BEFORE THE

CALIFORNIA ENERGY COMMISSION

In the Matter of,	)
	) Docket No. 10-BSTD-01
Draft 2013 Building Energy Efficiency Standards Revisions	)

Draft 2013 Building Energy Efficiency Standards

Revisions for Residential Buildings and General Requirements

CALIFORNIA ENERGY COMMISSION

HEARING ROOM A

1516 NINTH STREET

SACRAMENTO, CALIFORNIA

FRIDAY, OCTOBER 14, 2011

9:03 A.M.

Reported by:
Kent Odell

Commissioners Present

Karen Douglas

Commission Staff Present:

Mazi Shirakh
Martha Brook
Gary Flamm
Patrick Saxton
Leah Lentz
Danny Tam
Jeff Miller
Dave Ware
Bruce Wilcox, consultant

Also Present (*on phone):

Mike Gable, Gable Associates
Mike Thompson, CBPCA HERS Providership
Tom Garcia, CALBO
Ken Nittler, ENERCOMP
George Nesbitt, Environmental Design /Build CalHERS, Passive House California
Erik Emblem, Joint Committee on Energy and Environmental Policy
Jon McHugh, McHugh Energy
Avery Kintner, Empowered energy
Nehemiah Stone, Benningfield Group
John Steinberg, EcoFactor
Dan Varvais, Bayer Material Science
Mike McGaraghan, Energy Solutions
Yanda Zhang, Heschong Mahone Group
Eric DeVito, Cardinal Glass Industries
Mike Fischer, Kellen Company
Jim Francisco, Sierra Consulting
*Roger LeBrun, Velux America
Gary Talbott, Five Star Performance Insulation and the Spray Foam Alliance
Michael Morgan, Performance Foam Tech
Rick Peterson, Eagle Roofing Products
Frank Klink, 3M
André Desjarlais, Oak Ridge National Laboratory
Sarah Deukmejian, ACS Building Products
Ed Osann, NRDC
Pat Eisler, PG&E
Abhijeet Pande, Heschong Mahone Group

Bob Raymer, California Building Association
*Elizabeth McCollum, Heschong Mahone Group
Cathy Chapelle, Heschong Mahone Group
Reed Hitchcock, the Asphalt Roofing Manufacturers Association
Eric Banks, BASF Corporation
Mike Hodgson, ConSol for CBIA

I N D E X

I N D E X

P R O C E E D I N G S

OCTOBER 14, 2011 9:03 a.m.

COMMISSIONER DOUGLAS: Good morning. Welcome to the Building Energy Efficiency Standards Committee Workshop on the standards. Today we are going to cover a busy agenda, focusing primarily on the residential sector and I'll ask staff to get us going here.

MR. SHIRAKH: Okay, Commissioner Douglas. I'm Mazi Shirakh. So the presentation today, the topics in the morning are going to be mostly the administrative sections of the standards which are common to both res and non-res, definitions and then, after that, we'll get into the residential sections 150.1 and .2 and then we'll finish this afternoon with a brief discussion of the REACH standards. So the presentations today will go back and forth between myself, Gary Flamm, Patrick and Martha.

So we'll start with—so this is the schedule for the remainder of the proceedings. From here on out, November 3 is going to be preparing the express terms like ISOR, NOPA and EIR and the forms 399 and I guess the dates that are of most significance is the efficiency hearing scheduled for January 9. That would be to hear the 45 day language and the 15 day language is going to be followed on March 14 and adoption at a

Business Meeting on April 4.

With that I'm going to turn this over to Gary Flamm who is going to do the definitions.

MR. FLAMM: Excuse me. Good morning. First we are going to cover the proposed changes in Part 1, the Administrative Code, Section 10-102 Definitions. The definitions have been edited for clarity. There have been a few definitions added. Note that there is still an ACM, alternate calculation method, approval manual and there's a new definition. ACM Reference Manual. There's a number of other definitions, I'm not going to read the list, but the definitions support clarity and other changes to the standards.

I want to turn this back over to Mazi.

MR. SHIRAKH: So there's been many changes to subsection 10-103. This is the section that describes the permitting requirement, the type of compliance documentation that needs to be submitted. A lot of these changes are clarifications but there are also some new material here, some obsolete language which was deleted; we reorganized this section so that it will flow better in a more logical way.

Number 3 is that we introduced a way for enforcement agencies to create simplified compliance documents. This was requested by CALBO for simple

additions less than 300 square feet and alterations that does not involve a HERS verification feature. Basically, now we're letting the Building Departments to come up with their own forms or procedures or compliance for these projects.

Number 4 is, then again, the same thing that is trying to simplify the procedure for small products where we can simplify alterations to residential buildings to submit Certificate of Compliance which is CF1R to Enforcement Agencies in conjunction with Certificate of Installation which is CF6R. This is offered as a convenience for situations in which HVAC replacement applies only to projects that requires HERS verification for when REACH enforcement agency does not require building design plans. It's an attempt to make this a little bit easier on Building Departments.

Number 5 is an update from within Section 10-103 we refer to the Reference Joint Appendix JA-9 and this is a new appendix that we are creating that has specifications for the electronic documentation registries and depositories.

And other changes include the expanded documentation author signature requirements to all documents Installation Certificate which is again CF1R, Acceptance requirement, and Certificate of Field

Verification and Diagnostic Testing. In order to accommodate Administrative Assistants that are responsible signers of the documents required for registration of the procedure. The whole attempt here is to create accountability for who is responsible for the document, who can sign on behalf of the installers. So there's some language included in here.

Another change to 10-103 is Item 7. In 2008 we introduced the requirement for the residential forms, CF1R, 6R and 4Rs, to be uploaded into a data registry. The intent here is to have some kind of electronic record of compliance documentation. For this round of standards, we're proposing to expand that to the nonresidential forms that would include Certificate of Installation, Acceptance forms and basically all nonresidential forms will be required to be uploaded to a registry.

Number 8 is the language that would authorize the creation of a documents repository, central documents repository, which could reside here at the Commission or at a third-party. The intent of this repository is that all of the forms that are uploaded into the registries will automatically have the documents uploaded into the repository. We can then use that for various agency enforcements, program

development, evaluation and also some other purposes.

10-106 was the—there were some changes in there. It's only for clarity.

10-107. This is language that basically clarifies—we've always had this authority for the Executive Director to come up with procedures and techniques that are equivalent to what's in the standards or the related documents. This just clarifies that languages and makes it more explicit that in between cycles the Commission can come up with procedures that are not new regulations but could be equivalent as long as they are deemed to be equivalent to the existing procedures.

