MEETING

STATE OF CALIFORNIA

ENVIRONMENTAL PROTECTION AGENCY

AIR RESOURCES BOARD

SCIENTIFIC REVIEW PANEL

ON TOXIC AIR CONTAMINANTS

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

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10:07 A.M.

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

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Cort Anastasio, Ph.D.

Alan R. Buckpitt, Ph.D.

Sarjeet S. Gill, Ph.D.

Stanton A. Glantz, Ph.D

Beate R. Ritz, M.D., Ph.D.(via teleconference)

REPRESENTING THE AIR RESOURCES BOARD:

Mr. Jim Behrmann, Liaison, Scientific Review Panel

Mr. Peter Mathews, SRP Support Administration

REPRESENTING THE OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT:

Dr. George Alexeeff, Director

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

Dr. Daryn Dodge, Acting Chief, Air, Epidemiology and Risk Assessment

Dr. John Faust, Chief, Community Assessment and Research Section

Dr. David Siegel, Chief, Air, Community and Environmental Research Branch

I N D E X

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1. Review of the “Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (Guidance Manual)” (June, 2014) 2

The Office of Environmental Health Hazard Assessment (OEHHA) is required to develop guidelines for conducting health risk assessments under the Air Toxics Hot Spots Information and Assessment Act of 1987 (Health and Safety Code Section 44300 et seq.). OEHHA, in conjunction with the Air Resources Board, developed a Guidance Manual combining information from three previously reviewed and approved Technical Support Documents (OEHHA, 2008, 2009, 2012). The Guidance Manual contains the algorithms, recommended exposure variates, cancer and noncancer health values, and the air modeling protocols needed to perform a health risk assessment. OEHHA staff will present the draft revised Guidance Manual for review by the Panel. By law the Panel reviews risk assessment guidelines and recommends changes and additional criteria to reflect new scientific data or empirical studies. Following review by the Panel, OEHHA will finalize this Guidance Manual.
http://www.oehha.ca.gov/air/hot_spots/riskguidancedraft2014.html

2. Review of Reference Exposure Levels (RELs) for toluene diisocyanate (TDI) and methylene diphenyl diisocyanate (MDI) (July, 2014) 70

OEHHA staff will be making an introductory presentation to the Panel of two documents summarizing the toxicity of toluene diisocyanate and methylene diphenyl diisocyanate and the derivation of acute, 8-hour, and chronic reference exposure levels (RELs). RELs are airborne concentrations of a chemical that are not anticipated to result in adverse non-cancer health effects for specified exposure durations in the general population, including sensitive subpopulations. OEHHA is required to develop guidelines for conducting health risk assessments under the Air Toxics Hot Spots Program

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2.	Review of Reference Exposure Levels (RELs) for toluene diisocyanate (TDI) and methylene diphenyl diisocyanate (MDI) (July, 2014) (CONTINUED) (Health and Safety Code Section 44360 (b)(2)). In response to this statutory requirement, OEHHA adopted in 2008 a Technical Support Document that describes acute, 8 hour and chronic RELs. This guideline has been used to develop the RELs for both TDI and MDI. Following this introductory presentation, the Panel will continue its review and comments on these two RELs at its next meeting. After the Panel's review the two documents will be finalized and will be added to Appendix D of the Technical Support Document. http://www.oehha.ca.gov/air/hot_spots/070414TDIandMDIreviewdraft.html	
3.	Briefing on the California Communities Environmental Health Screening Tool: CalEnviroScreen.	36
	OEHHA staff will give an informational briefing to the Panel on CalEnviroScreen, a screening methodology that can be used to help identify California communities that are disproportionately burdened by multiple sources of pollution. http://oehha.ca.gov/ej/ces2.html	
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P R O C E E D I N G S

CHAIRPERSON KLEINMAN: Good morning. I want to convene this meeting of the Scientific Review Panel on Toxic Air Contaminants. And before we start, since this is really only the second meeting we've had in about a year, I thought it would be a good idea to go around the table and just very briefly introduce each of us so people know who's who. So start with Stan.

PANEL MEMBER GLANTZ: So I'm Stan Glantz. I'm a professor of medicine at UCSF, and I'm the current longest serving member of the Committee.

Do you want more?

CHAIRPERSON KLEINMAN: That's good.

PANEL MEMBER GLANTZ: Okay.

PANEL MEMBER ANASTASIO: My name is Corte Anastasio. I'm a professor at UC Davis in the Department of Land, Air, and Water Resources. And on an unrelated not, I'm having sciatic nerve problems, so I'm going to have to stand up every so often. That's why.

PANEL MEMBER BUCKPITT: I'm Alan Buckpitt also from UC Davis, the Department of Molecular Biosciences in the School of Veterinary Medicine.

PANEL MEMBER GILL: I'm Sarjeet Gill. I'm from the University of California, Riverside. I'm from the Department of Cell Biology and Neuroscience.

CHAIRPERSON KLEINMAN: I'm Mike Kleinman. I'm a professor or at UC Irvine in the Adjunct Series, and I am, as I said, Chairing the meeting today.

I believe Beate Ritz was going to be on the phone. Beate, are you up?

MR. MATHEWS: She's not up yet.

CHAIRPERSON KLEINMAN: Okay. So hopefully she will be able to join us fairly soon.

So the first item on our agenda is review of the Air Toxics Hot Spots Program Guidance Manual for the preparation of health risk assessments. So the guidance manual is a -- been modified from the original version, and there have been several important changes. And I believe the way we're going to start this is there will be a brief presentation from the Office of Environmental Health Hazard Assessment, and they will give us a brief background on it, and then the Committee will -- or the Panel will review that document. So I guess we're ready to begin with the presentation.

(Thereupon an overhead presentation was presented as follows.)

DR. SIEGEL: Good morning, Mr. Chair and Panel members. My name is David Siegel. I'm the Chief of the Air Environmental -- Air, Community, and Environmental Research Branch in which this document was produced. And

here today to present the document is Dr. Daryn Dodge.

DR. DODGE: Okay. Thank you, Dave.

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DR. DODGE: Okay. We'll start with the purpose of the Hot Spots Guidance Manual.

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DR. DODGE: It's to provide a user's manual to risk assessors on how to conduct a hot spots risk assessment. It's a consolidation of methodologies from three hot spots documents previously reviewed by the SRP. The guidance manual contains air dispersion modeling procedures to estimate emissions migrating off site into neighborhoods and businesses.

It contains equations and default values used to estimate noncancer hazard and cancer risk from these facility emissions. And it also contains distributions of some variates, such as breathing rates to provide stochastic analysis for cancer risk.

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DR. DODGE: As I mentioned on the first slide, it's approved hot spots documents incorporated into the guidance manual. The guidance manual here is an update of the 2003 manual. And it was revised due to hot spots program to comply with the Children's Health Protection Act to -- and this was done primarily to include sensitive

subpopulations, primarily infants and children.

OEHHA created the technical support documents, which I'll call TSDs to lay out the underlying science and methods to meet this requirement. As I said, there's three documents, or TSDs. The first two, non-cancer and cancer risk assessment guidance were reviewed by the SRP in 2008 and 2009 respectively. And then in 2012, the exposure assessment and stochastic guidelines came out.

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DR. DODGE: The SRP charge here is, number one, is the guidance manual clear? And number two, are there any problems or errors with the material we clarified or corrected? And you might have noticed in your versions that we had highlighted areas in green and yellow. So in terms of clarifications and corrections from the previous TSDs, these are areas in green.

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DR. DODGE: Okay. We'll start out with the highlighted areas in the air dispersion chapter. This is chapter four, I believe. There was only a few spots. Text was added to clarify examples of release types for point, area, and volume sources and modeling selection related to screening and refined air dispersion modeling.

We also added text that clarifies the spatial averaging method, specifically how to place the grid when

dealing with a fence-line receptor.

DR. DODGE: Okay. Then we have some highlighted areas in the chapter five. This is estimation of concentration and dose. First up is soil contaminant accumulation. I'd like to -- I'll at least first say that we're dealing with these subgroup or subclassification of chemicals. It's a rather small select group that are semi- or non-volatile here. Most of the chemicals in the Hot Spots Program are considered VOCs, or volatile organic compounds.

So the only pathway that we assess for those chemicals are the inhalation pathway. For these semi- and non-volatile compounds, such as the metals and things like dioxins and PCBs, we have to also take into account dermal exposure and oral exposure, when these chemicals deposit out -- you know, out of the atmosphere onto soil or other surfaces.

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DR. DODGE: So this is a clarification here. For simplicity and health protection, we clarified that tier 1 default assumes 70-year soil deposition for the accumulation period at the end of a 70-year facility lifetime, in order to estimate exposure via soil contact and ingestion.

What we say here is under a tier 2 scenario,

subject to district approval, the risk assessor may use soil accumulation at the time of assessment, or expected accumulation at the end of the facility operation to estimate exposure. So this gives a little more flexibility to the risk assessors.

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DR. DODGE: Okay. Also, in chapter a 5 estimation of concentration in milk, the mother's milk pathway. This is referring to the highlighted table here. We added footnotes to the table to use the mother's milk biotransfer coefficients or how to use them. This was actually material already in the 2012 TSD, but it could require a little bit more scrutiny.

What this table is showing essentially the biotransfer coefficients for the small group of chemicals we need to assess by the mother's milk pathway. It's based on information we found in the literature. These biotransfer coefficients are essentially a ratio of the mother's exposure, and then the accumulation or -- into the breast milk.

So since it's a ratio of it's greater than one, this would suggest there's possible bioaccumulation going on. If it's less than one, the chemical is still getting into the breast milk, but maybe not considered bioaccumulation.

Now, since these chemicals are semi- or non-volatile, we also have to take into account all three pathways, oral exposure, inhalation, and dermal. But we only found information in the literature for one or two of these pathways. So we're essentially saying for the P -- the dioxins, furans, a PCBs --

PANEL MEMBER RITZ: This is Beate.

