dose or concentration that causes a specific level of effect. Often, we're looking at the five percent response rate. It's derived from a curve fitting of the dose response data. I'll have an example of that in a little bit.

It incorporates slope, dose response curve, and sample size information. These are all advantages over using a NOAEL/LOAEL approach. And unlike the NOAEL, benchmark dose is not directly dependent on the choice of

exposure level by the investigator.

PANEL MEMBER GLANTZ: Just one point of clarification. When you say a five percent response, what does that mean, five percent of what?

OEHHA STAFF TOXICOLOGIST DODGE: Five percent of the effect. If you're looking for, you know, a certain number of -- numbers of animals affected over a total number of animals, it's the five percent response rate where you have five percent of the animals responding to some sort of injury or lesion.

PANEL MEMBER BUCKPITT: So it's a population response?

OEHHA STAFF TOXICOLOGIST DODGE: Right. Right.

PANEL MEMBER GLANTZ: But then is it DEF? Is it -- I mean, how -- what are you -- what are you calling it? What's your definition then of a positive response in this case?

OEHHA STAFF TOXICOLOGIST DODGE: In this particular case, I'll get to it in a moment, but then it's --

PANEL MEMBER GLANTZ: Well, then just keep going if you're going to get to it.

OEHHA STAFF TOXICOLOGIST DODGE: Okay. The methodology is presented by U.S. EPA at this website here. And, in fact, this is the modeling software we used to

develop a benchmark dose.

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OEHHA STAFF TOXICOLOGIST DODGE: Okay. These are the proposed RELs. The acute 1 hour, 770 micrograms per cubic meter, which is equivalent to 170 parts per billion. An 8 hour, which is 7 micrograms per cubic meter. And a chronic REL, which is two micrograms per cubic meter.

The 8-hour is a intermittent exposure, 7 days per week. Chronic is a 24-hour exposure, 7 days per week.

The RELs are based on sensory irritation. That's the acute effect. And for chronic in the 8-hour, it's based on injury to the epithelium in the upper airways.

PANEL MEMBER BLANC: Isn't there a rounding error in the 8-hour? Wasn't the part per million conversion something like 4.6?

OEHHA STAFF TOXICOLOGIST DODGE: Right. In the original draft we had out several months ago, it was presented wrong.

PANEL MEMBER BLANC: Well, how can 7 micrograms be 1 part per billion. Shouldn't it be 1. --

OEHHA STAFF TOXICOLOGIST DODGE: There is a rounding that occurs.

PANEL MEMBER BLANC: But isn't it 1.6 parts per billion or something, or --

OEHHA STAFF TOXICOLOGIST DODGE: It's probably

like 1.5 and it's rounded down.

PANEL MEMBER BLANC: I would say that if you're at this kind of thing and you're trying to tell us the difference between 0.5 and 1, you should go out a decimal point in your -- it's silly to round in this way. If you're getting down to the 0.5 parts per billion, let us understand that the 8-hour is three times greater not two times greater.

OEHHA STAFF TOXICOLOGIST DODGE: Um-hmm.

PANEL MEMBER BLANC: Do you see what I'm saying.

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: The 8-hours are adjusted for breathing right. We're assuming that you're --

PANEL MEMBER BLANC: I'm just talking about dividing 7 by 4.6. I'm not talking about --

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: Okay. We can fix that.

PANEL MEMBER BLANC: -- how you got there.

PANEL MEMBER NAZAROFF: Or even look at just -- I had the same reaction, so I'll amplify Paul's comment. The chronic mass concentration to 8-hour mass concentration goes up by a factor of three and a half. And then if you look at the part per billion levels, it only goes up by a factor of two. But of course the conversion factor is the same in both cases.

So if I was, let's say, an industry representing -- a toxicologist working on behalf of industry, I would pick the set of units that gave me the most favorable outcome, because one of those is going to be favorable than the other in any particular case.

And when you're just dealing with one as the significant -- when you have one significant figure and one is the digit that appears, your uncertainty is 50 percent, because it can be anything between 0.5 and 1.5 that rounds to 1.

In that case, using one and a half significant figures, which means a second significant figure when one is the first digit eliminates the problem. So just --

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: We'll fix it.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: It should be 1.5 ppb. Duly noted.

PANEL MEMBER NAZAROFF: Thank you. Sorry, not to get on my box, my soap box.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: That's okay.

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: That's fine.

PANEL MEMBER NAZAROFF: Significant figures is one of my favorite stories.

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OEHHA STAFF TOXICOLOGIST DODGE: Much of our information for sensory irritation comes from worker or occupational studies, where upper respiratory tract irritation was noted, eye irritation, and dermal contact irritation.

From one of these worker studies in particular, we can identify what's basically a LOAEL of 10 parts per million, which is equivalent to 46 milligrams per cubic meter. But there wasn't enough data there from which to find a NOAEL.

And the worker studies also didn't provide robust data from which we could determine long-term exposure in humans or the effects, in terms -- in other words, we couldn't develop a chronic REL based on the worker studies.

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OEHHA STAFF TOXICOLOGIST DODGE: Now, to begin with, the acute REL derivation, it's based on occupational a study for Ferguson and Wheeler in unacclimated workers.

Five workers stood at various distances from the emissions source, the caprolactam vapor. Now, it's vapor, but it probably -- it may not be all in a vapor form, especially at the concentrations we're looking at.

They stood, you know, for several minutes near

the emissions source. And the concentrations measured were 10, 14, 25, and 104 parts per million. Most or all the workers experienced transient nasal irritation at all concentrations.

This data didn't -- it wasn't robust enough to determine a dose response from this data in which to use the benchmark dose approach.

CHAIRPERSON FROINES: If you have those results, what makes you think that there's going to be a NOAEL in any case? That looks like a linear dose response.

OEHHA STAFF TOXICOLOGIST DODGE: Well, I don't have the raw data to show you here in any of these slides.

PANEL MEMBER BLANC: Basically, John, their summary of it basically said they were almost all symptomatic at all of the levels. You actually couldn't --

OEHHA STAFF TOXICOLOGIST DODGE: Even at the lowest level.

CHAIRPERSON FROINES: That's what I'm saying. That's my point.

PANEL MEMBER BLANC: They don't claim any dose response. They're trying to say that the lowest effect level was 10. They don't have a no elect level.

But you don't even say how it was that they measured this. Was this personal breathing zone

measurements or were these area measurements? You don't even say that in your summary. Did they say it in their paper, in their five page paper that almost generated five pages of summary in your document?

OEHHA STAFF TOXICOLOGIST DODGE: They weren't very specific on that point.

PANEL MEMBER BLANC: Okay. Well, I'll be coming back to that. I'm going to let you finish, and then I'm going to be critiquing this whole document extremely severely. I'm just preparing you.

OEHHA STAFF TOXICOLOGIST DODGE: Yeah, sure.

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OEHHA STAFF TOXICOLOGIST DODGE: We already covered the first point, a LOAEL of 10 part per million and above led to transient nasal and throat irritation. We did not apply a time adjustment, because it's a -- sensory irritation is a concentration dependent response not time dependent. So there was no change in time extrapolating from the several minute exposure to 1-hour exposure.

We applied a LOAEL to NOAEL uncertainty factor of 6. And this is based on work we did in our own office here, in which we looked at sensory irritation studies in humans. We found that an uncertainty factor of 6 would cover the span of 95 percent of all the studies we found.

Intraspecies uncertainty factor. Toxicokinetic was a 1, because it's a site of contact irritant. Toxicodynamic uncertainty factor was 10. This is applied based on our methodology to protect against the human variation, in particular it's for asthma.

PANEL MEMBER BLANC: In children.

OEHHA STAFF TOXICOLOGIST DODGE: Yeah, in children.

The cumulative uncertainty factor is 60. So we take the 10 parts per million or 46 milligrams per cubic meter divide it by 60 and this is our acute REL at 770 micrograms per cubic meter.

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OEHHA STAFF TOXICOLOGIST DODGE: Our 8-hour and chronic REL derivation is based on the same study, a 13-week rat study, five days per week, six hours per day, at 24, 70, and 243 milligrams per cubic meter. And this was by Reinhold et al., 1998. And this is the study that was by the industry.

PANEL MEMBER BLANC: Would you just clarify -- sorry to interrupt you -- what standard OEHHA policy is on the number of weeks that are the minimum number of weeks for an experimental study for you to classify it as chronic? Do you have a cutoff for that?