10-109 was just reorganized for clarity, general requirements; application; compliance software, alternative component packages, exceptional methods, data registries and repositories. Just clarifying language and inserted a new subsection to address the data registries which I previously talked about.

10-110, again this is just clarification language. This is another new requirement is that the Executive Director may charge a fee to recover the costs of processing and reviewing applications with the exception of Section 10-106 applications.

Gary, do you want to take this one?

MR. FLAMM: So moving on to 10-111. Labeling. Clarified the differences between manufactured and site-built fenestration. Manufactured fenestration requires air leakage testing and site-built fenestration does not. Clarified that manufactured fenestration requires a label for each product where as site-built does not. It requires one label for multiple fenestration products. And there are some NFRC clarifications that have been inserted.

Certification Requirements. Added VT language because it is used in Part 6. And added the Component modeling approach software tool, CMAST, to allow manufactures and specifies to use this program to acquire an NFRC certified label.

Section 10-113 was edited for clarity.

And Section 10-114. Determination of outdoor lighting zones, and administrative rules for use. The requirements for requirements for amending local ordinances have been removed to be consistent with changes made to Section 140.7 (The outdoor lighting power requirements).

Okay. Any comments on what we've covered thus far?

UNIDENTIFIED SPEAKER: When are they due?

MR. SHIRAKH: Actually, yesterday we announced

that it would be October 31, that's Halloween. Don't make it too scary.

MR. GABLE: Mike Gable, Gable Associates. Just a couple of quick comments in this section on 10-103, 2C. I wanted to add—I wanted to make sure that the Commission added something about the local Enforcement Agency having the authority to require the compliance software input file, the electronic file. I made these comments to you in person and in writing previously. I think that if you don't give local Enforcement Agency with the authority to see the computer input file, there are many buildings for which you can't really enforce the standards. You can't really see what's going on with how they model things. So I think that it's really important to include that.

On 10-109, I'm just curious about the public domain versus the compliance software. Does the public domain have to meet the ACM Manual requirements or not?

MS. BROOK: It does. Yeah.

MR. GABLE: It does. Okay. Thanks. And, finally, on 10-111 I won't go into this today but yesterday I talked about CMAST software. My understanding of CMAST is that it doesn't meet the requirements of 10-111. It does not publish, at least annually, a directory of product certified and de-

certified within its program. So we wanted to talk to NFRC about CMAST and how that can work under those rules. Thanks.

MR. THOMPSON: Good morning. Mike Thompson, Director at CBPCA HERS Providership. The new forms that you talk about, especially the abbreviated ones that apparently municipalities will have discretion over. Will they require registration by a HERS Providership?

MR. SHIRAKH: No because we're not changing any of the registration requirements for the residential. It's exactly the same as 2008.

MR. THOMPSON: Okay.

MR. SHIRAKH: So these are only features that did not involve the HERS verification requirement which currently do not have to be uploaded into the registries so I don't think it should impact you.

MR. THOMPSON: Got it. Thank you very much.

MR. SHIRAKH: Is that correct, Jeff Miller? Are you there?

MR. GARCIA: Tom Garcia, representing CALBO. I just wanted to clarify or make a couple of comments about the 10-103(a)1C which is the part where you're talking about allowing building departments to make their own compliance form. I think CALBO's position, or request, was that we actually just say there are

specific cases where we don't need compliance forms so I want to work with you on that language or allow you to take a second shot at that because I think just allowing building departments to make their own form can, in some cases, make it confusing for contractors. So I'd like to—

MR. SHIRAKH: So what you're saying is—our language would allow you to basically—

MR. GARCIA: But you're still saying that you need a form. I'm saying that there are cases, for example water heaters, where really there's no need to have a form because the standards are very clear on what's necessary and it's one or two numbers that we have to check. And, by just issuing the permit, we can in fact enforce the standards.

MR. SHIRAKH: So should there be any kind of record that—

MR. GARCIA: I don't think so. We issue a permit for a water heater. We go out and inspect it to the proper energy factor and installation of pipes and we're done. The standards are very clear on what's necessary.

MR. SHIRAKH: Okay.

MR. GARCIA: I'm just saying that we need to get back to cases where the standards are clear and

there’s no need for additional paperwork—

MR. SHIRAKH: Okay.

MR. GARCIA: It slows the process and frustrates people. So we should look at the cases where that’s necessary and make an exception specifically for those.

MR. SHIRAKH: Okay.

MR. GARCIA: I had another question on Section 10-103(e)1E. I’m not quite sure what that section is intended to do. It’s about having an engineer record or an engineer review the documents. You kind of brushed over that and I wasn’t quite clear on what we’re doing there.

MR. SHIRAKH: Do you know what that is? I think you need to come up. Okay. We’ll look at that language. We can work with you offline.

MR. GARCIA: Again, I’m not just quite-it was brand new and it was kind of onerous.

MR. SHIRAKH: Unfortunately I don’t remember all the subsections in my head.

MR. GARCIA: Okay. Thanks.

MR. SHIRAKH: Thank you. Mike?

MR. HODGSON: Mike Hodgson, ConSol. Good morning, Commissioner. Just a couple of housekeeping things, one of which is that the PowerPoint that you

presented yesterday did not—was not the same one that was on the web so if you could upload the most recent copy that would be very helpful. And it was just at the very end, there were a couple of slides that were different. And today's PowerPoint has not been posted yet. So it'd be helpful for those of us trying to follow electronically to have it posted as soon as possible.

MR. SHIRAKH: Okay.

MR. HODGSON: And that way we can take notes. I know we're not talking about the residential appendices today, at least that's my understanding, but is it the intent to adopt the residential appendices and language along with the standards?

MR. SHIRAKH: Yes.

MR. HODGSON: And is that a requirement to do that?

MR. SHIRAKH: The residential appendices, they need to be adopted at the same time as the standards so are the ACM Approval Manuals but we're actually making a change to the Approval Manuals. There's going to be two ACM Manuals. One is going to be adopted and one is going to be approved.

MR. HODGSON: Yeah. The appendices in 2008 really got much more robust than they had been

previously and we've used them with clarifications and trying to figure out how to interpret the standards. My suggestion is if there's a way not to adopt them so we don't have to go through a rulemaking when we want to change language, I would suggest that we explore that. I don't know if that's legally possible but those residential appendices really come down to the nitty gritty of enforcement and other issues, and other than every three years it would be nice to be able to have access to them.

MS. BROOK: We actually think we do have the ability to make periodic updates because there's some, correct me if I'm wrong, but I think we added some disclaimer language in there that says, "Under approval of the Executive Director" we could make some modifications.

MR. SHIRAKH: For instance, JA-4 which has the building assemblies in there and we have specific language in there that allows us to continuously update that section.