DR. DODGE: We have information on the oral route, but not the dermal and inhalation. We're saying use the TCOs -- the oral TCO for the dermal and inhalation pathway as well. We also clarify for the PAHs use the inhalation pathway for the dermal pathway, since we don't have information on the dermal. And for lead, we've got information about the biotransfer for the inhalation route, but not for dermal and oral, so use this biotransfer coefficient for all three pathways.

Is Dr. Ritz on the line now?

PANEL MEMBER RITZ: Yes, I am.

Can you hear me?

DR. DODGE: Yes, we are on -- okay, the slide number doesn't show up on our screen, but we're about five or six slides in, estimation of concentration in milk, the mother's milk pathway.

PANEL MEMBER RITZ: Okay. I'll find that. Thank you.

DR. DODGE: Okay. We're going to move on to the next slide which is also in chapter five. This is estimation of concentration in home-produced food pathway. These are food animals, such as cows, chickens, and pigs. Scenarios, such as a farm that is being exposed to emissions from a facility. The cows, pigs, and chickens are eating pasture -- or out on the pasture eating contaminated food -- forage.

We added some footnotes to Table 5.4 here, conditions using various intake point estimates for food animals. We expanded on it a little bit. For example, if pigs were raised in a pen versus pigs raised with free access to pasture, the intake of the contaminant would be different. So we go into a little more detail in the footnotes here about that.

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DR. DODGE: Okay. On to the next slide, use of 8-hour non-cancer RELs. This is a clarification on when or how 8-hour RELs can be used. We first introduced the 8-hour RELs in our 2008 noncancer documents. So this is appearing in the guidance manual for the first time. 8-hour RELs a primarily for or off-site worker exposure, but can also be used for school site exposures.

But for now, since these are relatively new, we only have a few 8-hour RELs currently available. So we

recommend that the assessor also estimate the chronic hazard index, or HI, at these locations. And 8-hour REL -- I'm sorry, 8-hour hazard index, based on the daily average 8-hour exposure, is not required at the MEIR, which is the maximal exposed individual resident. But we clarified that it can be performed at the discretion of the air district, in case the air district feels that an 8-hour hazard index is more appropriate or more health protective than the chronic.

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DR. DODGE: Okay. The next slide is -- also, in chapter 5 estimation of dose. This refers to all the noncancer non-inhalation pathways. We had no equations in the 2012 exposure assessment TSD for calculating average dose for these chronic non-inhalation pathways.

For hazardous assessment, we have a time-weighted average approach we put in there to -- and is used to combine ingestion or exposure rates for the age groups that need to be addressed for chronic noncancer hazard. This would be the 0 to 2, 2 to 16, and the 16 to 70 year age groups. This is will estimate the chronic dose for residential exposure.

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DR. DODGE: And here I have a example of the equations -- a sample of the equations we added to the

document. And this is for soil ingestion rate.

So we have different soil ingestion rates for the 0 to 2 year age group. And this is incidental soil ingestion, by the way. We also have different rates for the 2 to 16 and the 2 to 70 group. We do a time-weighted average, because the 0 to 2 group represents only 2/70 of the chronic dose. The 2 to 16 group represents only 14/70, and the adult group is 54/70.

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DR. DODGE: Okay. This slide refers to a specific target organ system that we clarified. OEHHA considers developmental toxicity to be a subset of reproductive toxicity. Thus, for the hazard index, we combine them as impacting one target organ system. Now previously, the acute hazard index was a combined hazard index for a reproductive developmental target organ system. This is how we want to present it. However, previously the chronic was not combined. It was presented as either reproductive or developmental.

So what we are recommending is that in a risk assessment hazard quotients for either developmental or reproductive toxicity is combined into one hazard index. So the chronic and 8-hour hazard indexes will be the same as the chronic hazard index.

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DR. DODGE: Cancer risk assessment. This refers to a highlighted section in chapter eight. The mother's milk pathway, we modified the equation here for just the o to 2 year age group. In the 2009 TSD, technical support document, we had risk as equal to dose times the cancer potency factor, times the age sensitivity factor, times an exposure duration of two years, times a multiplier 0.5. This is essentially to reduce the exposure duration from two years to one year, because we make the assumption that for this mother's milk pathway, the infant is only breast feeding for their first year, from 0 to 1, and then from 1 to 2 years of age has gone on to solid food.

This is the only case where we have a modification of the exposure duration for an age group. So what we did in this most recent draft of the guidance manual is change that equation, so that exposure duration is back to two years. I'm sorry. Exposure duration is defined as one year. We got rid of the multiplier, and we divide it by the averaging time, which -- so we put averaging time back into the equation. It should have been there originally.

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DR. DODGE: All right. Now, we'll talk about short-term projects --

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DR. DODGE: -- for cancer risk.

These are highlighted sections I believe also in chapter 8. The air district's use the hot spots guidelines for permitting short-term projects. Upon their request, we added more details around off-site worker short-term exposures. For the off-site worker, although workers are presumed to be older than 16 years of age, risk managers need to consider the presence of women at child bearing age, and day cares on the site, and then apply the appropriate age sensitivity factors in those cases to the risk estimate.

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DR. DODGE: Okay. We also clarified that we suggest that risk managers consider lowering the allowable risk level when evaluating short-term projects. This is to avoid compacting lifetime risk into a short time period. And this reflects the concern over impacts of higher exposure to carcinogens in a short time period.

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DR. DODGE: Now, this final highlighted area is in Appendix E. And this is for the polychlorinated biphenyls, or PCBs. Previously, we provided noncancer health values for speciated PCBs, but not the mix of unspeciated PCBs.

Now, in the case of cancer risk assessment, we do

have potency values for both speciated and unspeciated PCBs, but not in the case for noncancer. So we added language to Appendix E for estimating noncancer hazard impacts from unspeciated PCB mixtures. Basically, we're saying consult with OEHHA and the local air pollution control, or air quality management district, if an assessment of noncancer hazard for unspeciated PC mixtures is needed.

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DR. DODGE: So, in summary, the updated draft guidance manual incorporates approved methods from the cancer, noncancer, and exposure assessment technical support documents. And we are looking for comments on clarity and material we clarified or corrected that were highlighted in green.

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DR. DODGE: So now we'll go on to the comments we got from the public review. Many of the comments had to do with issues already addressed at previous public reviews on early and life cancer risks, specifically age sensitivity factors. We did respond to all these comments, but we won't go over them line by line here.

And this refers -- the age sensitivity factors brought a lot of attention, because these are the major changes to the document. We are referring to the

sensitivity factors from 0 to 2, which were weighted 10X, and 2 to 16 year group, which is weighted 3X. The adult groups are weighted 1X.

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DR. DODGE: So going on, this comment, OEHHA should incorporate into the final guidelines a procedure for developing ASFs, or age sensitivity factors, based on chemical specific data that can be used in tier 1 health risk assessments.

Response. In Section 8.2.1, we already say that the risk assessments generated under the hot -- Air Toxics Hot Spots Act are reviewed by OEHHA. If a risk assessor had data indicating that there are no windows of susceptibility early in life or that a different ASF should be used for a specific carcinogen, and wanted to use these data, OEHHA would review the material as part of a review of the risk assessment.

We essentially added this language to another part of the guidance manual and maybe changed the wording a little bit, but we wanted to emphasize that we will consider this, if the assessor has information other than having to use the default factors for the ASFs.

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DR. DODGE: Next comment. The proposed changes to the guidance overstate risk from exposure without

recognizing the large range in risk variables or the degree of uncertainty built into the process. This is also a subject covered in previous technical support documents.

Nevertheless, we added text to chapter 1 that provides a description of cancer risk in noncancer hazard assessments describing sources of uncertainty in the estimates.

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DR. DODGE: Next comment. The process and criteria by which a project could seek and obtain approval is to utilize the tier 2 or tier 4 approaches, is not well defined, nor is it clear why a tier 1 approach is needed to -- needed, if other approaches provide better or more scientifically sound site-specific data.

We clarify further in section 2.5.3, tier 1 is a standard point estimate approach using the recommended point estimates presented in the Hot Spots Guidance Manual.

So all risk assessments do a tier 1 approach. However, if site-specific information is available and more appropriate to use than the recommended point estimates or distributions, then a tier 2 or tier 4 -- tier 4 in the case of alternate distributions, allows use of that site-specific information.

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DR. DODGE: We have also added language in Section 8.1.1 regarding the use of tier 2 and tier 4 for small footprint facilities, such as gas stations. For example, alternative breathing rates, point estimates and distributions, may be used as part of a tier 2 or tier 4 risk assessment with appropriate supporting justification in the case of these very small zone-of-impact facilities.

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DR. DODGE: The final comment here. We had a number of comments from the L.A. Sanitation District come in that asked for additional clarity for very specific items in the air dispersion chapter, primarily regarding air dispersion and the air dispersion modeling program known as HARP, which stands for the Hot Spots Analysis and Reporting Program.

All these comments were addressed, and clarifying language was included in the air dispersion chapter of the manual. That's all I have.

CHAIRPERSON KLEINMAN: Okay. Thank you. I'd like to pass it on to Stan Glantz who has been our primary reviewer for the document and he has comments.

PANEL MEMBER GLANTZ: Well, I read it all. I read all the comments and the responses. I think the document was a fair representation of the more technical

support documents. And I think I was the lead for all of those, right? Anybody have better memory than I do?

I gave them a few really editorial suggestions for clarifying a few points, which were all made at least in the draft I saw a couple days ago. So I think it's fine.

I just want to comment on this issue of how to handle the childhood exposures, because a bunch of the comments dealt with that. And we got this letter a couple days ago from the chamber of commerce and a bunch of other business groups. And I think I'm the only member of the panel that was here when those original documents were being discussed. But the issue of how to handle the safety factors for childhood exposures got a lot of discussion, when we were doing the earlier more technical documents.

And sort of one of the complaints that we heard over and over again in the public comments, was, well, you shouldn't be making assumptions, and why shouldn't you be using specific evidence or specific numbers?