OEHHA STAFF TOXICOLOGIST DODGE: Well, in this

case, it's a 13-week study which --

PANEL MEMBER BLANC: I understand that this is -- my question is more generic. Do you have a precedent for calling this a chronic study?

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: I think we follow U.S. EPA precedent.

PANEL MEMBER BLANC: Which is, just to remind us all?

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: Which is that 13 weeks is subchronic.

PANEL MEMBER BLANC: What's that?

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: Thirteen weeks is subchronic.

OEHHA STAFF TOXICOLOGIST DODGE: He wants to know if we use shorter exposure durations for chronic.

PANEL MEMBER BLANC: Yeah, I would classify it as subchronic too. You're classifying it here as chronic.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Actually, it says subchronic to chronic --

OEHHA STAFF TOXICOLOGIST DODGE: We do a factor --

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: We have an uncertainty factor that we applied for subchronic too.

PANEL MEMBER BLANC: So anything over four weeks

is subchronic?

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: I think over 13 weeks would be considered chronic.

PANEL MEMBER BLANC: You mean 13 is the minimum, is that what you're saying?

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: Over 13 would be the minimum for chronic.

OEHHA STAFF TOXICOLOGIST DODGE: In rodents a 13-week study is approximately 12 and a half percent of lifetime. And we consider anything over 12 percent lifetime exposure.

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: It's kind of borderline.

OEHHA STAFF TOXICOLOGIST DODGE: So it's borderline.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: When we did our methodology document, adopted EPA's definition of a chronic exposure, which is 12 percent of the lifetime.

EPA also, because it is so common to do these 13-weeks studies, EPA sometimes applies a subchronic to chronic uncertainty factor when they're deriving, for example, an RfC and we do the same. So, in this case, we did apply an additional uncertainty factor to extend out

for chronic exposure.

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OEHHA STAFF TOXICOLOGIST DODGE: Okay observations that were seen during the study. What they found -- what appeared during the second week of the exposure was a treatment related increase in labored breathing, nasal discharge, and moist rales. This began the second week of the study.

And at sacrifice, they found nasal and laryngeal tissue damage. And that was also treatment related. They found these effects even at the lowest exposure of 24 milligrams per cubic meter. So there's a LOAEL of 24 milligrams per cubic meter, and no NOAEL for this study.

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CHAIRPERSON FROINES: Are you deriving your -- you're using $BCML_{05}$, so that tells me you're doing a benchmark.

OEHHA STAFF TOXICOLOGIST DODGE: Yes. Yes, that was what we were using as our point of departure.

CHAIRPERSON FROINES: Okay. Then why do you have a LOAEL?

OEHHA STAFF TOXICOLOGIST DODGE: That's just to demonstrate where -- that there was no NOAEL here.

Okay, now I'm going to go --

CHAIRPERSON FROINES: But it's important to

emphasize, because the question of whether or not there should be a low dose linear response of course is a question. And here, you're using the benchmark and you should make that clear, because it's not made clear in the document.

OEHHA STAFF TOXICOLOGIST DODGE: Okay. Even though we didn't find a NOAEL in the study, we did see a dose response effect, in which we could use the benchmark concentration approach to extrapolate to a point of departure below the so-called LOAEL we have here of 24 milligrams per cubic meter. And I'll explain that a little more in the next slide.

The BMCL is the upper bound or it's the lower bound 95 percent interval at the five percent response rate. Did I explain that correctly?

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: I think. So

OEHHA STAFF TOXICOLOGIST DODGE: And that's three milligrams per cubic meter.

CHAIRPERSON FROINES: That's correct.

OEHHA STAFF TOXICOLOGIST DODGE: To this three milligrams per cubic meter we applied a -- which is our point of departure, we applied a time adjustment. Because the exposure in the rats were six hours per day, five days a week, we had to extrapolate to eight hours per day,

seven days a week. And so the time-adjusted value goes down here from three.

And for chronic, we're assuming or using 24 hour exposure, seven days per week.

We also applied the human equivalent concentration, the HEC approach, which is also a U.S. EPA method. Based on regional gas dose ratio, this is a rat to human extrapolation, specifically for the upper airways. It takes into account differences in surface area of the upper airways, respiration rate, body weight, and a few other little variants that are in there.

And so when you plug this in, you get 0.25. So applied to the time-adjusted value, you get an 8-hour of 0.402 milligrams per cubic meter, and a chronic of 0.134 milligrams per cubic meter.

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OEHHA STAFF TOXICOLOGIST DODGE: Here's the dose response data for caprolactam from the rat study. This is what we based our benchmark dose -- or benchmark concentration approach on -- or calculation.

The nasal effects here of at sacrifice, there was minimal and/or slight changes even in the control animals. So there was a background level of inflammatory response going on, even in the control animals.

Removing that shows why caprolactam -- the injury

that caprolactam does in the animals over and above background levels. So essentially, it's an exacerbation of a normal low level of inflammation that's going on already in the rats. That's for the nasal findings, respiratory mucosa, and the olfactory mucosa.

For the laryngeal tissues, there was no background inflammatory process going on. So that's the pure data right there.

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OEHHA STAFF TOXICOLOGIST DODGE: Applying the benchmark concentration approach. We got a BMC_{05} -- or I should start out with a $BMCL_{05}$. That's what we used as our point of departures.

For the nasal respiratory mucosa, it's four milligrams per cubic meter. Olfactory it's 12. And the Laryngeal tissue is three. And so that's what we actually use as our point of departure for the REL, which was based on the laryngeal tissue.

Now, the next column over is the BMC_{05}. That is the so called response rate. And the $BMCL_{05}$ again is the lower bound -- 95 percent lower bound on the five percent response rate.

A P value gives an indication of the curve fit to the data. And the AIC is the Akaike Information Criterion, which U.S. EPA recommends you base your values

on the lowest AIC value. In other words, you'd run several models through, the data, and you get several numbers. And the lowest AIC is what they recommend using -- or using the model at the lowest AIC.

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OEHHA STAFF TOXICOLOGIST DODGE: And here's an example in graph form of the data or what the BMC method generates. This is for the laryngeal findings. And a curve or line is fit to the data. And at the lower end there is your BMCL and BMC_{05}.

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OEHHA STAFF TOXICOLOGIST DODGE: So we have our point of departure. And for uncertainty factor application, we did apply a subchronic to chronic uncertainty factor of two. This is because 13 weeks is considered borderline chronic for exposure in rodents. And there's evidence, particularly in formaldehyde and acetaldehyde, when you look at their 13-week studies in rodents and the chronic studies and you compare the two and those particular compounds, you get an uncertainty factor of two or less. Now these two compounds also cause inflammatory injury to the upper airways.

An interspecies uncertainty factor of one is used because we applied the RGDR, Regional Gas Dose Ratio,

already of 0.25, and also because the compound is direct acting irritant.

And the toxicodynamic uncertainty factor is root 10 per lack of data. We only have the one rodent study in rats. If we had a mouse study as well, it's quite possible that could have been reduced to a one.

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OEHHA STAFF TOXICOLOGIST DODGE: Now, the intraspecies uncertainty factors. Toxicokinetic is a one here in this case. Toxicodynamic to take into account human variation, specifically children of with asthma, is assigned a 10.

The cumulative uncertainty factor is then 60, which applied to the adjusted values you saw on previous slides, the result is an 8-hour REL of seven micrograms per cubic meter and a chronic REL of two micrograms per cubic meter.

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OEHHA STAFF TOXICOLOGIST DODGE: Okay. We also looked at the repro developmental studies. There are no inhalation studies. All we had was oral studies. However, there's a couple of very well run studies. And the finding among those studies was fetotoxicity in the form of reduced fetal body weight. The NOAEL in this study was 700 milligrams per kilogram. We did a

route-to-route extrapolation from oral to inhalation to make comparisons to our proposed RELs, which are based on inhalation.

And this, you know, assumes that you have a 70 kilogram person breathing, 20 cubic meters of air per day to make the conversion. And to that we applied 100-fold uncertainty factor, 10 for interspecies and 10 for intraspecies. The result was 24 milligrams per cubic meter.

Now, if you recall, our acute REL is the highest of the three REL values we have is 0.77 milligrams per cubic meter, quite a bit lower than this number.

So our REL is based on upper airway sensory irritation will be protective for the repro developmental effects as well.

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OEHHA STAFF TOXICOLOGIST DODGE: In summary these are our proposed RELs again.

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OEHHA STAFF TOXICOLOGIST DODGE: Did you want to go on to some of the comments now?