MR. HODGSON: As long as we have access so that we don't have to go through a rulemaking—

MS. BROOK: Right. Right.

MR. HODGSON: Or—

MS. BROOK: We can definitely check with our

Legal Counsel on that—

MR. HODGSON: Right.

MS. BROOK: to see if that's a requirement that the appendices get adopted. I think that's a very good—

MR. SHIRAKH: And that language that I just put up there in 10-107, that gives us further authority to adopt procedures that are equivalent to what's in the standards. So that gives us some flexibility. I understand what you're saying but the problem is in reference to when we actually have standard requirements in it.

MR. HODGSON: Right. I understand the standards—okay. We would really like access to them rather than in a formal rulemaking process.

MR. SHIRAKH: It would be nice if we didn't have to adopt them. I admit that.

MR. NITTLER: Ken Nittler with ENERCOMP. One of my business activities, I operate an NFRC laboratory and we do the so-called CMAST ratings. I was just reviewing this language here in 10-111(d)4 and while I certainly support getting CMAST, it's really properly called the Component Modeling Approach, into the standards. This language, I don't think, is quite in the right spot. So I would certainly work with you to

get it—

MR. SHIRAKH: Okay.

MR. NITTLER: properly placed.

MR. SHIRAKH: Can you work with Nelson on that one and send him an email?

MR. NITTLER: Perfect.

MR. SHIRAKH: Thank you.

MR. NESBITT: George Nesbitt, Environmental. Design/Build, CalHERS Passive House California. First off, I'd like to start with HERS Rater with a small 'r,' I believe it was Commissioner Douglas and the Commission that in February of 2010 that at my and CalHERS request had staff capitalize all the 'r's' in Rater, it's a title as Architect and Engineer are. So I suggest we retrain all the Commission spellcheckers to capitalize the 'r' in Rater as well as the 'p' in Provider.

On the section on the Certificate of Compliance. I'm thinking partly in performance method, the thing is not all inputs that you put into the software necessarily come out on the compliance forms. Although, you do say that all the features have to be included on all the forms.

Also on the—

MS. BROOK: Hold on there, George.

MR. NESBITT: Sure.

MS. BROOK: So are you recommending that they are all reported on the forms, is that what your comment is?

MR. NESBITT: I'm saying that all inputs are not necessarily show up on the compliance forms.

MS. BROOK: I know. Is that a good thing or a bad thing?

MR. NESBITT: That's a bad thing.

MS. BROOK: Okay. Thank you.

MR. NESBITT: Yeah. Because there are things—it's gotten a little better in the 2008 but there are and perhaps it's more of an EnergyPro issue than a MICROPAS. There are things that you can't manipulate specifically the solar space heating fraction that I have raised in the past.

So on the small alterations and small additions on the simplified forms; I'd like to say yeah. Every jurisdiction being able to come up with their own form does not sound like a good idea. I believe you have forms for change outs for each climate zone that have all the requirements. I think perhaps what is needed is rather than, maybe on the simple stuff, rather than requiring a form that says you're going to do it, maybe just make it clear that you have to present the CF6R which says that you did it and to the standard.

MR. SHIRAKH: Did you just hear what Tom Garcia said? That he doesn't want any forms at all. So go and talk to Tom about it.

MR. NESBITT: Well, I mean, if—then let's put the water heater make and model and efficiency right on the permit. I don't care either way. I think your intent is to simplify or to make it easier on the one hand yet if everyone comes up with their own different form, it's a total mess.

MR. SHIRAKH: But what Tom is saying is no forms at all.

MR. NESBITT: Well, I'd say installation certifications may suffice for a lot of the simpler stuff and that may be the answer. That may not be on the form but it is the right form.

Also, you kind of mentioned a form for mechanical ventilation yet we have a CF6R Mech 5 that is specifically for that yet the language kind of says, "Well, you need to submit documentation, blah, blah, blah." Yet we do have a specific form saying that the ventilation form meets 622.

The other thing is in this section as well as elsewhere, you often use the term—well you need field verification and diagnostic testing according to appendix chapter whichever one it is. Yet I think it

would be better to make it clear anytime that most of those are HERS measures to make it clear that "this requires HERS Rater verification according to" as a constant reminder that this requires a HERS Rater because it's often forgotten and not enforced.

And then on software approval, Pat Splitt mentioned maybe having some sort of public forum as the approval process. I would say at the moment, the only public forum for the software is to file an official appeal to de-certify. Perhaps when stuff is submitted you'd like those of us in the industry to review it before you certify it and before we have to file complaints. And I'll leave it at that for this section.

MR. SHIRAKH: Thank you, George. I forgot to mention that it would be nice if speakers gave a business card or spell their name for the Court Reporter. Thank you. Erik?

MR. EMBLEM: Good morning. I'm Erik Emblem with the Joint Committee on Energy and Environmental Policy. Commissioners, Staff. I just wanted to say so far you're doing a great job. It's a tough job you have going.

On this particular section when you get into the administrative portion, we have a lot of questions. I think the big change that will affect our contractors

in particular is the State of Registry for nonresidential forms. I'd like to keep things simple but my people that I work with, they like to keep lawyers in the background. Obviously we sent this over to one of those guys. Number one, our lawyer says there may be—he says—he can't see that you have the authority to do it. I always drop back to say, "Is this potentially a good thing?" And I think it is. He thinks that maybe you need to review that and look at, that maybe the Commission is stretching their arms a little farther than the public code says. So take a look at that.

Let's look at it from a practical standpoint. I've been an advocate for a long time and we've been an advocate for a long time for streamlining a process to make it easier for contractors to get permits and to process paperwork. We know that in today's world the best way to do that is electronically.

From a labor standpoint, we like the idea of validation and clarification and substantiation that the work being done is the work that you're getting paid for. I think that's where you're going with this. From a [inaudible] protectoral perspective we're in favor of it. But the problem that we see right now is we think it's premature and that we don't have the infrastructure

behind it in place, nor do I think you'll have it in place by January 1, 2015. Now, I work with this Western HVAC Performance Alliance on several committees. And the long-term plan has asked us to transform the HVAC industry of one that is kind of haphazardly come together through various processes and, according to reports, on a consistent basis does not quality install and quality maintain systems. In order to do that, we need to make sure that the infrastructure we're building around it in codes and standards is also put together in a way that the public is getting value from it and the contractors are getting value, we streamline the process and the intended objectives are met. We'd like to work with you in creating this registry in a format that will work good for our industry and perhaps, in some beta form between now and the next code cycle, we'll have something that's up and running and we'll get volunteer contractors to work with you on submitting forms and how the forms will go in and what the data is on those forms and how it's going to be used. That's a concern to them as some of their clients may not like that information all over the place. So to protect the building owners and the information that's on those forms.