And both the technical support documents and this user's guide say if there is specific data to support specific risk estimates for effects on children, you should use them. And the real -- the challenge that we were confronted with when debating and approving the

earlier document was what do you do when you don't have specific numbers for a specific chemical?

And, you know, one approach would be to say, well, we don't know, so we'll just assume it's one. But what we ended up with -- and I believe if you go back and look at the record on the -- when the earlier reports were being discussed, there was a lot of back and forth and some adjustments to what the defaults should be, in the absence of specific evidence.

So I just thought it was useful to put that into the record. You know, to know that, again, the purpose of this document is not to break new ground. It's to simply take these very long, even more technical, technical support documents and get them into a more user-friendly form.

But the substantive scientific issues -- and my understanding was this was not a place to reopen the substantive science. But having said that, if there had been some specific evidence supported or presented that there was a mistake, then we could have engaged that, but it was really a lot of sort of general comments.

And I do think that the Agency and the SRP, when it voted on the technical support documents before, did the right thing in saying, because of what we know about the biology of exposure to various toxins among infants

and young people, we know those are biologically different. And I think that the factors that were adopted were based on a sensible reading of the science at the time.

Obviously, if industry or anybody else can come in either with specific reasons that that was wrong, you know, I think that it ought to be considered, but that didn't -- and, you know, and we have on occasion during my tenure on this committee, you know, adjusted some of the estimates in the face of new information, but there needs to be new information. And there wasn't any presented in the public comment. And again, the thing -- the main objection, as I read it, was that, well, what if we have evidence that these compounds aren't as bad as the default risk factors? And but what the both the technical support document and this document say is use them. So I saw that as kind of a non-issue.

But since it was raised over and over and over again, I thought it would be worth mentioning -- you know, putting it into the record in this discussion. As I said, the only suggestion I gave the Agency, which sort of bordered on maybe being a little bit substantive, is when they were talking about how -- what to do when you lacked data in terms of exposure?

I suggested, in addition to the options that were

already outlined adding in multiple imputation, which is a widely accepted, relatively new by maybe ten years old, way of filling in blanks and data, which is in most advanced statistics text books now. But I don't see that as a substantive change. It's just offering one more alternative for dealing with missing data.

I was aware of that because I've been having multiple imputation banged into my head by some of my colleagues at the university. A less -- a better way to deal with missing data than just either throwing out the data or putting averages in.

But I don't really see that as a substantive thing, because it would need -- if it was going to be used, and if you were doing this in a scientific paper, you would say exactly how you did it and justify the procedure that's used. But those are -- you know, those are in the more advanced statistical text books now.

So those are my -- I think it's fine. I think we should approve it.

CHAIRPERSON KLEINMAN: Thank you.

PANEL MEMBER GLANTZ: Well, that's everything I found. I don't know if you guys have any reactions to that or questions or? I think it's a nice job.

DR. SIEGEL: Just I want to thank you.

CHAIRPERSON KLEINMAN: Yeah, I wanted to echo

that I thought the document was very well prepared. There were some minor typos and things that I'm sure will be picked up. I don't think it's worth taking a lot of committee time or your time to deal with it, but we'll provide some of that in writing. And I think it would be a good idea to go around the table and give everybody a chance.

So I'll start with Cort.

PANEL MEMBER ANASTASIO: So I had a question, first, about, you know, the age specific factors are only used for cancer risk, is that right?

DR. DODGE: Yes.

PANEL MEMBER ANASTASIO: Okay. So is there evidence -- now, I wasn't here for the TSDs, but I'm just wondering, is there evidence for non-cancer risks that there are also higher risks for children and infants? And if so, it doesn't seem to be included in the risk assessment for noncancer endpoints.

DR. SIEGEL: Well, that's why we're doing -- the RELs are developed with that in mind in looking at age-specific effects. So we're now -- if you noticed at the end of each REL, we talk about whether it should be added as a child -- how is that working specifically?

DR. DODGE: Well, we have uncertainty built into the RELs. We're going through the RELs right now to

update them with our new noncancer -- to be consistent with our new noncancer TSD support document.

So there's added uncertainty factors built into the RELs, which account for sensitive subpopulations, infants and children. However, you know, the main thing that people were focusing on is cancer risk. And, yeah, the noncancer changes to take into account sensitive subpopulations kind of got lost in all the excitement there over cancer risk.

PANEL MEMBER ANASTASIO: Okay. So within the UFs for the RELs, there will be some acknowledgement for chemicals where there is --

DR. DODGE: Yes. Right, as we're slowly updating these RELs, we do include language and uncertainty factors, if it's needed for sensitive subpopulations.

PANEL MEMBER ANASTASIO: Okay. I had a few other more specific comments. And again, they go more towards the substance of the TSDs, I hope that's note a huge issue.

But on page 5-5, in Table 5.1, for the breast milk exposure route, you had four out of the --

PANEL MEMBER GLANTZ: What page are you on again?

PANEL MEMBER ANASTASIO: Page 5-5. For the breast milk exposure route, you've got four out of the, what, nine organics you consider through that route. And

I was just wondering, you know, a number of the other ones you don't have considered are also very lipophilic. And I was wondering why aren't they included for breast milk exposure?

DR. DODGE: Well, we got the major ones. In part, we didn't have time or enough information in the literature to really assess these other chemicals for this pathway. But we got the ones that we considered the ones of major concern here for now.

In our 2003 guidance manual, we only had two of these groups for -- you know, the dioxins and furans and the PCBs. So with our updated guidance manual, we added PAHs and lead.

PANEL MEMBER ANASTASIO: I see. So this is something as data becomes available, they would be included as well.

DR. DODGE: Correct, yeah.

PANEL MEMBER ANASTASIO: Okay. Another comment on that page. It's a minor comment. The third line up from the bottom. You know, it's the issue of deposition rate for dry deposition of particles. And you've got two settings 0.02 or 0.05. You mentioned that the 0.02 is the default, and then the example you give is for internal combustion engines powered by compressed natural gas. But really, any internal combustion engine, whether it's

natural gas or, you know, diesel will have fine particle emissions.

And so my suggestion is just to get rid of powered by compressed natural gas, because there's nothing specific for CNG engines --

DR. DODGE: Okay.

PANEL MEMBER ANASTASIO: -- that gives you that size distribution. And so that is also on page 5-70 of the same phrase, second line up from the bottom.

DR. DODGE: It's in two places.

PANEL MEMBER ANASTASIO: Yeah, so 5-5 and 5-7.

On page 5-9, the middle of the page, the assumption for equation 5.3.3 B. You say all material deposited into the water remains suspended or dissolved in the water column and is available for bioaccumulation. That's actually not true. You're allowing the chemical to flush, so you have this VC, volume change, per year. That actually dilutes the chemical.

So my suggestion is to change that comment, because it's not as conservative an assumption as you're saying it is. You actually do allow for dilution.

DR. DODGE: Okay. We'll fix that.

PANEL MEMBER ANASTASIO: On 5-18, Table 5.2 for mercury and inorganic compounds, you've got a fish bioaccumulation factor of 80, which is probably fine for

inorganic mercury, but, you know, the big concern with mercury deposition into water bodies is methylmercury, which has a bioaccumulation factor on the order of a million.

So I know it's very complicated to understand a certain fraction of inorganic mercury deposition what ends up being methylated, and so it's hard to get that right, but even a very small fraction of methylation that million bioaccumulation factor could lead to much higher exposures of mercury. So it would be nice to have some examination of how can you include the methylation pathway, and that really enhanced BAF for methylmercury there.

DR. DODGE: We actually include that in some of that information in the technical support documents, but it didn't get put in the manual here, because -- well, we wrestled with it a little bit. No facilities we know of emits methylmercury directly.

PANEL MEMBER ANASTASIO: Right. Right. It would get methylated in the sediments of the lake.

DR. DODGE: So it's hard, at least in this Program, to really assess methylmercury formation.

PANEL MEMBER ANASTASIO: Yeah, I agree. I think it's a complicated issue, but I also think because the bioaccumulation factor is so huge that you need to think about can you or how can you?

DR. DODGE: Um-hmm.

PANEL MEMBER ANASTASIO: And then maybe -- I'm not a limnologist, but maybe there's someway to take the incoming deposition fraction of inorganic mercury, and knowing something about the lake, estimate some fraction of methylation.

DR. DODGE: Okay.

PANEL MEMBER ANASTASIO: And that was it. Thank you.

DR. DODGE: Thank you.

PANEL MEMBER BUCKPITT: I also found that this document was easy to read. The one suggestion that I'd have, and it's probably for people like myself who can't remember their own name 30 seconds later, can you make a page of list of abbreviations. They'd be stated and then three pages later, I'd have to go back figure out what the abbreviations -- and there's lots of them in here. I think it would help the document itself.

I had a question about the TCOs for breast milk. If you look at your PCBs and all of the chemicals that you really have listed there, they vary a lot in K_{ow}. And there's just a huge difference in those. Have you considered doing anything in terms of concentration in breast milk based on that K_{ow}? In other words, wouldn't that vary a lot?

DR. DODGE: Such as within the class of PCBs or --

PANEL MEMBER BUCKPITT: Within the class, yeah.

DR. DODGE: -- dioxins and furans. Yeah.

PANEL MEMBER BUCKPITT: I know it makes things much more Complicated. And if you're dealing with a mixture, then obviously you can't apportion everything out. But certainly, if you're dealing with highly chlorinated or highly halogenated derivatives, it's going to be very different than if you're doing with derivatives that are less so.

DR. DODGE: Right. I believe our group looked at the mixture. They didn't look at individual isomers or PCBs and dioxins and such.

PANEL MEMBER BUCKPITT: Okay. That was all I had.

PANEL MEMBER GILL: Well, for me, actually I had a bit -- reading through the document was a bit slugging through. And I would suggest to you to improve this, it would have been nice to have followed through with more than just an abbreviation, but an index -- a brief index at the end, which will allow me to go back and forth when I miss something which section it is. So it would be easy to access it from one. It doesn't have to be an extensive index, but it will make it much more readable as such.