CHAIRPERSON FROINES: Yeah. How is our time going, because we've got some plane -- people have planes.

PANEL MEMBER BLANC: I think people said if they left at 4:00 that would be okay, is that correct?

CHAIRPERSON FROINES: That's what I'm asking, what is the time? Oh, I've got it here, 3:30.

What I'm worried about is that I think you're going to have lots of comments from the Panel, so I would say to take no more than 10 minutes for response to comments, is that reasonable?

PANEL MEMBER GLANTZ: Or do you think it would be better to just -- if some of the Panel members have strong opinions, maybe we should make sure those get heard first.

CHAIRPERSON FROINES: Of course.

PANEL MEMBER GLANTZ: Because we're not going to vote on it today.

CHAIRPERSON FROINES: Why? We may or may not.

PANEL MEMBER BLANC: I certainly wouldn't.

CHAIRPERSON FROINES: You would not?

PANEL MEMBER BLANC: No.

CHAIRPERSON FROINES: Okay. So we're not going to vote, so we will -- and Paul has lots, and he's next to Bill. So we'll get to those two fast.

So I would, again, say about 10 minutes would be appropriate. And if you think -- but if you think there are comments that are particularly important, then we will extend them.

PANEL MEMBER BLANC: You know what I would suggest, John, actually is let's hold on the comments,

because I think some of what I'm going to say is going to deal with what I think are some of the more salient comments.

PANEL MEMBER GLANTZ: Yeah.

CHAIRPERSON FROINES: So you think -- well, then --

PANEL MEMBER GLANTZ: Yeah. Let's have the Panel discussion.

PANEL MEMBER HAMMOND: Because we can read the comments.

CHAIRPERSON FROINES: Okay. Let's go with -- that's a good idea. Bill, why don't you start out.

PANEL MEMBER NAZAROFF: I'd actually like to hear what Paul has to say, first, but I have some comments about the exposure-related issues, some of which I've already communicated directly to Melanie, and the problem with using what is undoubtedly particle inhalation exposure conditions when you get above the saturation vapor pressure concentration above 13 milligrams per cubic meter, to make inferences about insult to upper respiratory tract tissues for vapors. So that -- I'll say more about that, but --

CHAIRPERSON FROINES: Bill, let me ask you this, because of the time issue. Have what you told the Panel just now and what you told Melanie sufficient --

PANEL MEMBER NAZAROFF: That captures 90 percent.

CHAIRPERSON FROINES: -- for your comments?

PANEL MEMBER NAZAROFF: Yes.

CHAIRPERSON FROINES: Okay. Paul.

PANEL MEMBER BLANC: So, I think my first question is what do you see is your charge or goal in preparing a document like this? Was it your intent, at least, to summarize, even if briefly, the human health effects even if they were not going to be specific to a study which would yield your risk calculations?

In other words, sort of like a mini document that would be -- to determine a TAC, but not as elaborate. Is that -- am I correct in that?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Yeah, for the reference exposure levels, we typically have not done -- we haven't developed a whole huge document for each chemical. Although, some of them are pretty big, depending on the availability of data.

But we essentially tried to summarize briefly what is known about the toxicity of the chemical, and then focus more on describing what we call the key studies to development of the value.

PANEL MEMBER BLANC: So I would say that it may have to do with various limitations of resources, but I think the document is unacceptable on that criterion. It

does not sufficiently deal with the human health effects. And I think the reason why is because perhaps you got too hung up on trying to identify the study.

So, for example, you have ignored the human case report literature entirely, and that is why relevant because this is a well documented cause of contact dermatitis. The way you describe it you would only think this is a contact irritant of some sort.

Now, I didn't -- it's not my job, so I didn't pull the cases of contact dermatitis, but they seem to be well documented. And in particular, more disturbing, there's a case report in the Archives of Internal Medicine from not so very long ago, certainly contemporary to some of the studies you rely on, which is not only a case of contact dermatitis, but a case of new onset seizures in someone who'd only been exposed for three days in a factory or a week or something.

So that study is not cited, not mentioned, not summarized. And, in fact, the entire issue of this chemical having as a potential target organ, the CNS is sort of ignored absent. And that I understand why you have -- don't have the studies that you might want, but you need to grapple with that. And the data may be soft, but they need to be alluded to the extent that they're weak.

It seems to me that -- just one of John's phrases, it seems to me -- one other thing you've done is this was a chemical with which the Russian literature was obsessed for some reason in the 1950's, maybe because of a Nylon 6 production in the former Soviet Union. But none of the Russian literature is cited, even translated abstract.

So I think you've got to identify the resources at least to screen the Russian literature from the fifties and sixties. It's been discounted by other in reviews, but nonetheless it needs -- you'd have no way of knowing it exists.

I think John's question at the very, very beginning and why I was resistant to start off with that is, yes, the literature, as cited here, is weak and there's -- and you make it weaker because you tend to cite -- this document tends to cite things, which are out of date.

I'll just give you a little example. The whole section on occurrence and major uses cites literature that's not really exactly peer reviewed, but whatever it is, it's 20 years old. Well, uses change in a product like this over 20 years. I mean give me something that's a little more up to date.

I don't even have a sense what percentage of

carpeting that's sold in the United States contains some amount of Nylon 6. It's not clear. You've come to this because of its indoor air pollution potential really, and -- or at least that's why it seems to be a hot topic, but I can't put it into context.

The points that you were making I found also -- not just from a toxicological point of view, but the way the words dust and vapor and fume are used here are incredibly sloppy. Now, it may be that the authors that you're citing were sloppy, but that's no reason for you not to let the reader know that you know that that's the inappropriate term. When you talk about caprolactam dust, you don't mean dust in the way an industrial hygienist would normally be using the term, I don't think.

OEHHA STAFF TOXICOLOGIST DODGE: Well, that's how it was described in the paper.

PANEL MEMBER BLANC: Yeah, but that doesn't mean you have to stick with that. I mean, they may have used the wrong word, but you need to say what you think it was.

I mean that's why this is an assessment document.

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: We can correct that.

PANEL MEMBER BLANC: Now, there's -- I don't think also you've done your homework. I mean, I was able easily on Google to identify an EPA document which has

animal data from a 72-week -- sorry, 72-day exposure at six hours a day with a variety of species showing a variety of disturbing endpoints at levels which are relevant to what you want. I can give you that document number. It's an industry document that was submitted to the EPA, probably not so long ago in some kind of house cleaning of here's information that we have.

I mean, it's hard for me to believe, in fact, that given nylon and the industry, that there aren't industry -- other industry toxicological data, either from Haskell Labs or somewhere else. So I think some due diligence.

One of the things I've always admired about you guys is you don't sort of take the federal EPA, you know, passive approach and have, you know, been more dogged in doing some of this stuff.

One of the critiques that you had -- I don't know why exactly they made this critique, because you'd think they would have been happy with it. But apparently the previous version of this, which we didn't see as a review panel, did not use this week industrial study from 1973, which I don't know how one could interpret that you chose a 10 part per million LOAEL, but rather used the data from the controlled human experiment.

OEHHA STAFF TOXICOLOGIST DODGE: The

controlled --

PANEL MEMBER BLANC: And then you abandoned that. It seems to me that you abandoned it, because you couldn't do benchmark calculations with it, but yet the data --

OEHHA STAFF TOXICOLOGIST DODGE: No, that's not it at all.

PANEL MEMBER BLANC: Well, then what is it? Because it's clear from the data you present -- I didn't pull the paper -- that the level at the five million --

OEHHA STAFF TOXICOLOGIST DODGE: Okay. Dr. Blanc is referring to study, acute human chamber study by Ziegler et al., where exposures were for six hours at concentrations of the 0, 0.15, 0.5 and 5 milligrams per cubic meter. They looked at a number of objective and subjective measures of sensory irritation in the upper airways, eye blink, tear formation, nasal --

PANEL MEMBER BLANC: Rhinometry

OEHHA STAFF TOXICOLOGIST DODGE: Right -- and subjective questioning as well. They didn't see irritation -- sensory irritation even at the highest exposure. What they did find was a --

PANEL MEMBER BLANC: You mean they didn't see quantifying --

OEHHA STAFF TOXICOLOGIST DODGE: -- nuisance -- odor nuisance basically.

PANEL MEMBER BLANC: Well, that's -- but that's not a correct characterization of their findings at all, based on the table that you present on page six. I certainly wouldn't agree with that characterization.