I think moving forward that's something to look at on that but in this code cycle it's premature

and we'd like to work with you. In the end I think the objective is right.

MR. SHIRAKH: You may have noticed that we've have a delayed implementation day.

MR. EMBLEM: Yes.

MR. SHIRAKH: That was January 1, 20—

MR. EMBLEM: 15.

MR. SHIRAKH: So that gives us nearly four years.

MR. EMBLEM: Right.

MR. SHIRAKH: You don't think that's enough time to work out our differences?

MR. EMBLEM: Well, I don't want to say that we have a lot of differences, to be honest with you. What I'd like to say is that to meet the intended objectives, I think to put it in this code, to write it in a statute or into the code, it sets the wheels in motion. Let's face it. We haven't done a good job on the HERS side. We haven't done a good job of getting the Providers to upload the information to the Commission. Nor have we on the Commission side done a good job of what we're going to do with the data once we receive it. In other words, what's there now and what have we done with it? Have we actually gone through all of the forms to date and utilized the data from those forms to move forward?

Or are we moving forward just from anecdotal information that's coming in through various code authorities on jobs that are being permitted? And then ignoring all the other ones that haven't been permitted. I just don't think we're there yet. Like I said, we're not against it. It's something that I think is that we ultimately want to end up there and we'd like to work with you on it and we'd like to—

MR. SHIRAKH: We'd be happy to work with you. As far as the authority, we have actually checked with our attorneys and they're okay with this.

MR. EMBLEM: That's why we have attorneys on both sides. And, again, I'm not there with that but the attorney did question that.

The other thing is the document author and I said this yesterday and I'll say it again. The information on those forms is critical. The person filling out those forms has to understand data gathering, understand instrumentation and understand building operations. It can't just be a person who was sent out in the field and said to fill out a certain piece of paper and bring it back to the office. Now I notice that there's going to be signatures on both of the forms so that the license party is also going to sign off on the forms. I guess what's not clear is if I

sign off on that form as the licensed party, am I taking responsibility for the data on the form? Is that your intent?

MR. SHIRAKH: Can you respond?

MR. MILLER: Okay. Jeff Miller, Energy Commission. The intention is that there be one person to take responsibility of the person who is licensed to take responsibility for the information on the document. So the information is yes, the license person would determine whether the information provided on the document was what he would want to take responsibility for.

MR. EMBLEM: Okay, that's important to us. I think for all practical purposes there is a clear delineation on the form that the person signing the form is taking responsibility for the data on the form. And I think that will help out a lot.

Again, I'm going to come back to my point about the person filling out the forms needs to be certified. If we look at the HVAC industry as a whole, beyond just compliance certificates, we have a problem out there with quality installation and quality maintenance, both in residential and nonresidential. One of the fixes that we have determined in the long term plan and the workforce education and training is to

drive our workforce and to drive our industry toward certifications. I think this is a perfect place to lead the way and set the example for us requiring certifications, basic certifications, for people who fill out these forms so that we know that the person who fills out the form has a skillset and an ability to collect the data and to insert the data on the forms correctly. With that, I'll rest. Thank you.

MR. SHIRAKH: Thank you, Erik.

MR. THOMPSON: A little follow up to that. Good morning, Jeff.

MS. BROOK: I'm sorry but can you introduce yourself again?

MR. THOMPSON: I beg your pardon. Mike Thompson. CBPCA HERS Providership. We have wrestled with this question now for a long time and we posed questions related to this to the Energy Commission and what has come out of that is an Energy Commission interpretation that doesn't fit what's going on in the real world. The fact is today that the forms and the regulations have gotten so complex that most contractors don't understand them, especially small contractors and it presumes they're computer literate which many are not. What we find in the field is that many Raters actually take over the job for the contractor. They'll

fill out the compliance form. They'll fill out the 6R, right. Because the contractor wants nothing to do with it. It's out of his realm of expertise. The way they do that is that the contractor will give the Rater his login. Well, the Energy Commission has said that's not appropriate and we have promoted that amongst our Raters but I can assure that that still goes on.

What I want to propose going forward is maybe a different scheme that creates a role for the Rater where he can take over this role for the contractor. I think that one, it's realistic and two, if we built it in that way that a Rater can assume these responsibilities it would take care of what the gentleman said about some sort of certification. Right now the Commission told us that we are to fill out, for each contractor, a list of people who can sign for him. My understanding is that it's supposed to be people within his office, his secretary or whatever. But that's not to include the Rater. Again, it's just not realistic of what's happening in the field and, I think, as we go forward that's going to become a bigger problem.

MR. SHIRAKH: Is it true that the Rater can actually do that as long as he's not doing the verification? Is that correct?

MR. MILLER: The documentation author role that we've proposed is intended to address the assistance that these contractors and others need, the administrative assistance that they need and actually are receiving now under the table by receiving their login. So by providing opportunity for a non-licensed person to assist with document preparation makes it possible for the licensed person to keep their username and login private and the digital and electronic signature stuff that will be introduced is going to create more of an emphasis on the significance of the signature that that licensed person provides. I think we're addressing the concern that you're expressing.

MR. THOMPSON: Well the fact is that no matter what security you put in, if somebody hands a login off to somebody else that circumvents any kind of security no matter how sophisticated it is. And that's what's happening today and that's what going to happen in the future. I'm suggesting we at least look at a way of formalizing that process. HERS Raters are certified, they're audited. That is a role that they can conceivably fill in the future. It would take a great burden off of especially the smaller contractors.

Thank you.

MR. SHIRAKH: Thank you, Mike. Any other

questions on that administrative section? Anything online? Jon McHugh?

MR. MCHUGH: I just have a couple of questions since I haven't looked at this too closely. My understanding is that in general these forms are filled out by the responsible party, the contractor, etc., and sort of the hammer out of all of this is that they're licensed. Now if the contractor is handing over to this third-party to fill out the forms, where is the liability path for that contractor and now that this created, potentially, a kind of big legal quagmire for, "Well, I asked you to fill out these forms." It's not my fault that the HERS Rater filled this out incorrectly." It's their problem. It's their liability." I'm just wondering kind of if somehow responsibility is being diluted or diffused by what's being proposed. I don't know the answer; I'm just asking the question.

MR. MILLER: So this convention is well established with a certificate of compliance where the persons who learned how to operate those compliance software have been put into place to assist the designers with the energy calculations. So there's a relationship between those two parties that's a business relationship and I'd say it's comparable to the

relationship between a tax preparation person and a citizen. If we have a documentation author role and a responsible person role, I think you're familiar with that, with tax preparation.