With regard to substantive issues, one of the things I noted was a lot of times you talked about specific chemicals. And other than group of chemicals, when the biology biochemistry of that chemical is very similar. In some cases, you have done it on dioxins and hydrocarbons, but in other cases, for example, diethylhexyl phthalate, you only talk of DEHP, but you don't talk about any phthalates otherwise.

So it would be useful to when you talk about RELs and other assessments you do, because groups of chemicals have sometimes basic similar biochemistry. And it would be easier to actually develop those for a group of chemicals, which are very similar in nature. When there are specific examples, yeah, clearly, you can go beyond that. But when you do not have those sometimes, the chemistry is such that it's likely they will all behave similar. So when you begin to develop RELs, you may want not to just -- specific RELs for specific examples, but of a group of chemicals may follow the same category as such. So you may want to fix out and see how you would be able to incorporate those into the documents as such.

And I don't know where you would do that, but I see sometimes you are talking about generalities and sometimes some very specific examples. It would be nice to actually have a bit more consistency among that. And

when you have specific examples, yes, I understand you need to go to specific examples. But when there are none, you can extend the focus of knowledge gap for those which could have a similar chemistry with the others.

DR. DODGE: Okay. Yeah. For DEHP, we only have a -- I believe it's just one noncancer REL for that compound. We don't have information or RELs for the other --

PANEL MEMBER GILL: No, I'm just using that as an example, but it could be any other chemical. Anilines for example you have some. You talk about specific 4,4-methylenedianiline are other compounds with similar kinds of chemistries, which will also fall into the same category.

DR. MARTY: This is Melanie Marty from OEHHA. I just wanted to clarify a couple points. So this document is really an integration of three already reviewed and approved documents. So some of the suggestions you're making are great, and we will really look into those and we can bring them forward as amendments to the technical support documents that we've already done, but we can't really add them to this document at this point, so -- but I am -- we will follow through with these comments.

The other issue is that the risk assessment only addresses a limited set of compounds that are on a list

that was created by the statute.

So, you know, some of the compounds, you know, which would be interesting to address, aren't on the list, so we don't address them. It's just the way the program works.

PANEL MEMBER RITZ: This is Beate Ritz. I just have a question about the third trimester estimate that you're using. So in all this risk assessment is the third trimester of pregnancy just dealt with like the age 0 to 2 or 0 to 1 or is there -- I didn't see anything. Is there any accounting of that there's a placental transfer? Because you're talking about breathing rates of the third trimester fetus, which sounds kind of strange.

DR. DODGE: It's the mother's.

DR. MARTY: This is Melanie, Beate. So those age sensitivity factors were in our technical support document that we did for cancer risk assessment in 2009. In that document is a very large appendix where we evaluated the data we had on potency by age at exposure largely from animal studies -- all from animal studies actually, and we used those -- we used distributions of potency by age to come up with these default policy age sensitivity factors to weight risk by age at exposure.

In that document, we discussed what to do about prenatal exposures. And we ended up deciding that the

highest risks in the animal studies were from exposures just after birth, which was equivalent essentially, crudely, to the third trimester in human development. So rodents are born a little more immature than a human is born. The data we had on prenatal exposures in rodents was -- well, first of all, we had less data, but it was also a little messy in terms of trying to figure out elevated risk for that time period. So we chose to not wait the first two trimesters in human.

As for the breathing rate, what we did was we took the -- for that third trimester, we took the breathing rate of the mother. So that's, you know -- the whole thing is, you know, as you are aware, trying to put a step function over something really messy.

PANEL MEMBER RITZ: Right. Yeah. No, that makes sense. It just reads funny when you have a breathing rate in the third trimester. It might help if you say it's the mother's.

DR. MARTY: Okay. We'll fix that.

PANEL MEMBER RITZ: And also I think whatever the exposures are in the first two trimesters probably have other types of effects more likely. Especially, in the first trimester, you're probably having a spontaneous abortion. So fetal loss, right?

And so, yeah, I think a third trimester is

probably appropriate, but then we get into the realm of reproductive toxicants rather than cancer.

CHAIRPERSON KLEINMAN: Beate, was there anything else?

PANEL MEMBER RITZ: No. Otherwise, I -- if you ever highlight something, don't use green. I had the hardest time seeing anything.

(Laughter.)

DR. SIEGEL: You're right. We'll -- if we use -- next time, we'll use a lighter highlight also.

PANEL MEMBER RITZ: Because I do read this while I travel a lot, and the lighting is not always optimal.

DR. SIEGEL: I apologize for that.

PANEL MEMBER GLANTZ: So this is Stan Glantz. I just had -- what you said, Melanie, about there's some other compounds that would be interesting that aren't in the statute. And I think, you know, there have been times in the Panel's history where we've asked for sort of prioritizations or discussions of things that are worth further consideration.

But, I mean, would it be okay to ask OEHHA to maybe put a little briefing together for us on, you know, what else ought to be getting considered, based on the current science? Because the law was passed a long time ago, and we know a lot more about stuff than whenever it

was passed. I mean, is that okay thing to do?

CHAIRPERSON KLEINMAN: I think that's good.

DR. MARTY: Okay. We'll have to work with ARB, who are the keepers of the information on what gets emitted into the air from stationary sources in California.

CHAIRPERSON KLEINMAN: I think it would also be useful to consider, you know, going forward, you know, how things are going to be changing over time as well, as we change different fuel sources and things like that. There may be different mixes that should be considered.

So I have very little else to add, but I do have a question, and it was just that I didn't -- I wasn't able to quite tease out how you're utilizing the data that's in Table 5.8 on page 5-30, where you're estimating breathing rates and point estimates based on activity levels.

And I was looking for some clarification of how you actually apply the activity levels? Are they a time-weighted average, or do you have someway of working that into the exposure equation?

DR. DODGE: You want me to ago ahead?

DR. SIEGEL: Yeah.

DR. DODGE: Well, as a default, we're recommending using the moderate intensity activities, breathing rates. However, if there's information that

suggests that the activity level, where the exposure is occurring, is less than that, then you can use a less intensity activities that result in low -- in lower breathing rates.

That's why we provided Table 5.9 to give an indication of the kind of breathing rates we're talking about, you know, comparing active working on a farm to just desk jobs. There's going to be -- you can use -- we're trying to apply or give some flexibility to this. It's sort of a risk assessment.

CHAIRPERSON KLEINMAN: So if someone were to be trying to make an estimate for, you know, a 24-hour day, they might be able to use a combination of these activity levels, say, during work hours, they have 8 hours at, you know, a relatively high level. And when they're sleeping, it's at the basic -- basal level.

DR. DODGE: Well, we have our annual breathing rates, which try to take all that into account. And this -- ideally, these 8-hour breathing rates would be applied to an 8-hour off-site worker, 8-hour kind of exposure. And it's dependent on how active they are, and which breathing rate you use.

We have all the age groups there, because we realized that there could be school exposures too. So we got the younger age groups there, as well as the

assumption that workers are going to be 16 to 70 in age.

CHAIRPERSON KLEINMAN: Great. Thank you. Are there any other comments from the Panel?

PANEL MEMBER GLANTZ: So I move we adopt or endorse or whatever the appropriate verb is the report.

PANEL MEMBER BUCKPITT: I'll second that.

CHAIRPERSON KLEINMAN: All right. We have a motion to approve the guidance document as submitted.

PANEL MEMBER GLANTZ: Well, subject to the minor tinkering and clarifications that people have been talking about, which typically the Chair could review on behalf of the Panel.

CHAIRPERSON KLEINMAN: So let's do a voice vote since Beate is on the phone.

PANEL MEMBER RITZ: Yes, I approve.

PANEL MEMBER GLANTZ: Yes.

PANEL MEMBER ANASTASIO: Yes.

PANEL MEMBER BUCKPITT: Yes.

PANEL MEMBER GILL: Yes.

CHAIRPERSON KLEINMAN: Yes.

So we informally approve that document. And thank you very much.

Because Dr. Ritz is going to have to leave the meeting sometime during the afternoon session, I'd like to move up the briefing on the California communities

environmental health screen tool, otherwise known as CalEnvironScreen, which was originally listed as topic number 3, but we'd like to move that up on our agenda and deal with that now, so that Beate can participate.

(Thereupon an overhead presentation was presented as follows.)

CHAIRPERSON KLEINMAN: So while Peter is passing that information around, we'll have a brief discussion of what the EnviroScreen is and how it's applied. And then we'll have an opportunity to very briefly discuss that. So let's --

OEHHA DIRECTOR ALEXEEFF: Good morning. I'm George Alexeeff, Director of the Office of Environmental Health Hazard Assessment. And I just have to say that for -- I know Stan knows this, but, you know, my first job that I had in the State service in 1986 was presenting carbon tetrachloride to this Panel. And I'd spent most of my working life presenting documents to this Panel. I was fortunate to be promoted and now I'm Director.

So I really appreciate the work of this Panel. It's been instrumental for, not only OEHHA, but also the Air Board and the State, if not the nation. A lot of important documents have been discussed by this Panel.

And, in part, because of that, because the Panel has provided us such great guidance on many issues that

the State has kind of broken through, like looking at children's health issues, dealing with a lot of very difficult subject matter chemicals, such as diesel exhaust and environmental tobacco smoke, we thought we should update you on this particular work that we've been doing, which isn't subject to SRP review, but it's something that has some interconnection with the types of things that we talk about or have been talked about by the Panel.

And this has to be this tool called CalEnviroScreen. And the tool is a project that we've worked for the Agency on. And it's one in which we are trying to better understand, well, what's referred to as the cumulative impacts on communities, not just the air impacts, but everything else that's in these communities, which often Designate themselves as environmental justice communities. And they have often petitioned the agency to look at their communities and to make changes in the practices of the Agency.

So that is a project that we've worked on. And I know that's something that issues that have come up related to that by, you know, over the years. And I also want to just note that early on, prior -- we'll be talking about version 2.0. Version 1.0 we had the benefit of Dr. Kleinman being on an academic panel, which advised us on this project, and actually made some very substantive

changes, which made the product much, much better.