First of all, you later make the point that you think the odor nuisance was what drove the cumulative association, and yet --

OEHHA STAFF TOXICOLOGIST DODGE: That's what appears to be the case, yes.

PANEL MEMBER BLANC: Well, in fact, that doesn't appear to be the case to me looking at the statistics, because I grant you, you derive these from the table, but the sort of mean level of complaints is very close to the mean level for eye and for total irritation, and not for the other nuisance.

And because they had a number of different questions that they apparently asked for each category, I think that they weighted them equally, so that some of those drove more than others. And so I don't -- at least base on what you presented -- I didn't pull the paper -- your argument wasn't convincing.

And the ANOVA that you present was, in fact, significant. And in just looking at the data, it looks like the highest category there's an effect.

And the quantitative data that they did, as you

reported, you said that there was a trend which was not significant. Now a trend which is not statistically significant, as I think Stan will agree, is not -- there's no evidence of an effect. So it's not that there wasn't some kind of an effect. I didn't see the data, because I didn't pull the paper and review it.

But if you're going to disregard this paper -- apparently you were convinced that you could use it the first time around and then abandon it. But I think that that was probably an inappropriate decision, especially because the other paper seems to be so awful.

OEHHA STAFF TOXICOLOGIST DODGE: Well, I could go into a little more detail, of course, but the --

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: I think you should.

OEHHA STAFF TOXICOLOGIST DODGE: -- subjective sensory irritation --

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: I think we should explain why we did what we did, please.

OEHHA STAFF TOXICOLOGIST DODGE: Well, the sensory -- your subjective sensory irritation barely registered as a trend, okay. Generally, when you turn on those various sensors there in your nasal cavity, you're going to get an immediate response. Okay, there's a

threshold generally for sensory irritation. And what you should see in that data is a sudden and steep increase in the response, and that is just not there.

So it may be close to what might be considered sensory irritation in stimulating the trigeminal nerves, but it didn't -- it strongly looks like it didn't quite make it there, okay. We have a very -- we have a very shallow line or curve going through the data points, 0.15, 0.5 and 5.

PANEL MEMBER GLANTZ: Right. But now when I looked -- and I think I'm talking about the same thing. When I looked at that, it seemed to me that there was evidence of not an effect. So I couldn't figure out how you were using that to estimate the effect.

So, you know, the whole thing -- I mean, it doesn't bother me necessarily to say there was a non-significant trend, but all you had in there -- again if it's the one I'm thinking of -- is it was just P was greater than 0.05.

PANEL MEMBER BLANC: Yeah.

PANEL MEMBER HAMMOND: Yes.

PANEL MEMBER GLANTZ: Well, if P is greater than -- if P is 0.06 or 0.08, that suggests a trend.

OEHHA STAFF TOXICOLOGIST DODGE: Right. And I --

PANEL MEMBER GLANTZ: But if it's 0.4, it

doesn't. So I really choked on that part of the argument.

OEHHA STAFF TOXICOLOGIST DODGE: I've giving you as much information as I could get. I emailed all the authors about the paper on that exact point. I wanted to know what the P value actually was, but they don't have the data for me to give to me yet.

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL:

Yeah. We asked for the raw data for the study. If we could have gotten the raw data, we would have.

PANEL MEMBER GLANTZ: But then if you can't get that, and I can sympathize with that problem, but then I don't see how, based on what's there, you can draw the conclusion that you drew. You know, I mean, I think if you've got the raw data and you looked at it, you might well find evidence or a suggestion of a trend. But at least based on what's in the report, it looked to me like it was a suggestion of nothing, unless I was misunderstanding it.

PANEL MEMBER BLANC: So you're saying maybe that's the point they we're trying to make, but it got confused by reporting the benchmark and doing the benchmark dose calculation.

PANEL MEMBER GLANTZ: Yeah. I didn't see how you could do it. I mean, I walked away feeling inadequate, because I just didn't see how you could even use that data

to do it, based on the way you described it.

CHAIRPERSON FROINES: Stan, are you saying that you thought you interpreted it as no effect?

PANEL MEMBER GLANTZ: Yeah, I thought it was pretty flat. Now, maybe I was misunderstanding something.

CHAIRPERSON FROINES: Because I would have said the opposite.

PANEL MEMBER BLANC: No, it's probably the way they presented it, because they put greater than 0.05. That's a little confusing.

PANEL MEMBER GLANTZ: Yeah, but I was looking at the raw numbers. And those didn't -- those just seem to be bouncing around.

PANEL MEMBER BLANC: And then the numbers -- they didn't ever provide numbers for the quantitative stuff. They just said it wasn't -- there was a trend that wasn't significant without ever providing any kind of numeric.

PANEL MEMBER NAZAROFF: Their table -- this is the paper. Their table is the same as the one that's --

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: Yeah. Maybe we can clear this up a little bit. The total symptom score was significant, but when we took out the odor-related stuff, it wasn't significant, is that right Daryn?

CHAIRPERSON FROINES: I'm sorry --

OEHHA STAFF TOXICOLOGIST DODGE: That is the exact question we wanted to ask the authors, but they couldn't come back with an answer.

CHAIRPERSON FROINES: Could you restate that, because there was noise down here, and I'm not sure everybody heard that.

OEHHA STAFF TOXICOLOGIST DODGE: Well, the total symptoms score is based on 29 questions that they've asked the volunteers.

PANEL MEMBER BLANC: Right.

OEHHA STAFF TOXICOLOGIST DODGE: This could be -- this would include subjective sensory irritation data. It included odor questions. It included questions on sense of well-being, okay.

Now, they didn't list all 29 of these questions were in their paper, and that was one of the answers I wanted from the authors. But what they do say is that -- or imply is that a number of these sense of well-being questions perhaps is like a feeling of nausea or headache, often are generated by odor, okay.

The accumulated sensory -- subjective sensory irritation questions did not reach statistical significance at the highest concentration by itself, when you add that in with all the other data, including odor, which was the most significant finding.

PANEL MEMBER BLANC: There was a control, yeah.

CHAIRPERSON FROINES: But does that mean -- I mean, the problem with what you just said, if I understood it, is that they are using odor to justify their results, but it's not entirely clear to me that those results aren't of respiratory irritation aren't realistic.

OEHHA STAFF TOXICOLOGIST DODGE: I didn't quite follow there. Are you saying that you think the sensory irritation there is significant at the highest dose?

CHAIRPERSON FROINES: I'm saying that that's possible.

OEHHA STAFF TOXICOLOGIST DODGE: Um-hmm. Well, they combined --

CHAIRPERSON FROINES: Paul, what do you think? You're the respiratory guy.

PANEL MEMBER BLANC: Well, I didn't go through the whole paper, so it -- what I'm still trying to sort out -- I think the -- all right, let's take a step back. Everybody would agree that if one could use these data, these would be the data you would use preferentially over the 1973 factory data, right? I mean, I think that's why you used it originally.

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: We weren't thrilled with it.

PANEL MEMBER BLANC: I mean, because it's an

experimental study. It's a control. They actually measure the exposure levels. We're not even sure how they measure the exposure levels in the workplace one, is that right?

OEHHA STAFF TOXICOLOGIST DODGE: Well, the problem is it looks like it's odor that generated that total symptom score. It's hard for us to base a REL on odor if there -- if the effect is not that great. I mean, we're talking about an increase of average odor response of between barely and somewhat a nuisances. Okay, three of the people did respond that it was moderately severe nuisance to them. Three out of the 20, okay.

PANEL MEMBER BLANC: Right.

OEHHA STAFF TOXICOLOGIST DODGE: But they didn't leave the room for the entire six hours, and they didn't seem to report any severe headache or other responses.

So, you know, it's a bit of a -- you know, it's an indicator that it's probably more of an N-O-E-L, a No Observed Effect Level or LOEL, Lowest Observed -- but not an adverse effect.

PANEL MEMBER BLANC: Right, but the problem -- I mean, what John is bringing up is that you have to -- you're -- if that's true, then that's the case. But the problem is if it's not what's driving it, what does the body of evidence from this study look like? Does it

convince you that five is -- I think you're certainly convinced that there's no effect below five. So the question is, is there effect at five? Is five a LOAEL or not, right, isn't that what it comes down to?

OEHHA STAFF TOXICOLOGIST DODGE: Right, a L-O-A-E-L. Yeah.

PANEL MEMBER BLANC: Right. So you're not so -- so that's one thing I would urge, a more integrated approach. So if you look at there's a figure on resistance, on nasal resistance, which was apparently not -- which showed a trend that was not statistically significant, right?