MR. MCHUGH: Right.

MR. MILLER: And that's the essence of this. The responsibility is the business relationship then between those two parties.

MR. MCHUGH: And when I have my tax preparer prepare my taxes, they always send me a copy and I still have to sign the form. Are you intending that in the same case that when you have the HERS Rater help fill out the documentation that at the end of the day the responsible person is still signing and saying I've reviewed what this person has done and as far as I know— is that your intent?

MR. MILLER: Absolutely.

MR. MCHUGH: Okay. Thank you.

MR. SHIRAKH: Thank you, Jon. Any other questions or comments on this section? So we'll move on.

MR. FLAMM: So now we're moving back into Part 6, Section 100.0. It used to be section 100. There was a new subsection that has been created to cover processes that Martha discussed yesterday. We added in

another exception to section 100(f). Basically it says when you can deem a building to be one kind of occupancy. Currently, the current language says for mechanical and, I believe, envelope requirements you take—if 90 percent of the condition floor area is one type of condition occupancy you can deem that to be that one occupancy. However, the conflict is that lighting applies to both condition and unconditioned spaces equally so that the Exception 1 does not quite cover the need so this is saying that okay when you have a combined conditioned plus unconditioned space that is 90 percent one type of occupancy you can deem that space to be that one occupancy. So it's just to be in line with where the standards are already.

Section 100.1 Definitions have been edited for clarity. There have been new documents that are incorporated by reference so all of those have been cited. There are version number documents incorporated by reference and those have been updated. If anybody catches one that we didn't update, please let us know. There have been new definitions added to support changes made to other Sections of Part 6. And deleting definitions no longer needed.

So a lot of definitions are migrating into groupings and into master groupings. A lot of these

master groupings already exist but these are basically the new master groupings under which if you're looking for a definition related to fenestration you're going to look for fenestration first and then the definition under that. And there's lighting terms and lighting controls. In the current standards, nonresidential complete building occupancy types and area function types are in one section. For clarity they have been broken into two separate sections. Outdoor lighting terms, they're the same. Sign lighting terms are the same. And residential space types are the same. So those are basically master definition groupings. So added new definitions and replaced definitions & cited other code. For example there were—the 2008 standards were probably the first standards in the nation the listed LED definitions. Prior to this there were no nationally recognized standards. IES RS—or actually, LM-79 came out about the same time that we adopted our 2000 standards. So anyway what we've done is we deleted all of the LED definitions and we cite ANSI/IES RP-16-10 for those definitions now.

So Section 100.9, I wonder if we can break here for questions—

MR. SHIRAKH: Why don't you complete the 100s?

MR. FLAMM: Okay, I'm going to complete the

100s, excuse me.

So Section—it used to be Section 119, now 100.9, has been edited for clarity and as I stated for those who were listening yesterday, Section 119 are basically lighting controlled devices. The 130 sections are lighting control applications but 119 are the requirements for devices and systems.

So we've recently proposed, and I believe we are at 45 day language for Title 20; the lighting control devices have been moved to Title 20 and taken out of Title 24. What that leaves in Title 24 is lighting control systems. So lighting control systems and lighting control devices currently have to be certified through the Energy Commission and so that means many times one off systems, let's say a grocery store, have to certify that system to the Energy Commission and it's pretty clumsy. So the new requirements say that if lighting control system that's meeting the requirements, functional requirements, of a lighting controlled device you no longer have to certify that to the Energy Commission but you have to do acceptance test, or basically an installation test, that it meets all of the requirements.

So track lighting integral current limiter is basically a lighting fixture, track lighting fixture,

that has a circuit breaker in the fixture itself and it's recognized that it may not be as much wattage as might be—as the standards might normally require it to be calculated as. So there were elements of track lighting integral current limiters in several sections of the standards and they were moved for clarity into one section and the same with supplementary overcurrent protection panels. And these residential LED luminaires have to be certified to the Energy Commission in accordance with Reference Joint Appendix JA-8. I'm going to go over that in a little bit some more on that.

In section 146 currently we offer a—Title 24 offers a Power Adjustment Factor for dimmable ballast with minimal relative system efficiency. So that table has been moved from section 146 to section 119 or 100.9. The existing RSE for which we have been giving a PAF becomes Tier 1 for all linear fluorescent and we've entered a Tier 2 for the Power Adjustment Factor.

MS. BROOK: Hold on, just for clarification for everybody. Patrick noticed that it's really supposed to be 110 point—go back up because the—

MR. FLAMM: So how do I go back?

MS. BROOK: Yeah, just do previous.

MR. FLAMM: I can't even see that far.

MS. BROOK: Keep going up, up, up, up. A

couple more.

MR. FLAMM: Oh, there it is. There's previous.

MS. BROOK: So it should be 110.9.

MR. FLAMM: Excuse me.

MS. BROOK: For everybody in the audience and on the phone, we got a little bit out of order. We're trying to go section by section and we just covered the lighting 110 section when we were in the 100 section.

MR. FLAMM: Later today I'm going to talk some more about the Reference Joint Appendix 8, I believe it's with the residential lighting standard so this is an unfinished topic at this point. So I'm going to turn it over to Patrick.

MS. BROOK: And say that then, Patrick.

MR. SAXTON: The same section problem is here. This should actually be Section 110.10. It's a new section. The purpose is to prevent building design from precluding future installation of solar energy systems due to the layout of the building. And studies cited in the case reports show that in many cases, particularly, the commercial sector, only 30 percent of existing buildings are compatible with solar and with state's long-term goals we'd hopefully like to influence that in a more positive way.

The solar zone is defined as being portion of the roof designated and reserved for the future installation of a solar energy system and wanted to emphasize that it is on the roof. This does apply to all building types but there are different thresholds for those building types. For those single family residences, it's going to be limited to production housing with 10 homes or more and within each subdivision 70 percent of the homes. To acknowledge that there are steps in the planning process where developments with street and lot layouts are currently approved but the homes have not applied for permits by the effective date of the standards, we're trying to delay the implementation of this requirement for those particular homes such that only newly designed subdivisions at the effective date of the standard will need to meet this requirement.

For those 70 percent of homes, they would have a solar zone requirement of 250 square feet, an exception for residential buildings that are three stories or greater, with a total floor area less than 2,000 square feet can reduce that solar zone to 150 square feet in that case.

There's a pretty broad exception for additions and alterations that they do not have to meet this

requirement unless there is an existing solar zone. So that wouldn't come into play for quite a few years.