We're not asking you to make substantive changes today, but we wanted you to begin to think about it, and to think if there's, you know, over time what would be -- you know, what kind of discussions we might want to have about this project.

So I will turn it over to Dr. John Faust, who's been the lead on this project for, I think, seven years or so. And there is -- this is something that the U.S. EPA has also been struggling with, as you might guess. And it's something that they took to the National Research Council and got some advice. And we were able to benefit from the advice the National Research Council gave U.S. EPA and incorporate a lot of those suggestions into our document.

U.S. EPA has not yet released their proposal yet, but -- anyway, so we wanted to brief you on that. I'll turn it over to Dr. Faust.

DR. FAUST: Good morning. Thank you. So I know this is something that's new to the group here, so I have a somewhat general presentation about the screening tool. I'm going to talk about -- a little bit about the history about where it comes from, that George mentioned already; how the tool is constructed, the data that go into it, show you some of the results, and then talk a little bit

about how the tool is being used.

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DR. FAUST: So the CalEnviroScreen tool, as George said, is a screening tool that's used to help identify communities that are disproportionately burdened by multiple sources of pollution and vulnerabilities.

The tool itself is made of 19 individual indicators that describe environmental conditions and population characteristics across the State. And the 2.0 version came out recently in August of this year, so that will be the version that I'll be talking about.

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DR. FAUST: So a little bit of the history. This originally comes out of a recommendation made to the California EPA by a group called the California Environmental Justice Advisory Committee. And they recommended that the CalEPA and OEHHA, in particular, develop guidance on this area of cumulative impacts. This idea that certain places, communities across the state face these multiple burdens of pollution, and vulnerability.

So Cal EPA incorporated that into its Environmental Justice Action Plan into 2004, and OEHHA, since that time, has led this effort to develop guidance in this area, and the CalEnviroScreen tool is the product.

One of the first things we did was to convene a work group of external stakeholders that met over several years and provided guidance. And one of our initial products from that effort was a 2010 document called *Cumulative Impacts: Building a Scientific Foundation*, which describes some of the scientific bases for concern for cumulative impacts, particularly in California.

And at that time, we also made the proposal to develop a screening method, which we could use to begin to identify these places across the State. So following that report in 2010, we initiated another process to develop the screening tool more fully. We continued to conduct meetings across the State getting stakeholder input. We did meetings over a number of -- in a number of different areas.

We took written comments. We had more than a thousand oral and written comments during that period through the summer and fall of 2012, released a revised draft. And then last year, we released an initial version, the 1.0 and 1.1 versions, which were conducted at the zip code scale of analysis.

As part of the process, we also received a lot of comments that we should be looking at a little bit more finer grain across the state. So over the past year, we have moved towards moving this analysis at the zip code --

or at the census tract scale, which is what I'll be talking about today.

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DR. FAUST: So I mentioned some of the bases for concern for cumulative impacts. And these are some of the lines of evidence that we're described in our 2010 report. Numerous studies showing that multiple pollution sources are disproportionately located in low income and minority communities. There's also studies that have reported communities with certain socioeconomic conditions have increased sensitivity to pollution. And it's this combination of multiple pollution exposures and increased sensitivity that can lead to concerns for cumulative impacts in these places.

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DR. FAUST: So when we were thinking about developing a screening tool as a beginning of a way to identify these places and form a basis for action, there were a number of features that we wanted to include. One is that we wanted to keep it relatively simple, or simple to the extent possible, partly so that we would be able to communicate the results easily. We needed to combine information from multiple media, different types of exposures, air, water, and soil. We needed data to represent different types of factors. And part of these

ideas come from a definition of cumulative impacts that was adopted by the CalEPA early on. But basically, they include exposures, environmental conditions, population sensitivity, as well as socioeconomic factors.

We needed to provide information at a roughly community scale. So this is a geography based assessment. And then it needed to allow for comparisons between different places, so that we would be able to see some of these differences.

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DR. FAUST: So these are what we're calling the four components of cumulative impacts that are broken into four -- two broad categories. Half of them relate to pollution burden, and half relate to population characteristics. So these are the sort of the definitions that we worked from for each of these four components that are incorporated into the model as indicators.

So the exposures, these are where people come in contact with pollution. Environmental effects, these are adverse environmental conditions caused by pollutants, such as environmental degradation, clean-ups and so forth. Sensitive populations, these are populations with biological traits that may magnify the effects of pollutant exposures. And then finally this new category, socioeconomic factors, are community characteristics that

may result in increased vulnerability to pollutants.

So in developing the screening tool we were thinking about each of these concepts and trying to incorporate each as we could into the overall model.

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DR. FAUST: So when we were developing the individual indicators, the 19 indicators that go into CalEnviroScreen, we, first of all, wanted them to provide a good measure of the environmental or socioeconomic conditions that fall into each of the components that I described. The pollution indicators were related to issues that were potentially actionable by the California EPA.

And then, of course, we had certain data quality requirements. The data were to be publicly available, provide good location-based information, so that differences could be discerned across the State. We needed statewide information, so that we could develop this statewide screening tool. And, of course, we wanted the data to be as accurate and current as possible.

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DR. FAUST: So this slide identifies all of the indicators that are in the current CalEnviroScreen 2.0 model. The four columns are the four components that I mentioned earlier, and they fall into the two broad,

pollution and population, groups that I also mentioned.

So the exposure indicators. So these are, for example, the PM2.5 concentrations, ozone concentrations in air, estimates of diesel PM emissions, drinking water contaminants, pesticide use, toxic releases, as well as traffic density.

Environmental effects, again this represents different types of environmental degradation, clean-up sites where there are legacy contaminants in different communities and brownfields, certain types of groundwater threats, impaired water bodies, solid waste facilities, including closed illegal and abandoned sites, as well as hazardous waste processing and generation across the State.

The population characteristics that we've included fall into these two categories of population sensitivity, as well as socioeconomic factors.

For sensitive populations, we've looked at the prevalence of children and elderly, asthma emergency department visits, as well as the rate of low birth weight infants.

And then the socioeconomic factors derived largely from census data, include educational attainment, linguistic isolation, the rate of poverty, as well as unemployment.

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DR. FAUST: So the scale of analysis is the census tract scale. This is a visual representation of the census tract boundaries from the 2010 decennial census. It's a relatively fine scale of analysis. There are about 8,000 census tracts across the State, so our goal here is to score each one of these with respect to each of the individual indicators.

There are about 4,000 people per tract with a range of 1,200 to 8,000 And this is a commonly used unit of evaluation that we've moved to in this version.

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DR. FAUST: Okay. So now I'll talk a little bit about how we developed the individual measures for each of the indicators I've mentioned. So, you know, data come to us in different forms. Some of it is tabular, some of it is vector based, and there's also spatial models that can be used.

PANEL MEMBER GLANTZ: What does vector based mean?

DR. FAUST: Basically talking about area designations, for example, you know, the perimeter of a clean-up site or a landfill.

So -- and I should be clear that we're taking data that come from a number of different sources. We're

not, you know, collecting new data ourselves, but we're finding ways to analyze it that represent it at the census tract scale.

So we do summarize each indicator. For example, each census tract is assigned a PM2.5 concentration. And each one required some unique methods for approaching, either by spatial modeling, averaging, summing numbers of sites, and then intersecting with census tracts to come up with a score for each.

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DR. FAUST: So for each indicator, each census tract is assigned a percentile value based upon where it falls in the statewide distribution. So, for example, if we have a measure of PM 2.5 concentration across the State, we look at that distribution across all 8,000 census tracts, and then we give a percentile score based upon where an individual census tract falls in that distribution.

So, for example, 90th percentile means that a census tract has higher concentrations than 90 percent of the other census tracts across the State.

So the equation on the bottom just describes generally how we combine that information together. So we use each of these percentile scores for each of these individual indicators, first combining all those that are

related to pollution, and then also combining those that are related to the population characteristics, and then renormalizing them on a 0 to 10 scale.

We use the product of those two up to 10 for each group, to come up with the overall CalEnviroScreen score with a maximum possible score of 100. And that gives us a way to look across the State at the distribution of the overall CalEnviroScreen scores.

So I did include just a couple of indicators just to sort of walk through how we created the individual percentiles

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DR. FAUST: So, for example, with pesticide use, pesticide use data come to us from the Department of Pesticide Regulation. They have very extensive pesticide use reporting in California.

The indicator that we've developed here is the pounds of selected production agricultural use active ingredients per square mile for the years 2009 to 2011.

PANEL MEMBER GLANTZ: What's the picture? It's very hard to see.

DR. FAUST: Oh, yeah, it is a little hard to see. It's essentially the grid of pesticide use data. The data come to us from the grid that's the public land survey system. So this is a one-by-one mile grid across the

State. So the data come to us from the Department of Pesticide Regulation, and we have uses of these pesticides within those grid cells.

So here, as I said, we used selected production agriculture use ingredients. And we took the subset of pesticides that were either designated as high or moderate toxicity under the SB 950 process or were on the Prop 65 list of carcinogens or developmental and reproductive toxicants.

And then we also considered volatility, with the idea that those pesticides that are more volatile would be more likely to be associated with exposures. So that resulted in a paring down of the full list of pesticides to 69 total pesticides that are considered here.

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DR. FAUST: So what we had to do, here's a blowup of the public land survey system. So these are the one square mile grid cells that you see that we get the data in. The rough horizontal boundary is dividing two census tracts, Tract A and B. So we overlay that on the grid cell, so we use an area apportionment method to associate individual public land survey system sections with the tracts and then come up with an overall weighted pesticide value for the tracts, summing all of the individual grid cells together. And then we did the average over three

years, but for each census tract.

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DR. FAUST: So when you look at the results, you see something you probably would expect. This is a map showing the San Joaquin Valley with Fresno in the upper left center. As you would expect, the pesticide use values are very high in the agricultural communities that surround those areas, and relatively low in the urban areas of Fresno, for example. But we have results available in this form across the State.