OEHHA STAFF TOXICOLOGIST DODGE: Yeah. And I would really like to know what that statistical measure was, yeah.

PANEL MEMBER BLANC: But if you look at it graphically, that looks like a pretty convincing dose response, doesn't it, where there was --

CHAIRPERSON FROINES: Where's that?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Stan, it's in the paper, not --

PANEL MEMBER NAZAROFF: Yeah, that's Figure 4 of their paper.

CHAIRPERSON FROINES: Can I ask a question?

The Ziegler paper, if I understood Paul, he said

that you were convinced that there was no effects below five. But when I look at that data, I'm not convinced there are no effects below five. And so that I'm not sure I would agree with your conclusion.

OEHHA STAFF TOXICOLOGIST DODGE: You mean, the -- well, there is a -- even at the lowest concentration of 0.15, there is a recognition of odor that the volunteers could smell.

CHAIRPERSON FROINES: I don't have a 0.15 in what I'm looking at.

PANEL MEMBER HAMMOND: Yes, you do. Second column.

OEHHA STAFF TOXICOLOGIST DODGE: Well, that's --

PANEL MEMBER BLANC: 0.15, 0.5, 5.

PANEL MEMBER HAMMOND: I actually have a questions. You said this several times and I think you're quoting the author on this, and it's not clear to me about this. And that is you keep saying that the ability to perceive the odor of something can lead to headaches and to these other perceived problems. Is that a well recognized established fact? I mean, to me that's not obvious.

OEHHA STAFF TOXICOLOGIST DODGE: You mean it colors their other --

PANEL MEMBER HAMMOND: Yeah. I mean, I can

understand --

OEHHA STAFF TOXICOLOGIST DODGE: -- answers to the other questions on the questionnaire, yes.

PANEL MEMBER HAMMOND: It sounds like -- yeah, I mean, it sounds like that could be an explanation someone proposes, but I think that's distinctly different from saying that's been established as an explanation.

CHAIRPERSON FROINES: When we did MTBE, we had odor responses, but we certainly had no headaches.

PANEL MEMBER HAMMOND: Well, no, but I guess what I'm saying too is I understand the idea that it might be suggestive, that as soon as they smell, maybe some people get headaches from this, maybe. But also, when you can smell, it could just be that at the same time you're responding in different ways. But I don't think one should just assert that unless there's more evidence that I just don't know. Is there a generally accepted thing?

OEHHA STAFF TOXICOLOGIST DODGE: Yeah. Well, there's quite a body of evidence that looks at that exact response, I mean, how odor affects how people feel.

PANEL MEMBER GILL: In most cases, when you behavioral sense of odor, there's always a control chemical that is used to --

PANEL MEMBER HAMMOND: To mask it.

PANEL MEMBER GILL: -- assess an individual

population. Apparently, that is not in this particular case, is that true?

OEHHA STAFF TOXICOLOGIST DODGE: Yeah, there was no other chemical.

PANEL MEMBER HAMMOND: To mask it, right.

PANEL MEMBER GILL: Because you really need to see the response of individuals to odor and relate that to a physiological response. So I would be cautious about that particular interpretation.

PANEL MEMBER BLANC: Right. I mean maybe there's an approach that you could take to these data that would be non-parametric, that would answer the question, you know, is there a difference between the category of five and the category of what's the other categories, because it seems that in every one of their evaluations, you --

OEHHA STAFF TOXICOLOGIST DODGE: You mean the severity categories?

PANEL MEMBER BLANC: Not just the subjective, but the objective evaluations. Also, the point estimate at five milligrams is always higher, you know, for the blinking, for the -- you know, the nasal resistance goes right up in step. I mean, isn't that -- couldn't you do some kind of high square for trend or something?

PANEL MEMBER GLANTZ: Yeah. See, the other problem is if you look at -- I sort of glommed onto this

table, because it was something I kind of understood.

But the other thing is you were doing a parametric analysis of variance on this data is not a good idea, because if you look at their Table 1 like at the eye irritation for five milligrams per cubic meter, there's a mean of 0.38 and a standard deviation of 0.4.

Well, if you've got a normally distributed population, most of it is about plus or minus two standard deviations about the mean. So that means the score on this that's implied is going from minus 0.4 to something. Well, it can't be negative.

So what that's telling you is this is a skewed distribution. It's got a big upward tale. And that's going to inflate the variance and reduce the power. So I think that the -- I don't think doing a parametric ANOVA on this makes sense, in the first place.

OEHHA STAFF TOXICOLOGIST DODGE: No. That's what the authors, did right?

PANEL MEMBER GLANTZ: Well, that -- lots of people make lots of mistakes. But that mistake could mask a significant effect. So I mean I think if you want to use this, somehow you've got to get the data so you can redo the analysis properly using non-parametric methods.

CHAIRPERSON FROINES: Stan, can I -- I would like to -- we're in a slight disarray. What I want to do is to

go back to the last speaker, let him finish, and continue around the room, rather than having everybody just climbing in. Paul, are you finished or what are you --

PANEL MEMBER BLANC: Well, I think there's two other salient things that are going to come up. One is the issue of this is an irritant, ergo it's going to aggravate asthma and children have more asthma, therefore this is important for children. And I know that you've used that argument with, I think, formaldehyde or certain other things.

I think your argument could be strengthened to the extent that there may be other human health effects of this chemical which might also be relevant to children, for example, a chemical being seizurogenic. And also I think the issue that you haven't clarified as to whether or not this is a sensitizer is relevant.

Now, the literature on the relationship between things that cause contact dermatitis and cause asthma is murky.

I wonder whether or not you want to bring, even though I think you get these in a different agency -- Dennis Shusterman, he's not with you guys anymore, right?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: He's at CDPH.

PANEL MEMBER BLANC: But whether or not you might

want to bring him into consult on some of these. He certainly has a lot of expertise on rhinometry and interpretation of rhinometry data, but the whole sensory irritant thing. He has some interest in contact dermatitis as well.

And then I'm happy to turnover my notes to you too so you have them, and to sort of serve as a kind of lead person, since there wasn't one designated. But I do think that this needs a lot of work. And I think that some of the critiques that you received, we don't go into the outside critiques, but they would partially be addressed by taking care of some of these things.

There, finished.

CHAIRPERSON FROINES: OEHHA.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Yeah, so I heard Paul volunteer to be a lead on the chemical. And I'd be happy to get your comments.

CHAIRPERSON FROINES: Do you have it in writing, Paul?

Yes.

Okay, let's move on.

PANEL MEMBER GILL: I have only two comments.

One, actually, I was concerned about the quality of the data, because there's very little that's recent. I know you are in a problematic situation and there may not

be much, but I think there has to be a more conscious effort to try to get at least more recent data, because there is data, and Paul has addressed some of the issues.

The other one, I was concerned about the sensory data, because to me the sensory data is very difficult to translate into a physiological response. I know you have a lack of it and you're trying to do it again. That's an issues that I don't know how to resolve. But it's a critical issue, because a lot of times behavioral responses is a physiological endpoint is what you want in terms of developing some of the NOEL and all that. I think that maybe more relevant. So I really don't know how to resolve that issue, because I don't -- the absence of data, sensory data, to me is not particularly useful, unless as -- in one of the measurements there's a physiological measurement. And it's all of this behavioral, and behavioral becomes difficult in the absence of control studies with this.

That's all I have.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: I mean, part of the issue we have is just the amazing lack of data on this compound.

PANEL MEMBER GILL: I am concerned, for example, even there's no understanding of even the primary metabolites, you know. Seventy percent of the dose is a

primary metabolite, unidentified.

CHAIRPERSON FROINES: In terms of action items from each person, is there an action item that you would like them to take up?

PANEL MEMBER GILL: I would like to have a more comprehensive report from them. And if it addresses Paul's concerns, I think it will address my concerns.

CHAIRPERSON FROINES: It will, okay.

Next person.

PANEL MEMBER ARAUJO: Yeah. I don't really have much more to add. Other than I was struck by the comment that the severity and the magnitude of the effects are even much, much greater than what is described here. And if that is the case, you know, that it can lead to CNAs or it could lead to seizures. And this is something that is not even mentioned in here, so that changes dramatically the scope or the spectrum. So that's certainly something that would need to be included.

From this review, it appeared to me that it actually was so trivial and probably irrelevant, and that all the comments that the company were making were probably okay. I mean, this compound causes mild issues in eye or upper respiratory irritations. So maybe that's not really that important.