For multi-family buildings the threshold is greater than, for applying this requirement, is greater than or equal to eight dwelling units or with central— the central water heating system. Those thresholds align with other proposals in the standards for multi-family water heating.

The solar zone is 30 percent of the roof area, excluding any skylight area or a provision for an alternate space somewhere on site but not on the roof. However it increases to 45 percent of the roof area equivalent. Again the same type of exception for additions or alterations unless there is a preexisting solar zone.

For nonresidential and hotel/motel buildings, three stories or less, the requirement would be 40 percent of the roof area, again minus any skylight area. The alternate on-site off-roof space would be equivalent to 60 percent of the roof area. Same exception for additions and alterations however if the roof space is increased by 20 percent or greater in an addition the solar zone requirement would apply to the addition only.

So these are the different thresholds for the different building types. These requirements apply in

all cases when a building must meet the solar ready requirements. The solar zone can be divided into multiple, noncontiguous areas as long as each section has 80 square feet or greater. Each section can have a dimension no smaller than five feet in any direction and that's to just make sure that the solar zone itself is actually useable. Any solar energy system that's installed at the time of construction, including ground mount systems, would be applicable toward the solar zone requirement. There will be a note that the solar zone must comply with any fire requirements that will be in 2013, Title 24 Part 9, excuse me. The background there is that California currently has guidelines from CAL FIRE that are applied to the layout of a PV system on a rooftop and those guidelines were used as the basis as the guidelines for the 2012 International Fire Code which will then be in turn used for the model 2013 Part 9 code. By the time the solar ready requirement becomes effective there should actually be codified requirements for the [inaudible] space.

The solar zone itself must be located on either a flat roof or between an orientation of 150 and 270 degrees. One of the important features to make the solar zone actually usable is that it be either shade free or minimally shaded, and to that end there are no

obstructions allowed within the solar zone itself. When an obstruction is present it must be at a distance from the solar zone that's at least 2 times the height difference between obstruction and solar zone. That will definitely use some graphics in the compliance manual to help explain that. The shading requirements applies to all on-roof obstructions, all existing off-roof obstructions at the time of construction and future or planned that are known to the permit applicant. An example of that would be in a subdivision, the builder ill know at some point which buildings are going next to each other and an adjacent two-story home may share a one-story home. It would not include things like where there's an adjacent lot with a different owner and you won't' know what will be there in the future. Obstructions that are completely north of solar zone will not have to meet the shading requirements.

There is a requirement to place on the construction documents the designed dead load and live load for the solar zone. This doesn't change any structural requirements; it's just a reporting of the designed loads. One of the frequent costs for retrofit solar projects is having to do a structural analysis and very often that analysis finds that the structure is adequate. By including this on construction documents,

it's hoped that some jurisdictions would accept that and be able to avoid the cost of a future analysis.

The construction document should also indicate a pathway for both conduit and plumbing from the solar zone or the alternate off-roof space back to the main electrical service and the water-heating system because this zone—this reserved solar zone is applicable to both solar electric or solar thermal systems.

And, since this information is then being recorded on construction documents it's very important that it be provided to the occupant so that they have an opportunity to make use of it in the future and realize some of the benefits.

These last requirements would be applicable only to single family residences and they have to do with the main electrical service panel ratings and configurations. A significant one would be that there would be a minimal busbar rating of 200 amps because this directly affects the capacity of a PV system that could be connected in the future. Additionally a space for a future circuit breaker would be located at the opposite end of the main breaker or the incoming input feeder. This mirrors a requirement in the California electrical code and the combination of those first two items would hopefully prevent another frequent costly

item for retrofit projects where the main service either has to be replaced or completely reconfigured. The space should be marked and hopefully it will still be a space in the future if somebody decides to install a solar system. That's the end of this section.

MR. SHIRAKH: Okay. So I'd like to hear comments on this material that Gary Flamm presented definitions and also the solar zone.

MR. HODGSON: Mike Hodgson, ConSol representing CBIA. First comment is thanks. Most of the suggestions we added, especially on the subdivision maps by SP1 were included and that's great because that's a very important part because we already have those lots already on paper and we're not going to change them.

I must admit I'm still confused about the potential shading of a two story building next to a one story building. It sounds like it doesn't matter. I want to make sure that's clear because we really don't know where one story and two story buildings go on lots. I mean lot size predicts some of that but many of our lots are similar in size. I want to understand that language a little bit better.

The one issue that we did bring up was expanding the area where the solar zone would be

eligible and I think you have 150-270 and we requested 110-270. The reason for the request is for the SEAT analysis, which is the Subdivision Energy Analysis Tool that PIER funded and the work was done by NREL. There was a paper at ACEEE a couple of years ago that said that area made less than 10 percent, that range varied less than 10 percent in annual incident radiation and that was a comment that we made back in August to the docket. So we would like that considered. Thank you.

MR. SAXTON: I'd be happy to talk with you more about that. I agree it's about a 10 percent energy difference, with TDV it's a noticeably bigger difference.

MR. HODGSON: I see. Okay. Let's have that discussion.

MR. SAXTON: Yeah. Let's schedule—

MR. SHIRAKH: With the one-story, two-story, isn't that addressed by that 70 percent rule that—basically we're leaving it up to you guys to decide.

MR. HODGSON: Well the question is what if you have—in a normal market it's two-thirds two-story buildings, one-third one-story buildings. That means do all those one-story lots no longer apply and that is basically 33 percent so you can't build on the lots where you have a smaller, narrower lot where you

planned. Not really sure because you don't know that based—I mean if you looked at the market today, it's probably 60 percent single story and 40 percent two-story. Not a problem but a market five years from now, if we go back to a market where it was in 2005 and 2006, you basically have two-story buildings. So when you put a one-story building next to a two-story building or two two-story or maybe a three-story or three two-story buildings surrounding the lot, what happens to the solar zone? If you have more than a third of those then that means some of those lots you can't build on at all. Or you put in a two-story home.

MR. SHIRAKH: Is it the case always that if there's a single story next to a two-story that the single zone could not be eligible for a solar zone? I mean is that always the cause?

MR. HODGSON: I don't know that, Mazi. We need to look at that, and that's just my concern is that I don't think we have a lot of thought of actually going out and looking at subdivisions in a typical market and whether the 30 percent number is the correct one or not. The language seems to imply that if there's a two-story building—if you build a two-story building next to a one-story building and the solar zone is now covered, it's okay. That's how I read that language.

Now does that mean it's included in the 30 percent, I think that's your presumption. It's not necessarily how I read the language but we need to kind of work on clarification of that but if that's the intent then we're concerned about that.

MR. SHIRAKH: Okay. Thank you.