So these -- the raw values that you see for the color codes are the numbers themselves for the amount of pesticide, but the colors are broken down into deciles. So these are the 10 percentile groups for the overall --

PANEL MEMBER GILL: Are these available on your website or is it available through Pesticide?

DR. FAUST: The results here?

PANEL MEMBER GILL: Yeah.

DR. FAUST: The results here are available through our website for each of the individual indicators we have.

PANEL MEMBER GILL: Are you going to show the website at the end?

DR. FAUST: Yes.

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DR. FAUST: Okay. So this is a second example.

PANEL MEMBER GLANTZ: So you had moderately high levels it looked like up in the Sierra foothills, in the mountains. Is that stuff blowing up there or is it being used?

DR. FAUST: Well, there may be some uses. For example, we do include uses that are associated with timber production. I couldn't tell you exactly where. Some of the tracts are very large in that area, because they're relatively sparsely populated, but, you know, it is part of the set that we included.

Okay. So the second example, so this is clean-up sites. So, as I said, these are the -- you know, the legacy contaminant sites, the brownfields across the State that are -- with information maintained by the CalEPA's Department of Toxic Substances Control.

So we took data from the Department of Toxic Substances Control, as well as the U.S. EPA National Priorities List for Superfund Sites. And here, because these are site specific, we essentially constructed an index based upon a weighted sum of the number of sites within the census tracts that are near where people live. So each site is given a score based upon its site type and status, where things like the Superfund sites, which are, you know, the greatest concern and the most active, are

given a higher score, and smaller sites are given smaller scores, particularly if they're nearing completion.

So we did an adjustment based upon proximity to where people live using the U.S. Census Bureau's populated block data. So this is a subset of the census tract data. And we also incorporated information where we could when we knew the perimeter, for example, of a site. For example, we had Superfund site boundaries, as well as a few other site boundaries that we were able to incorporate.

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DR. FAUST: Here's just an example of the -- sorry, the colors are a little pale, but the dark lines represent census tract boundaries. And then those points, or that dotted line polygon that you see on the left represent the perimeter or the -- perimeter of a site or the point location for a clean-up site.

And what we did is we applied a proximity adjustment, so that as sites are farther away from where anybody lives, they counted less towards the overall score author that census tract. And if they were beyond, here for example, one kilometer, they didn't count at all towards that tract score.

So what we did is we took these adjusted weights and we added them together to come up with a tract's

weight, or overall score for that individual indicator. And then again, we did calculate percentiles looking at the distribution across the State.

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DR. FAUST: So here's a map of the greater Los Angeles area for clean-up sites. The green dots represent individual sites within this area. And then the darker reddish colors are scaled according to the overall score for that indicator. And you see they match up closely with where these sites occur. And you can see certain corridors, for example, the corridor down to the Port of Los Angeles and Long Beach, with a number of tracts, many in the southern central part of Los Angeles, and certain other areas across that area. So that's another example

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DR. FAUST: Okay. So we take each of these individual indicator scores, and then we combine them together to come up with the overall CalEnviroScreen scores. And we've all along made these data available in a number of different formats. We have, of course, the report itself that describes the indicators, the rationale for its inclusion, where the data were obtained from, how we did the calculation, what metric we chose, you know, and referenced that accordingly.

But we also make the information available in a

number of other different ways. We have a mapping application, which is an online tool that allows you to go to any particular place across the State, searchable, click on it, and see the census tract, and look at what -- how any individual indicator scores with respect to the overall CalEnviroScreen score, as well as its individual indicator scores. We also provide race/ethnicity information for the tracts as well.

We make the data available on an Excel spreadsheet, so all of it can be recalculated or reanalyses could be done by anyone who would be interested. We have Google Earth files another way to look at it spatially, and then ArcGIS databases are available as well.

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DR. FAUST: So this is just a screen capture of the online tool and the website that it's available at. This is the overall CalEnviroScreen results. So this is the combination of all 19 indicators across the State. I do have some zoomed in areas. And as I mentioned, the pop-up. When you click on an individual census tract, it allows you to see the individual scores. And each of the indicators is hyperlinked, so it will take you to that part of the report where it's described and you can see the detail, as well as maps showing the individual

indicator results across the State.

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DR. FAUST: So again, here's the overall statewide results when you look at the CalEnviroScreen scores. Just some broad operations are that we do see a lot of communities identified in the San Joaquin Valley in particular, particularly on the eastern side, as well as large parts of the greater Los Angeles area --

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DR. FAUST: -- which is represented on this slide. We see high scores in central and south central Los Angeles extending down along the corridors to the ports overall, reflecting that combination of pollution and population vulnerability. A large number of communities in the Inland Empire, San Bernardino, and Riverside, as well as certain parts of the San Fernando Valley as well.

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DR. FAUST: This is the Bay Area. We see high scores in certain parts of the East Bay, in particular the Richmond area where there's a concentration of refineries, as well as the Hegenberger Corridor and certain parts of East Oakland and West Oakland as well where the port is.

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DR. FAUST: San Diego, we pick up neighborhoods

along the bay, south of the downtown area.

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DR. FAUST: And then here's a blowup of the San Joaquin Valley. Again, where we see high scores, many on the eastern side along the Highway 99 corridor.

--o0o--

DR. FAUST: And then the Sacramento area.

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DR. FAUST: Okay. So just a few words about the uses of the tool. So when the tool was developed, it was primarily envisioned as a way of -- for the agency to prioritize its resources to direct them to those communities that are most burdened by multiple sources of pollution and vulnerabilities.

So it's considered to be an aid to ongoing planning and decision making within the Agency. It's being applied as part of the criteria for the selection of environmental justice small grants in that program. There is an Environmental Justice Compliance and Enforcement Taskforce that is also making use of the information, as well as for the prioritization of site clean-up activities.

The California Strategic Growth Council has adopted use of the CalEnviroScreen results as part of their criteria for scoring environmental -- or sustainable

communities planning grants.

And then a process that we've been through more recently is a result of Senate Bill 535, which requires that proceeds from the greenhouse gas reduction front, the Cap and Trade Program, be spent in communities that are identified as disadvantaged by certain geographics, socioeconomics, public health, and environmental hazard criteria.

And recently, the CalEPA made a determination that the CalEnviroScreen tool was a suitable way to identify communities by those criteria, and identified 25 percent of the census tracts in California, by the CalEnviroScreen score, as disadvantaged for that purpose for receiving proceeds from that program.

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DR. FAUST: So these are all the contributors. You know, of course, we rely on, you know, our other sister boards and departments in CalEPA for data. Data come to us from U.S. EPA and other sources, Census Bureau. We have a great team and we've had a number of stakeholder processes that have been very valuable to us in moving this forward, and they're all identified on this slide.

So I think, at this point, we'd be happy to answer any questions, and then move to the discussion item.

CHAIRPERSON KLEINMAN: Well, let's open it up to Panel discussion. Should we -- look, why don't we just go around the table and start with that.

PANEL MEMBER GLANTZ: Well, I'm impressed.

(Laughter.)

PANEL MEMBER GLANTZ: I don't really have much to add, but it's really -- I've done a little of this kind of work in my research, and this is really hard. And I think you guys have done a great job of pulling together a very diverse set of resources in a way that's going to be very informative. So I don't have anything, other than being impressed.

(Laughter.)

PANEL MEMBER ANASTASIO: I second Stan's impressiveness of the project. It's really great. It's a nice tool. I've looked at it online. I guess it was version 1.0 previously. And I can definitely see using it in my teaching.

I had one question. For all these categories in terms of the pollutant exposures, you simply sum them, right? There's no thought that, you know, PM2.5 is more dangerous than ozone. It's simply the percentile summed across all the categories?

DR. FAUST: That's essentially correct. We do -- so for the 12 indicators that fall into the pollution

burden side, you know, we have a set that are related to exposures and a set that are related to, what we call, environmental effects or conditions. So the percentiles are averaged across that group. Although we did apply, you know, what we're calling a half-weighting to the environmental effects indicators that reflected concerns that some of those things, like the site clean-ups are a little bit more upstream from the more overt types of potential exposures that you see with air pollutants and with certain pesticide use, for example, and traffic pollutants.

But among those exposure indicators, we did not weight, for example, PM differently from ozone. Although, we're open to having discussions about how we might go about doing that.

PANEL MEMBER ANASTASIO: I think it's a hard question, so I think your approach is a good place to start.

DR. FAUST: Yeah. And something I do want to add is that, you know, this tool is something that is going to be revisited in terms of updates. So we do expect that there will be future versions with again more current data added. And we expect to have, you know, a process where we discuss different options for, you know, how we weight the indicators, how one might go about making adjustments

to the model.

PANEL MEMBER ANASTASIO: Right. I think the other question is for each, say, pollutant, it's simply a percentile of the range that you see in the State. And so I could imagine maybe for some pollutants, like ozone, tends to be more of a problem say than PM2.5. Although, that's certainly also a problem.

But I guess my comment is, you know, you can imagine these histograms of exposures. And some of the histograms may go well above the max, whereas another histogram may not go as far above the max. But in terms of the percentiles, the highest exposure in each is simply given, you know, the highest value, irregardless of whether it's well above a standard or not.

DR. FAUST: That's correct. I mean, we started with this relatively -- relative scoring system, so that it is distributed across the range of observed values. And we didn't -- we didn't incorporate any particular threshold for what it would take to score high.

PANEL MEMBER ANASTASIO: Yeah. I mean, unfortunately, in the State we have very high concentrations of ozone and PM2.5 for -- so for now it works fine, but I could imagine a case in which maybe you have an indicator where the distribution is not that bad actually. The highest level there is not that bad. And

so maybe at some point you could weight things by their concentration relative to some standard.

But I think it's a great tool. That's great.

PANEL MEMBER RITZ: So this is Beate. I'm wondering how did you estimate those PM2.5 concentrations? Is that a Kriging Process you use for the whole state to get the census level or what did you do?