But if we're talking about some more serious

effects, that's a whole different story. So I think that that needs to be included.

So that's all.

CHAIRPERSON FROINES: Okay. Just a couple comments. First, I don't see why you said that this is a direct acting chemical and none of the metabolites have any relevance, because I don't think that's true.

There's no reason to believe -- not to believe that some of these -- for example, this lactone or the hexanoic acid aren't going to have respiratory effects. And so what I'm -- let me go back to where I should have started.

Where I should have started was to agree with Paul that the problem with the document is at one level in terms of the details, but at another level is in terms of the document. It's simply not full enough to -- I think it needs -- it's not entirely adequate. And so I'll say it that way.

And I just -- maybe I'm wrong here, but I looked at this two-year caprolactam carcinogenesis bioassay, and I --

OEHHA STAFF TOXICOLOGIST DODGE: NTP.

CHAIRPERSON FROINES: And I went through it. And it's basically three paragraphs -- or two paragraphs, but there is no conclusion or no data, period, on the issue.

So how do we know what was found?

OEHHA STAFF TOXICOLOGIST DODGE: Well, I believe there was -- they didn't find anything of real significance, except maybe a decrease in body weight, but they didn't even -- you know, back then, they didn't even really try to make any statistical analysis on the body weight effect.

CHAIRPERSON FROINES: Well, okay. Okay. But I think that if you're going to do a two-year bioassay, you should write something in here about the results of that bioassay. And if you have to write and say there was absolutely nothing found, and show the -- but you can show a table which shows the dosages and the number of cancers. In other words, this gives you absolutely nothing.

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: Okay. We can add that.

CHAIRPERSON FROINES: Paul's already -- I found all the respiratory' --

OEHHA STAFF TOXICOLOGIST DODGE: May I inject here that I wrote here that the histopathologic examination did not find any compound related fix in nasal tissues, larynx, esophagus, stomach or any other tissues or organs.

PANEL MEMBER BLANC: Yes, I mean, I think John's point is that there's a sentence missing, just a final

sentence, thus there was no evidence of carcinogenicity in this two-year study.

OEHHA STAFF TOXICOLOGY DODGE: Okay.

CHAIRPERSON FROINES: Look it, you can have nasal tissues, larynx, esophagus, and stomach, but that doesn't tell you what the endpoint you're measuring is. It doesn't necessarily mean cancer. It could be hyperplasia.

OEHHA STAFF TOXICOLOGIST DODGE: Okay.

CHAIRPERSON FROINES: I think there's more to caprolactam in a respiratory sense than we are getting actually. And I think that you probably can't get it either. But I don't think caprolactam is quite as benign as this seems to indicate, but that's just a general statement and I'll leave it.

This person Gad in developmental and reproductive toxicity, where is he from?

OEHHA STAFF TOXICOLOGIST DODGE: I don't recall.

CHAIRPERSON FROINES: Melanie?

OEHHA STAFF TOXICOLOGIST DODGE: I don't have the paper with me today.

CHAIRPERSON FROINES: Well, I think that there may be nothing here, but I found that whole section of developmental and reproductive toxicity to be vague. And I don't know whether that's the lack of data. I don't know whether it's an industry study. I don't know whether

there's nothing there.

But I basically found that there were little findings here and little findings there and little findings everywhere, and yet I don't have a sense that one feels confident in the evaluation.

And I assume that if you had more, you'd say more. But when you get into saying, yeah, there's -- the primary finding of the two developmental reproductive oral exposure studies was that caprolactam may be fetotoxic due to reduced fetal body weight. Is that all we're going to get out of this, I mean that's --

OEHHA STAFF TOXICOLOGIST DODGE: That was pretty much it for the findings.

CHAIRPERSON FROINES: What?

OEHHA STAFF TOXICOLOGIST DODGE: That was pretty much it for the findings. I mean, the reason I think I say maybe is because there was also a decrease in the maternal weight as well.

CHAIRPERSON FROINES: Well, I think that one -- I'm not sure, because I'm stuck without having read the papers. And so I don't know whether to just accept it as is or to argue that it would be nicer to see something more spelled out and definitive.

OEHHA STAFF TOXICOLOGIST DODGE: Well, I can certainly do that. In fact, I can have some of our repro

developmental people take another independent look at this and make sure it's much more clear.

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: Yeah, and we can certainly put in tables from the paper, if you'd like.

CHAIRPERSON FROINES: Well, I think it's just too soft spoken for me anyway. So I'll stop.

PANEL MEMBER NAZAROFF: John, just as a point while you were raising your questions, I looked up the paper buy Gad. And affiliations is Department of Toxicology, Allied Corporation, Morristown, New Jersey.

PANEL MEMBER BLANC: That's the industry manufacturer.

CHAIRPERSON FROINES: So we have -- that's the trouble we have.

PANEL MEMBER BLANC: But it is published.

PANEL MEMBER NAZAROFF: It's published in the Journal of Applied Toxicology.

PANEL MEMBER BLANC: Right, okay.

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: If it's a peer reviewed journal article, we don't take into account it was produced by industry or not. We just evaluate the study.

CHAIRPERSON FROINES: I understand that.

PANEL MEMBER GLANTZ: Well, you know, there is

nice developed --

CHAIRPERSON FROINES: Wait, wait, wait, wait, Stan. If you don't mind, I'm still the person on talking.

PANEL MEMBER GLANTZ: I thought you were done.

CHAIRPERSON FROINES: I think that that's a dilemma, because we know that there are now in the field journals that reflect biases, and that were stuck between good journals and journals that are developed for purposes that are not necessarily legitimate, or what am I trying to say --

PANEL MEMBER NAZAROFF: Not in the public.

CHAIRPERSON FROINES: Integrity is problematic. So I guess we just have to go with that. But it's not so -- all I'm saying is that today, to say something is peer reviewed is different than it used to mean peer reviewed. And it's not the same. And that's a crisis that's beyond this particular little compound.

PANEL MEMBER GLANTZ: But I do think -- just to -- I do think though that that's something you need to consider. And there is a pretty well developed literature now in biomedical stuff about biases associated with industry sponsorship, which, you know, Lisa Bero at our place is a big expert on that.

So I do think you need to take that into account when assessing these results, especially when you're

talking about negative results.

CHAIRPERSON FROINES: Well, you know -- everybody here, at least who's been on for awhile, knows that we have had problems through -- especially throughout our review of pesticide documents where they reflect the orientation of the manufacturer of the pesticide.

So it's something that we need to be aware of, even though there's not much you can do about it.

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: Okay.

CHAIRPERSON FROINES: I think.

PANEL MEMBER HAMMOND: I think another piece of some of that is it's important in all cases to make sure you look at the data in the paper as opposed to just the discussion in the paper. And even in some of the comments through here, there are comments about well there's no trend. When I look at it, I do see a trend. It's monotonic. I'm not saying it's statistically significant, but it's monotonic.

And I think when it's monotonic consistently as in Table 1 for every single of the effects, there's not a single coming down. You know, that's -- I mean, there's something to that.

In the case of the reproductive, the statement is in your document, "Every generation consistently lower

mean body weights and food consumption were observed in both the P2 and P3 parental generations".

You know, I mean, I think that that's actually the kind of thing we pay attention to as a reproductive, but it's showing up in later generations, if not in the first generation. And maybe -- I don't -- you know, I haven't looked at the paper itself. But, you know, I would say maybe that's more significant than just being -- it's passed over and kind of lost later. It doesn't come back.

Now, again, I'm not a toxicologist, so I would defer to the toxicologist on the Committee for how to think about those things, but it almost looks like there's things showing up in here that they're not huge, but maybe they're significant in their outcome. And I suspect that the paper may have tended to bypass it in the discussion, but not talk about it, but it is there in the results.

OEHHA STAFF TOXICOLOGIST DODGE: Yeah, the problem with some of those studies is that they're feeding studies, and they're trying to feed caprolactam in feed and so they don't like the taste. They don't eat as much. They lose weight. And then ultimately that affects the fetus as well.

PANEL MEMBER HAMMOND: Well, actually this is a dietary thing.

OEHHA STAFF TOXICOLOGIST DODGE: Now --

PANEL MEMBER HAMMOND: Dietary, right, in one of the findings. A human study was diet to lose weight, right. So, yeah, I know. I don't quite know how to think about it.

PANEL MEMBER GLANTZ: Maybe I should try it.

(Laughter.)