MR. SAXTON: The 70 percent was meant as a relief for those situations so we may need to discuss that more and the two-story, one-story was just an example. We're not being prescriptive of what does or doesn't qualify.

MR. HODGSON: Right.

MR. SAXTON: I think it depends more on the setback, the side lot setback, than the actual roof heights.

MR. HODGSON: I can tell you what the setback will be.

MR. SAXTON: I think Bob was talking about it going down to three feet—

MR. HODGSON: That's correct.

MR. SAXTON: So that will be very difficult. So we should talk more for sure.

MR. HODGSON: Thank you.

MR. KINTNER: Avery Kintner with Empowered Energy in San Diego. I'd like to echo the comments that

Mike made regarding the effect on product mix and plotting as it relates to obstruction and shading.

I also had some concern on landscape and planting of trees. If you're—and some of which is outside the control of the developer or the building, eventually the trees are going to create shading on solar. I can drive through many areas here in Sacramento that are mature and beautiful and take advantage of passive shading. So it's unclear to me how this recommended provision is going impact the choice of landscape and the choice for builders and developers and future homeowners as it relates to shading and obstruction of solar on rooftops.

I also was a little unclear on if this was all times of the day. Certainly morning and evening hours, shadows are cast differently than during major production period of solar power so there is really no guidance that I've seen so far that has been developed around that. Have you had internal discussions in that regard?

MR. SHIRAKH: Yeah. In my view, on the landscaping is that we can't really predict that and it's really out of Title 24 control what happens to landscaping. Again, we're not requiring the systems to be installed. A lot of these are where you set aside

space on the roof so in the future the homeowner may or may not use that to install solar systems. We can only predict so much at this stage in the permitting time and that's why we put these rules that only 70 percent of the homes need to actually comply with this space that they're going to set aside and that we're leaving it up to the developers to decide. I don't know if you have a reaction to that—

MR. SAXTON: I would say that it would impact builder installed landscaping choices but homeowner installed landscaping would fall into that category of unknown to the permit applicant and, absolutely, by the time that a solar system was installed in either case it could be mature landscaping and impact the reality but.

MR. KINTNER: Is the perceived zone of the solar zone—is there a certain time of day the obstruction is being measured versus outside—morning or evening?

MR. SAXTON: We could talk about that but it's more geometrically and spatially based than sun path based but I'd be happy to talk with you offline about that.

MR. KINTNER: Okay. My second question has to do with communities that may be designed in the future where the developer has chosen to set aside an area for

a micro utility scale solar to serve the community and in those cases are there any provision that will be made to give flexibility to the developer to solve renewable energy strategy on a community basis outside of a rooftop by rooftop strategy.

MR. SAXTON: I would say that generally the Energy Commission is supportive of that type of system. Of course the current tariff situation doesn't allow that in California except for co-ops. If that changes in the future, we would definitely support language that would allow for that.

MR. KINTNER: So the current code would still require 70 percent solar zone if—

MR. SAXTON: I think we would not want to allow for that offset if we don't believe there's a realistic chance that tariffs are going to change to allow for that system to be built in the near future.

MR. KINTNER: Thank you.

MR. SHIRAKH: Thank you. Nehemiah?

MR. STONE: Nehemiah Stone with the Benningfield Group. I have two questions related to multi-family, I think I know the answer to one of them but I need to ask it anyway.

Some multi-families built in urban areas is infill and is already—all of the buildings around that

are going to be there and in some cases you have zero solar access on the roof or virtually zero. Does that mean you can't build that building?

MR. SAXTON: Yeah. That was one of the reasons for the single family homes we reverted back to the subdivision construction only but infill is very difficult to deal with and we need to give some additional thought to that.

MR. STONE: I'm just talking about multi-family.

MS. BROOK: SO in this case we wouldn't be required, right? Because it's not in a subdivision.

MR. SAXTON: Well, no. For multi-family we don't have that. We don't have that exception.

MS. BROOK: Okay.

MR. SAXTON: We don't have that exception right at the moment and we do need to address it.

MR. STONE: Okay. The other is that when you're not dealing with urban infill a lot of times multi-family new construction is there's four or five buildings in one project. Is there a provision for allowing for the same amount of solar on a couple of the buildings and serving all five buildings? Or are you really requiring 30 percent of the roof area on each and every building? And if that's the case, you probably

need to design an exception because that's where you can't do it on some buildings and as long as you meet the need, it should be acceptable.

MR. SAXTON: I would definitely discuss that with you offline. Again, it gets really difficult in the current tariff environment. For affordable housing communities what you suggested would work very well. For market rate housing, multi-family it would probably not work in most cases.

MR. STONE: The PUC just stated their intention, this last spring if I remember correctly, that they want to expand that tariff to all multi-tenant not just to the NSHP and the MASH which would mean then that it would be eligible everywhere.

MR. SAXTON: Yeah. Their decision was very nuanced and it still remains that if you're behind a single point of delivery which is generally going to be every building that for market rate housing you can't share across service delivery points.

MR. STONE: You have that same problem whether it's affordable or market rate.

MR. SAXTON: They have made a special allowance for affordable housing that that rule does not apply. We should talk.

MR. GABLE: Mike Gable. I think I have sort

of a more generic comment after hearing the previous comments on the subject and that is maybe staff needs to think about a more generic solar access definition where if a building, aside from subdivision which can keep the 70 percent or whatever you work out with CBIA, it's just more generic for all buildings of some solar access definition where if a building doesn't have the access essentially, regardless of what type it is, you're exempt. Why don't you think about that a little bit.

MR. SHIRAKH: Thank you, Mike.

MR. NESBITT: George Nesbitt. First on the solar ready. So single-family only in subdivisions of 10 units or more, correct?

MR. SAXTON: Correct.

MR. NESBITT: Multi-family only if it's 10 units or more or all multi-family?

MR. SAXTON: Eight units or more.

MR. SAXTON: Okay. I must have missed that. I got up too early. I missed that on the train. In the definitions you define ACCA Manual J, Manual S and Manual D but what we usually forget is Manual T which is one of the most important and that's actually getting the grills at the end of this system designed right.

The air barrier definition says the insulation must be in contact with one side. Yet, I think that

needs to be changed to either in contact with at least one side and/or in contact with the air barrier with an ‘s’ so an air barrier or air barriers in the case of walls.

On the duct system, I guess it was not totally clear. I think what you’re trying to say is that if 75 percent of the duct system is new it is considered as a new duct system say for purposes of duct leakage whereas if it was less than 70 percent you’d consider it as an existing duct system and it would have to meet the 15 percent. I think that’s what you’re intending to define but it did not read to me very clearly.