DR. FAUST: Yes. And I should say this work was done by the Air Resources Board. They used their air monitoring network data, and collected both the ozone and the PM2.5 data. So across those air monitoring stations to estimate in between, they did use awe Kriging Approach to get the values that were estimated for between the air monitoring stations.

If the estimate was -- or if the centroid of the census tract was more than 50 kilometers from the monitoring station, those weren't considered reliable, and those were excluded from our analysis. So there are some gaps still.

PANEL MEMBER RITZ: So do you describe these on your website?

DR. FAUST: Yes. Those are described in the individual indicator write-ups in the overall CalEnviroScreen 2.0 report that is available.

PANEL MEMBER RITZ: Great. And you said you want

to update those. So this is going to possibly become an annual kind of exercise or you don't know?

(Laughter.)

OEHHA DIRECTOR ALEXEEFF: Hi. This is George Alexeeff. So the actual timing for the update is -- you know, hasn't really been set. But, you know, some of the data are updated annually, in terms of like the pesticide use reports comes out every year. So that could be updated annually. Some of the data are not updated annually. But in any case, for the purpose of the Agency, we wanted to have a certain amount of stability in what we're identifying as a disadvantaged community.

So at this point, we were thinking somewhere around every two years to update it, but it hasn't yet been decided, but it will be updated on a regular basis.

And similar to that, we're also trying to think through a way of -- this is a relative scale, so it's not looking at changes over time, since it's relative. But our thought is to also think through how to develop a scale, which we could look at changes over time as well.

PANEL MEMBER RITZ: Right, because if you just use percentiles, you can't really compare across timelines, right?

DR. FAUST: That's correct.

PANEL MEMBER RITZ: Yeah.

CHAIRPERSON KLEINMAN: Alan, do you have any?

PANEL MEMBER BUCKPITT: Nothing new to add, but it is a very nice tool that I'm sure took a lot of thought and effort to put together, and I think will have some quite positive impacts.

PANEL MEMBER GILL: I would congratulate you. This is really useful. And I've got a couple questions. To me, it looks like it's a more reactive tool than a predictive tool, because you're getting your response. So I want to come to the predictive aspects of the things, which is to me is not there, but would be very useful.

Although it basically validates what the environmental justice groups have been saying to some extent, that it is -- that the risks exposed are higher in areas of poorer areas of the communities as such.

So my question is, how would you be able to use this tool to ameliorate or attenuate the environmental exposures that these communities get through? Because if I look at some of the markers that are used are going to be very difficult to change. For example, changes like clean-up sites, groundwater contamination, all that, they are not going to change. So even though if you try to ameliorate or attenuate those areas, you're not going to see any changes that occur.

So that's where I want to come to the next

question, because I do not see how you -- am I correct or not in that assumption?

DR. FAUST: Well, I mean, I would say there will be some changes. I mean, for example, sites do get cleaned up, and they fall off the list. And as a result, communities will look better here and there. And, you know, for example, the Air Board's, you know, diesel reduction program has resulted in significant decreases in emissions in certain parts of the State that would be captured with a -- you know, a snapshot over time.

So I'm not sure I have -- I'm going to have a satisfying answer for you about how we can expect things to develop over time. But I think, you know, partly we wanted to capture this snapshot, just so we have information about, you know, where these places are that exist across the State that do have these multiple burdens and think about, you know, how we can incorporate that into decision making moving forward.

PANEL MEMBER GILL: I'm going to be a bit more pessimistic, because in the sense that these things do not change, it's because the issue of -- the actual issue of economic status of a particular community that changes. If you look at -- it's just the same issue that happens with countries that are underdeveloped versus developed. It's a very complex issue. It's not easy to change.

But I want to suggest one thing that to use your grant program, which is through this issues which are going to SB 535, is if you could use some of the funds that come down there to actually assess actual exposure risks in the population. And that can be done through using of newer tools, which will actually indicate -- and I'm talking of using high throughput genomics approaches and all that to identify what are the risks that people are exposed, because actually the costs could be relatively small. You may want to pilot and see if you want to say they're a very high risk population here and say we want to look at what kinds of molecular markers that are in this population versus another population. Can you actually develop and assess that that is possible to do it?

And if you are, then you may be able to have a bit more proactive way of trying to evaluate what are the overall risks that you have and actually developing a science-based approach to coming to some tools that you can develop in the future. And it may not take much, but you may use it in a directive way to doing some research that could be very useful in the long term, and it would be useful if we can push or nudge some people through that, as seed funds, and then they can get funds from other places to be able to do that.

CHAIRPERSON KLEINMAN: Thank you.

I was, you know, thinking more in terms of where this could go in the future. And there are a couple of things that might be useful to consider as additional indicators. One of them would be the effects of meteorology on individual sensitivity. So perhaps something like a temperature humidity index could be adapted into it, because heat stress can, you know, really be a big effect modifier.

And then looking at the sensitive population indicators, they're very highly skewed to children, which is fine. I think that's great. But I think we have other vulnerable populations like people with preexisting heart disease, and possibly obesity as being an effect modifier, so things like that could be looked at for future iterations.

And then I was just thinking that, you know, we've -- you know, you've set this up and I think it's very elegant that you end up with this scaling factor. And it's fairly easy to understand and figure out. But it might be useful, if it hasn't been done already, to do some sort of sensitivity analysis and see if any of the factors are overweighted in developing the scale. And it might be possible in the future to have a more level playing field and still end up with something that's a

relatively useful and adaptable screening tool.

But I'm very impressed with the idea that you can put this together and get, you know, these maps and get some idea of what's going on on a population basis. So I congratulate you on that.

Are there any other -- oh, George.

OEHHA DIRECTOR ALEXEEFF: I have a couple more comments. First of all, I want to -- you know, many of the comments you said are actually insights that we've been struggling with. You know, so you've kind of like, you know, focused here and there. Yes, we know. We've been thinking about that. John has been very quiet like, you know, like just starting -- you know, like on the weighting of the different factors, and weighting the different indicators and how do we -- we've had a lot of comments about that. And, you know, if you look at what indicators we chose, you could say, well, we actually weighted it towards air pollution, because there's a lot of air pollution ones.

So a little bit has to do -- and Stan could have pointed this out if he wanted to, is that, you know, we've used data that's available, so therefore we've weighted it on that. And we actually developed the drinking water indicator, because there -- you know, there wasn't a similar system for drinking water as there is with the Air

Resources Board. So we actually worked with the health department and used a lot -- and also UC Davis and developed an indicator which we think is kind of like a first cut. It's helping us with an understanding of who's drinking what water and what is in the water.

So that is something that is clearly going to be developing over time, because it's actually how -- where our water comes from is actually more complicated than I ever believed, and I'm sure John every believed, so we had several people working on that. And, of course, with the issues of the drought, that's going to become more of an issue, I think. So that's something.

In terms of the meteorology, temperature index, that's actually a good one for us to think about, and see how to incorporate that. We did think about that early on and then we were directed to look elsewhere.

So -- and the -- in terms of the preexisting disease. So that is actually one indicator that we wanted to work on for heart disease. We have the data now from the health department. We have to kind of analyze it and see if we can put it into this same format. And it's interesting, the health data is -- we're embarking on a project with the health department to try to improve the health data information, because that is actually a limitation in some of this, because there's obviously the

issue of censoring data, so that it doesn't really apply to any individual. And when you get to census tracts where there's very small numbers, that is an issue, so we have to figure out some sort of a modeling technique. I don't know if I'm using the right term, but someway, so that it's not clear, you know, if there's an unusual, you know, incidence of disease in a census tract that people don't know who we're supposedly pointing to.

So there's some issues like that that we're working with, which are, you know, technically challenging and interesting for the staff to work on.

And also as I mentioned on the children, the children adult -- or aged indicator we have is actually one that we've been trying to figure out how to improve, because we feel it's not really getting at exactly what we want to get at, and possibly, you know, looking at the types of diseases that occur in those, in either the elderly or the children is a better indicator for us. So we're trying to think about that. And so that's part of the asthma incidence. But you'd think -- you know, the asthma rates -- or asthma ER information that we have is what we think is the best data that's out there, but we're trying to improve it, because it's really -- it has a lot of limitations because if you're not near an emergency room, like a lot of the, you know, parts of the State that

are not as heavily populated, you may have severe underreporting.

So there's a lot of issues like that that we're struggling with. But we find that, you know, this has been very helpful for the Agency to understand -- better understand the State issues. And when we started, we didn't realize the environmental justice communities that had made most of their comments to the Agency early on were mostly from the urban areas, and not from the valley. And now, a lot of the valley groups are -- feel they now have information that they didn't have before and are now coming forward as well. So that's actually very helpful.

And I also look at this project as when we first presented to the SRP the concern about children, which is actually part of a statutory change that occurred, that resulted in a lot of research about children that we are now incorporating into this -- to the technical support documents.

And we're hoping, as you were suggesting, this will result in additional research understanding the addition vulnerabilities of these individuals and why and how we can actually estimate them, because I think it's a very early stage of understanding, you know -- like, we can look at some of your studies, Dr. Kleinman, where you look at, you know, different pollution studies, you can

see certain subgroups might pop out as reporting a higher incidence of some response.

You know, maybe there -- those that are not as well educated, or something like that, or a certain ethnicity. But how do we actually start to understand that better. And I'm hoping this will create much more research in this whole area. So I thank you for your comments.

CHAIRPERSON KLEINMAN: Okay. Thank you very much. All right. The next item on our agenda is a review of the reference exposure levels for toluene diisocyanate and methylene diphenyl diisocyanate.

These will -- you know, we'll be receiving a briefing on them this morning, and we'll actually have a formal review of these at our next meeting in December. So there will be no vote on these today. We'll just be listening to the discussion and then perhaps have a few questions.

(Thereupon an overhead presentation was presented as follows.)

DR. SIEGEL: While Daryn is looking for the slides, I just wanted to say that you haven't received the document yet. You should --

PANEL MEMBER GLANTZ: I'm glad because I was wondering where was it? I thought I'd lost it or

something.