PANEL MEMBER HAMMOND: Well, but my point -- what brought my point here is that these were the subsequent generations, so that -- and it didn't show up in the first generation. It showed up in the subsequent generations. And I'm not sure how to interpret that, but I take that as like it raises some questions in mind, that we should look at that more carefully and think about that. And I would really defer to the toxicologist again as to what to do with that.

CHAIRPERSON FROINES: I'd just wanted to follow up before, and I won't hold Stan up. I just wanted to agree with Kathy because she said sort of the same things I was saying. I think you guys should look at that reproductive section, because I don't think it's fully developed as much as it could.

I think that her point about Table 1 is also worth thinking about. And so I think there is -- and the cancer thing is not developed. I think that the document

needs further development to give us some confidence in what we're reading.

PANEL MEMBER HAMMOND: And then to continue, I want to reemphasize some of Bill's comments about knowing what phase we're talking about, what it is that's actually there, that is --

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: I'm sorry. He was asking about John's comment. Sorry.

PANEL MEMBER HAMMOND: I should have waited. I apologize.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: So I'm sorry, you'll have to start again, because I was not focusing on what you were saying.

OEHHA STAFF TOXICOLOGIST DODGE: Yeah, sorry. We apologize.

PANEL MEMBER HAMMOND: Do you want to finish?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: We're done.

PANEL MEMBER HAMMOND: I just wanted to reemphasize Bill's point about being aware. We talk about a vapor phase has a condensed, is it in the particulate phase. And at least some consideration as to how that might affect how we interpret what's going on.

And furthermore, another way to look at that is

how do -- do the authors of the study, have they thought about what's actually going on. Are they measuring it appropriately? Again, I haven't read the papers. I don't know.

And I think there was an indication that some of the occupational studies are based on area samples rather than personal samples. You did reflect that in what you wrote, but I think that that's important to the degree that it's possible to figure out whether that means it's an underestimate. Quite usually that's an underestimate of actual exposure, but it may be an over estimate. It depends on how it's being used.

And I would like to see -- again, I go back to the other issue that people brought up to know what degree this material is in common usage, since, you know, conventionally there's this thing out there about carpets, you know, causing indoor air problems. And I don't know enough about this area, but is this actually really one of those problems? You know, we should look at that a little more.

CHAIRPERSON FROINES: Just one comment here. Stan is next, but Ellen isn't --

PANEL MEMBER GLANTZ: No, I'm done. I've said what I want to say.

CHAIRPERSON FROINES: Ellen is the new member and

so I'm going to defer to her and then Stan can come back.

PANEL MEMBER GLANTZ: Well, I think I've said what I have -- I have a couple other suggestions.

PANEL MEMBER HAMMOND: Well, there's Alan.

CHAIRPERSON FROINES: What did I say.

PANEL MEMBER HAMMOND: You said Ellen, but there's Alan and Ellen both.

PANEL MEMBER GLANTZ: I have a couple other sort of technical suggestions, but I can wait till later. I can give it to them off the record.

PANEL MEMBER HAMMOND: You've got two more people after Stan.

CHAIRPERSON FROINES: I know. I have Stan to my dismay.

PANEL MEMBER GLANTZ: No, I'm done. I don't have anything more to say.

PANEL MEMBER HAMMOND: And Ellen and Alan.

CHAIRPERSON FROINES: Ellen.

PANEL MEMBER EISEN: I don't have much to say, but I am sort of a little taken aback at the harshness of the criticisms. I guess, I thought -- I mean, these data are pretty week. I mean, they are sort of pathetic. And I sort of felt they had -- that this is what they had to look at.

And if it turns out there's actually some more

Russian data from the 1950s or case reports, you should -- you know, it would be nice to include those and some of the other pieces of information that would be useful, I think, to build the case, just a little description on how common exposure is and that kind of thing.

But basically, I thought it was a sad -- I mean, you were working some sad data. And, you know, there wasn't that much to say about it, and I thought you did what you could do. I didn't think it was so bad. But I don't know the other literature, so you know -- or that that's out there.

CHAIRPERSON FROINES: But I think that you should -- what happens is when Paul says what he says, you can take it with a little grain of salt, because he's close friends with the people who he's making the criticism.

PANEL MEMBER EISEN: I see. I didn't know that.

CHAIRPERSON FROINES: So we can -- it's not what you're hearing.

Stan

PANEL MEMBER GLANTZ: No, I'm fine. That's just the way Paul is with everybody.

(Laughter.)

PANEL MEMBER EISEN: I'd crumble in a minute.

(Laughter.)

PANEL MEMBER GLANTZ: Actually, he was in his warm and cuddly moment.

(Laughter.)

CHAIRPERSON FROINES: Stan move --

PANEL MEMBER BLANC: No body cried. I don't know what you're making such a big deal.

(Laughter.)

CHAIRPERSON FROINES: Stan move on.

PANEL MEMBER BLANC: Stan is done.

PANEL MEMBER GLANTZ: I'm done.

CHAIRPERSON FROINES: My friend.

PANEL MEMBER BUCKPITT: Sure. So I looked at my concerns were with Table 3, and whether this group, the Reinhold group, was dealing with animals that were not healthy. How can you have inflammation in all of your control animals.

PANEL MEMBER EISEN: Well, they were the people too.

PANEL MEMBER BUCKPITT: Well, but, you know, in the zero exposed group, that high numbers of animals that were affected. If you go back to the NTP, were those the F344s or were these Sprague-Dawley?

OEHHA STAFF TOXICOLOGIST DODGE: These were Sprague-Dawley, I believe.

PANEL MEMBER BUCKPITT: But again, historically

one in a clean colony would not expect to see that.

PANEL MEMBER BLANC: But isn't it all zero out of 20?

PANEL MEMBER BUCKPITT: No, no, no. Go back to the original table.

OEHHA EXPOSURE MODELING SECTION CHIEF BLAISDELL: We would really love to have some good data on this.

PANEL MEMBER HAMMOND: I'd like to hear Alan on this.

CHAIRPERSON FROINES: Hey, hey, hey, hey, hey, folks.

PANEL MEMBER BLANC: Sorry.

OEHHA STAFF TOXICOLOGIST DODGE: Right, I --

CHAIRPERSON FROINES: Buckpitt is talking.

PANEL MEMBER BUCKPITT: Well, I think Daryn may have an answer to it.

Again, my concern was that you subtracted all of that, Daryn. It may be such bad data, that you don't want to deal with it. And you may disagree with me, but I looked at it and said geeze you can't do anything with this. The controls are all screwed up.

OEHHA STAFF TOXICOLOGIST DODGE: Right. That was what was happening in the nasal cavity, the olfactory and respiratory tissue. Yeah, they were --

PANEL MEMBER BUCKPITT: So the only thing you really have then is the --

OEHHA STAFF TOXICOLOGIST DODGE: The exacerbation due to caprolactam that increased the severity of that dose responses in the nasal cavity, right. But the laryngeal --

PANEL MEMBER BUCKPITT: If they were virally infected, okay, you don't know what you have.

PANEL MEMBER BLANC: But the laryngeal effect wasn't subtracted, isn't that what you used as your endpoint?

OEHHA STAFF TOXICOLOGIST DODGE: That's correct, yeah.

PANEL MEMBER BLANC: So then maybe what you should do conservatively is say we didn't use the nasal data because of the high baseline. We used laryngeal, which didn't have a baseline. But even if we had used laryngeal and subtracted the background incidence, the actual number would have been lower anyway, rather than clutter --

PANEL MEMBER BUCKPITT: You're still dealing with infected animals. That is not a --

CHAIRPERSON FROINES: I'm confused.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Yeah. Can I step in here for a second. We

can only use the data that are available.

PANEL MEMBER BUCKPITT: You were handed a bad --

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: And we recognize all of these things. We frequently have data where -- for not just this particular endpoint from many endpoints where, for example, renal degeneration is common in older animals.

If we have an exposed group and a control group, knowing that the control group is going to get renal degeneration, if it's exacerbated by the chemical exposure, we still consider that as an effect and we have done dose response, subtracting out control incidence.

I think what you're saying, Alan, is that your concern is that you shouldn't have seen that in the control Sprague-Dawley.

PANEL MEMBER BUCKPITT: This maybe a purely bad study.

CHAIRPERSON FROINES: I'm sorry, but I don't understand what you're saying in terms of the control group on Table 3.

PANEL MEMBER BUCKPITT: Sorry. So Table 3 as it's presented in the report, all of the background data, John, has been subtracted. So that zero out of 20 was the -- after they subtracted from the -- I'm sorry, the 4 out of 20 on the 24 milligram per cubic meter dose. They

had subtracted all of the control data that was also positive.