(Laughter.)

DR. SIEGEL: Yeah, I thought I'd have it today. But you should -- we should have it in the mail by tomorrow night, and you hopefully will get it by Friday for your review.

PANEL MEMBER GILL: I'm glad I didn't get it yesterday. Otherwise, I would have to carry it all.

(Laughter.)

DR. DODGE: Here it is.

Okay. This is an introduction to the non-cancer reference exposure levels for toluene diisocyanate, which I'll refer to as TDI, and methylene diphenyl diisocyanate, which is -- which I'll refer to as MDI. We went through a comment -- or a public review already. And we are just about done with our comments and responses, so you'll be getting this material very soon.

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DR. DODGE: So let's talk about TDI first. TDI is a monomer used in flexible polyurethane foams, adhesives and coatings. It's a very high volume compound. TDI polymerizes to form long chains, and that's how the polyurethane is formed.

It's volatile with a vapor pressure of 0.023 millimeters mercury at room temperature. So you're going

to mainly find it as a gas or a vapor in the atmosphere. It has highly reactive isocyanate groups, which react with lung tissue and macromolecules you'll find in the lung lining fluid when it's inhaled.

It's also known as one of the most potent low molecular weight sensitizers. In other words, a number of exposure to workers in the field with this compound will result in them being sensitized, such that subsequent exposures at very low levels - we're talking a part per billion or even less - will result in an asthmatic response.

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DR. DODGE: A brief overview of the toxicity. Acute exposure in animals and humans. You see sensory irritation; eye, nose, throat irritation; pulmonary irritation and tissue damage, which is dose dependent. If the acute exposure is high enough, you see airways hyperresponsiveness, which is asthma like, but doesn't fit all the definition of an actual asthma response.

With chronic exposure, it's a sensitizer via lung and dermal exposure. Again, it's one of the best known occupational asthmagens around for low molecular weight compounds. With chronic exposure, you can see bronchitis, rhinitis, and conjunctivitis.

It's also found to cause an accelerated decline

in lung function in the absence of asthma. And this is often measured by FEV1 a forced expiratory volume in one second.

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DR. DODGE: Now, our draft acute REL --

PANEL MEMBER GLANTZ: What about does it -- so you just said that this has a sensitizing effect. So how come you looked at the non-sensitized people here rather than the sensitized people? Because people who are going to be repeatedly exposed presumably would get sensitized.

DR. DODGE: Um-hmm.

PANEL MEMBER GLANTZ: Are you going to get to that?

DR. DODGE: I may be getting to that. Yeah, but we have -- from the data, it's very difficult to find a level where you can protect all people from sensitization. We had a -- we were better able to find NOAEL LOAELs for effects on lung function that weren't necessarily due to sensitization. Is that what you were looking for?

PANEL MEMBER GLANTZ: Well, what I was thinking -- what I -- well, not quite. What I was thinking about was the slide you had up before, you were talking about effects in unsensitized people. And rather than trying to say okay what levels of exposure would it take to sensitize people, the question I was asking is why

weren't you looking at effects in sensitized without worrying about how they got sensitized? Why weren't you looking at effects of exposure to sensitized people, since you're saying the levels of exposure it would take to trigger an event are way lower in the sensitized people?

DR. DODGE: Okay. I understand. Yeah, for the 8-hour and chronic RELs, we are trying to protect from sensitized people as well. We base it on a different endpoint, you know, accelerated decline in lung function.

However, what we will -- as you'll see in the document when you get it, we also try to say that this level is low enough, once you apply all the uncertainty factors and such, it should protect most, perhaps all, people who are already sensitized. So we are trying to incorporate sensitized individuals as well.

PANEL MEMBER GLANTZ: Okay.

DR. DODGE: Okay. The acute REL that's based on a human study. An early German study, they found that with normal subjects, 50 parts per billion and above would result in sensory irritation. These were again acute studies, about 30 minutes long.

In a later -- in some later German studies, they looked at asthmatic responses in non-sensitized human asthmatic subjects and saw effects at 10 parts per billion and above with exposures for one hour. The effect that we

are using for our acute REL is a greater than or equal to 100 percent increase in airway resistance. This was seen in one in 15 asthmatic subjects at 10 parts per billion, and another one at 20 parts per billion.

In addition to this, they also saw subjective responses, some sensory irritation, as well as chest tightness. So we're not completely relying on this actual number.

They did see in 5 individuals, 5 out of 15, there was an increase in airway resistance between 50 and 100 percent.

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DR. DODGE: The 8-hour and chronic RELs, this is based on a worker study by Diem et al., in 1982. It is updating a chronic REL we have currently. And the 8-hour REL will be new, because that -- those are relatively new.

The Diem study is a five-year prospective study in 277 workers. There's detailed longitudinal analysis of the workers from the start of exposure in a new TDI production facility. Lung function was measured a number of times over the five-year period from the start of employment. They did see a sensitizing incidence of 12 out of 277 or 0.9 percent per year.

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DR. DODGE: Okay. Well, now we'll talk about

MDI. MDI and polymeric MDI is used mainly to produce rigid polyurethane foams, as well as sealants and some of the other uses that I mentioned for TDI. Now, polymeric MDI is generally made up of about 50 percent MDI and 50 percent partly polymerized MDI, usually most dimers and trimers.

It has a much lower vapor pressure than TDI. So in the atmosphere, you're going to mainly see it as an aerosol or a particle. Because of the low vapor pressure, the exposure is largely due to spraying applications, where you aerosolize the compound or with heating. There seems to be a more -- a greater dermal concern in workers, because there isn't as much inhalation here as with TDI.

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DR. DODGE: The toxicity of MDI is qualitatively similar -- or the toxicity of MDI is qualitatively similar to TDI, in that you see with acute exposure irritation of the lungs, and upper respiratory tract with symptoms including headache, sore throat, cough, and chest tightness.

In animal studies, you see respiratory epithelial damage, pulmonary edema. This is in the upper and lower airways as well. If exposure is high enough, you see reactive airways dysfunction. This is again rats. It's asthma like, but it doesn't fit the definition of asthma.

With acute exposure, just like TDI, you see sensitization, occupational asthma with a latency period. This is also true of TDI. And MDI you also see hypersensitivity pneumonitis. This is actually fairly rare, but you see it more often with MDI exposure than with TDI exposure.

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DR. DODGE: So the acute REL is based on MDI rodent inhalation study. The critical effect was increased total protein in the bronchiolo-alveolar lavage fluid in female Wistar rats.

These are 6-hour exposures. Increase in protein occurred three hours post exposure. From this study, we had know NOAELs. We are using the LOAEL of 0.7 as the point of departure. We tried benchmark dose or benchmark concentration modeling using U.S. EPA models. And we couldn't get it to work with this data. The continuous model tends to be a bit finicky with the way the data was presented.

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DR. DODGE: And the 8-hour REL is based on a PMDI rodent inhalation study. The critical effect is increased incidence of bronchiolo-alveolar hyperplasia. And there was some pulmonary fibrosis seen as well. This is a reexamination of the Reuzel study by Feron, so we're

actually using the data by Feron et al., here.

And it's a two-year study in adult female Wistar rats, 60 per group. Exposure is six hours per day five days per week. So the six hours per day is pretty close to kind of a 8-hour REL, what you'd want to base an 8-hour REL on, which is intermittent exposure eight hours per day.

The NOAEL -- this is the data presented here. The NOAEL is 0.19 milligrams per cubic meter and the LOAEL is the 0.98.

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DR. DODGE: Now, there was another chronic study out there that Feron also looked at. In fact, he took the original study here for -- that we basic the chronic REL on by Hoymann et al., as well as the Reuzel et al., data and compared the histopathology side by side these two studies using the same pathologists, so you get a more consistent comparison between the two studies.

The critical effect here was increased incidence in severity in interstitial fibrosis. And there's no NOAEL for this study. It was -- as you can see from the data down below, the lowest dose of 0.23 was quite high. We had 80 animals per group here. Exposures were 18 hours per day. That's why we chose it as the chronic -- for the chronic REL, because it's closer to kind of a continuous

type exposure that the chronic REL is.

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DR. DODGE: So the next steps here is OEHHA has received public comments and developed responses. We're just about done with them. OEHHA has revised the document in response to public comments. The Panel will receive three things here, the review draft of the document, the public comments that came in, as well as OEHHA's response to those comments.

So we'll go -- I'll go into much greater detail how we derived the RELs when we go -- when we're at the next SRP meeting here on December 12th.

So that's all I have.

CHAIRPERSON KLEINMAN: Okay. Thank you.

We can just briefly see if there are any other comments from the Panel?

This was strictly an informational attempt at this point. And at our next meeting on the 12th of December, Dr. Buckpitt and Dr. Gill will be taking the leads on the discussion of the actual documentation.

So I think that the only consideration of administrative matters that we have will be to formally schedule our next meeting, which I believe is slated for December 12th.

And on that note, I would entertain -- if there's

no further comment, I'd entertain a motion to adjourn.

PANEL MEMBER GILL: So moved.

PANEL MEMBER GLANTZ: Second.

CHAIRPERSON KLEINMAN: All in favor?

(Ayes.)

CHAIRPERSON KLEINMAN: Okay. Thank you all very much. This meeting is adjourned.

(Thereupon the California Air Resources Board, Scientific Review Panel adjourned at 12:10 p.m.)

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

I, JAMES F. PETERS, a Certified Shorthand Reporter of the State of California, and Registered Professional Reporter, do hereby certify:

That I am a disinterested person herein; that the foregoing California Air Resources Board, Scientific Review Panel meeting was reported in shorthand by me, James F. Peters, a Certified Shorthand Reporter of the State of California;

That the said proceedings was taken before me, in shorthand writing, and was thereafter transcribed, under my direction, by computer-assisted transcription.

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

IN WITNESS WHEREOF, I have hereunto set my hand this 17th day of November, 2014.

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