CHAIRPERSON FROINES: Okay.

PANEL MEMBER HAMMOND: Even though it says zero in the --

PANEL MEMBER BUCKPITT: Yeah.

PANEL MEMBER HAMMOND: That's what's confusing to me. I just don't understand that.

PANEL MEMBER BUCKPITT: Is that right?

OEHHA STAFF TOXICOLOGIST DODGE: Yeah. Well, if I were to present the data as it was in the paper, in the control group we would have 18 out of 20 affected.

PANEL MEMBER HAMMOND: Really?

PANEL MEMBER BUCKPITT: When you have 18 out of 20 of your control animals affected, you probably have infected animals.

PANEL MEMBER HAMMOND: And you don't have the power to observe an effect.

PANEL MEMBER BUCKPITT: Bingo.

CHAIRPERSON FROINES: Were you -- are you getting this data from the paper?

PANEL MEMBER BUCKPITT: No. I read it here. And then if you go back to some of the comments on page --

CHAIRPERSON FROINES: Okay, never mind. That's a good enough answer.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: We did base it on the laryngeal data, and those controls did not show any incidence of degeneration.

CHAIRPERSON FROINES: So, Melanie, the point being -- I'll come right back to you. The point being is that if we had to go on the document you prepared, and he hadn't read the comments, we wouldn't know about this problem.

PANEL MEMBER BUCKPITT: No. No, I didn't say it. It's explained in there.

PANEL MEMBER HAMMOND: No. It's hinted in here, but you can't figure it out.

PANEL MEMBER BUCKPITT: It's honestly presented.

CHAIRPERSON FROINES: Well, maybe you think so, but I think it could be -- let's just say --

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Clearer.

CHAIRPERSON FROINES: It could be improved.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: It could be clearer. And we will add in more of the data tables from the papers that we cite to make it very clear what it is we did.

PANEL MEMBER ARAUJO: I have a question. So are we clear about that, that the data is subtracted or are you just assuming or you're proposing --

PANEL MEMBER BUCKPITT: We're clear about it that it is subtracted.

PANEL MEMBER ARAUJO: But so how about the nasal, olfactory, mucosa four week recovery. So there are two out of 20. That's not a zero.

PANEL MEMBER BUCKPITT: Sorry, where are we? Nasal, four week recovery, two out of 20.

PANEL MEMBER EISEN: Subtract that one.

OEHHA STAFF TOXICOLOGIST DODGE: Yeah, I should probably clear that up. I think I'm going to -- I'll have to clear that up.

PANEL MEMBER BUCKPITT: But most of it, again the controls were at such high incidence levels that you're dealing with noise.

PANEL MEMBER HAMMOND: There's just no room to see anything.

CHAIRPERSON FROINES: That's good. That's really very good that we identified that.

Does anybody else from the Panel have further comments? Because at this point, we know what we're going to do and that is that OEHHA is going back and work on improving the document, using the comments that they've heard today, but most importantly Paul's written comments. And then they're going to come back at our next meeting with a new document.

Bill.

PANEL MEMBER NAZAROFF: Yeah. So I just want to weigh in on a couple of points about while, you know, I appreciate the critique, and I like probably somewhere between Paul and Ellen in terms of my sense of how I feel about what was presented here, which leaves a lot of room, right.

I want to reinforce what I think is the importance of addressing this chemical. And let me make two points on that.

First, while we're going around the table, I looked up on the U.S. EPA's inventory update reporting site, which is where they compile national chemical reporting data from manufacturers ostensibly to give us a sense of exposure potential. It doesn't really have that much utility there, but at least it gives you a sense of the economywide utilization.

And among other things listed here for this chemical are that aggregated production volume in the United States is one billion pounds per year or greater. And that's as of 2006. So it's still a big deal chemical in our economy.

And when you read down, there's some additional information there about the nature of uses. It includes the manufacture of Nylon 6, but it's also used in some

adhesives

CHAIRPERSON FROINES: Can you send OEHHA an email to that Effect.

PANEL MEMBER NAZAROFF: I'll send the link, absolutely.

So the other point that I wanted to make in this context is I don't know whether I should get credit for inventing this term or if I just rediscovered it. But the notion of exposure intimacy as a way of characterizing the proximity part of the story between a source of a chemical and humans who might come into contact.

So direct smoking, of course, is among the most intimate exposure opportunities that you have for the -- and environmental tobacco smoke not far behind. Whereas, emissions from, you know, a ship that's traversing the Pacific Ocean for the general population doesn't have anywhere near that kind of exposure intimacy.

With a chemical like this that's heavily used in the manufacturing of a polymer, that then ends up in kilogram or, let's say, tens to hundreds of kilogram quantity in our homes, and I presume in our offices, and we have children who we're worried about as a susceptible population, who are crawling around on carpet and we're concerned about monomer that didn't get bound up in the polymer in the manufacturing process escaping -- and I'm

not convinced, by the way, by what I've read by some of the outside commentators, that this is only a short-term issue. That it's only acute. You know, the carpet is manufactured. It off-gases for a few weeks and then no issue.

All of those things suggest to me that this is, from an exposure potential point of view, a chemical that definitely is worthy of our attention.

CHAIRPERSON FROINES: Good. Good.

I would even argue that the metabolism of this compound is not fully developed.

PANEL MEMBER HAMMOND: Eighty percent is undetected.

PANEL MEMBER GLANTZ: So are we done?

CHAIRPERSON FROINES: Before he just spoke, I said -- I laid out what the next stages were. And then he made comments. And so, at this point, I'll ask the question again, are we finished for the day?

PANEL MEMBER HAMMOND: Do you want to schedule future meetings?

CHAIRPERSON FROINES: And is that okay with OEHHA?

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Sure.

PANEL MEMBER ARAUJO: Can I make one last

comment.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: No, I want to be beat up some more.

CHAIRPERSON FROINES: Jesús wants to make one last comment.

PANEL MEMBER ARAUJO: I don't know if it is something that can be included or added or it will be against any rules of making these reports. But if one of the issues is that the data is sloppy is absent or is just not of good quality, couldn't that be said in the report or in your analysis or it could be too much of a judgment call from who is making the report and that cannot be mentioned?

CHAIRPERSON FROINES: Let me just answer that question for you. In my view -- and Melanie can tell me I'm wrong. In my view, if one -- if OEHHA wants to write something critical, as you've just said it, it's their -- it's up to them. And they have to decide the politics of what they write. And so it's not up to the Panel. I guess we can say that the Panel pretty much reflected your point of view, but whether you want to write something to that degree is the decision of OEHHA. You can write anything you want.

PANEL MEMBER BLANC: Well, I think the other point is that they have options, if they wish, to put in

additional uncertainty factors in their calculations, to the extent that the database as a whole induces them to do that.

And so if they were to comment strongly on the deficiencies of the database, then one would expect to see that kind of further uncertainty factor in the risk calculations to be consistent, were that to be their assessment.

CHAIRPERSON FROINES: I think that's really important, Paul. And that, Melanie, that if one is going to make significant criticisms, there should probably be some outcome from that conclusion, so it doesn't sound sour grapes.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: Okay. Well, you know, I think we will go back and put in a lot more detail on the studies that we have in there and then add in the case studies. We did look at the English review of the Russian studies.

PANEL MEMBER BLANC: Which was pretty negative.

OEHHA AIR TOXICOLOGY AND EPIDEMIOLOGY BRANCH CHIEF MARTY: But we could put in -- you know, we could do our best to cull what we can from the Russian studies and put those in there, and the case reports that Paul found.

We will also look at the apparent submission to EPA from the industry. So I'll get my hands on that. It

has old, old, old, data. It's older than me.

CHAIRPERSON FROINES: Now, this is usually when Paul says, "John, you forgot to take a vote on closing the meeting".

But he's so far away, he can't remind me to do that. So I'll remember to do it. And I'll ask for a motion to close the meeting.

PANEL MEMBER GILL: So moved.

PANEL MEMBER HAMMOND: Second.

CHAIRPERSON FROINES: And all those in favor?

(Ayes.)

CHAIRPERSON FROINES: It's unanimous.

(Thereupon the California Air Resources Board, Scientific Review Panel adjourned at 4:34 p.m.)

CERTIFICATE OF REPORTER

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 31st day of January, 2011.

JAMES F. PETERS, CSR, RPR
Certified Shorthand Reporter
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