MR. MILLER: Jeff Miller. The thing we’re trying to capture is how to differentiate between an entirely new system in an alteration situation versus a system that’s an altered system.

MR. NESBITT: Right.

MR. MILLER: And the requirement is different for the two. This is our draft proposal for how to do that.

MR. NESBITT: Right.

MR. MILLER: And if you have comments, we’re really open to that.

MR. NESBITT: Yeah. It wasn’t really entirely clear. I think early on what people figured was that

they left the sheet metal boots at the registers, they replaced all the rest of the ducts in the system yet it was an existing system yet there's nothing stopping you from sealing it effectively. So I think that's what—I read it as your intent although I didn't find the wording to be too clear, I guess.

MR. MILLER: I'll be open to your suggestion, if you have a better one.

MR. NESBITT: Yes. Then under window definitions, I'm going to jump ahead to the default U-value and solar heat gain tables—actually just to the solar heat gain coefficient table.

You have clear glazing and tinted glazing but it's not defined. We either need to define it there or in the definition section with windows.

MR. SHIRAKH: What's not defined? Tinted?

MR. NESBITT: Tinted is not defined. I think most of us would understand what clear is. Is a low-E code tinted? I mean there's the bluish and the greenish so I think that's missing as a definition.

MR. SHIRAKH: Okay.

MR. NESBITT: Nothing on lighting. I can't illuminate you on that.

MR. GABLE: Mike Gable again. I forgot a few things. On 110.7 limiting air leakage, I don't want to

take much time on this, can staff simply explain the distinction between this sanction and prescriptive requirements around air leakage that are new in either res or non-res? Is there a sort of simple way of explaining? Because a lot of this stuff looks like much of the stuff that's in prescriptive. Does anyone on staff want to take that on or we can do it offline.

MR. MILLER: You're talking about envelope leakage, yes?

MR. GABLE: Yes.

MR. MILLER: That's not my area. That's you and Payam.

MR. GABLE: We can do it offline then. And, finally, on Section 110.6 on eliminating the center of glass calculation as a default value. I still want to suggest that it shouldn't be eliminated yet. It should be reduced from 10,000 to maybe 1,000 square feet. We should keep it as a safety valve for some unresolved issues about CMAST and the prescriptive values or put something in there that—a default calculation to prove by the Executive Director so leave it open about what that other thing might be just to leave the chance that we have to work out some temporary solution that we don't anticipate with the new standards. Thanks.

MR. SHIRAKH: What would that do if we kept

1,000 square for nonresidential building?

MR. GABLE: The idea being that—for small projects where it's a limited amount of glass involved, if there's going to be problems or issues with the new standards and looking at CMAST values and getting certified values, it may be a lot of overhead involved with dealing with that in the first year or two of the standards until we know kind of how that's all going to work out so we can talk more about that offline.

MR. SHIRAKH: All right. Thank you. Any more questions on definitions and solar zone? Online? Okay. Moving right along.

MS. BROOK: Mazi asked—this is Martha—this is Section 110.2 and we've updated the air conditioners and heat pump efficiency tables to reflect the new federal appliance efficiency standards.

MR. SHIRAKH: So this one is the upgradable setback thermostats. This is a mandatory requirement for newly constructed buildings and covers almost all residential units and some nonresidential occupancies where currently setback thermostats are installed. The requirement is that they should have an upgradable setback thermostat instead of just a regular setback thermostat. And the upgradable refers to the fact that there will be a port that can receive a communication

module. That communication module will upgrade the thermostat from a setback thermostat to the communicating thermostat so that's where the term upgradable refers to.

When the subdivision is built the thermostat is installed, the setback thermostat, and then after occupancy, if the homeowner chooses, in cooperation with the local utility they can get a module and insert that into the thermostat and then they can enable the communication and then take advantage of the various utility programs that are offered.

So then the language is such that all unitary heating and/or cooling systems including heat pumps that are not controlled by a central energy management control system shall have an Upgradeable Setback Thermostat. If there is any kind of EMCS System that is controlling their air conditioning system then this UST will not be required.

The USTs that will go into newly constructed buildings shall not have onboard communication devices so when it is installed it is basically a setback thermostat. And again, the upgrading will be up to the occupant and the local utility.

When it is enabled, there will be some default offsets of +/- 4°F for both price and emergency events.

The occupant will be in full control of the device including the override functions. Even after installing the module when the thermostat becomes enabled, the communication part of it, if there is a DR event of either price or emergency the occupant will have full control of either changing the set points or actually overriding the event and basically restoring the thermostat to the conditions that existed before the DR event.

In existing buildings, we do allow onboard communications, USTs that have onboard communications. The reason for that is basically the homeowner is already there and if they want to make that choice, it's up to them. They can have onboard communication.

We have presented this concept in several of our workshops and the stakeholder meetings. Recently, I know we've have some comments from stakeholders such as from NEMA and Honeywell. We're still in negotiation with them. It seems as if our differences our narrowing somewhat. There are still a few technical issues remaining. We'll have more stakeholder meetings perhaps not next week but the following week to work through the remaining issues.

One of the other subjects is that within the code language is that we refer to Reference Appendix JA-

5 which is the technical specifications for the thermostat. That document is under construction, has not been fully developed and is not posted. We will post that as soon as we have it. The contractors are working to make that available as soon as they can. I must also mention that this is actually, this effort, is being sponsored by the IOUs, PG&E, SCE and SDG&E.

So with that I'll actually take any questions related to the USTs that are in the room or on the line.

MR. STEINBERG: John Steinberg from EcoFactor. This has come up a couple of times before and Mazi, as you were explaining the scenarios in which a UST would originally would be placed on a wall and eventually get a module plugged into it. You refer to a scenario in which, it seems to me, is likely to occur which is that a utility is the one, in effect, sponsoring the module that the module communicates with a utility. I just want to reiterate our strong desire to make sure that everybody keeps in mind that that's not the only scenario in which a communicating module will be plugged into a communicating thermostat. It's entirely possible that a consumer will elect will plug in a radio that communicates with a completely independent service provider that may or may not have any relationship with the local utility. I think that understanding needs to

inform all of the provisions of the old 112 about what can and cannot be done with a UST that has a plug-in radio installed.

MR. SHIRAKH: I agree. I just described one scenario but the ports, the module is there and the capabilities are much more digestible so.

MR. STEINBERG: Absolutely. As long as it's clearly stated and understood that that's not the only way in which these radios are intended to be used, then I don't think we're going to have a problem.

MR. SHIRAKH: In fact there's nothing in the code language that says this is the only communication for the utilities and in the technical specifications is where we can address it. I'll ask you to work with Jeremy—

MR. STEINBERG: I'd be happy to do so.

MR. SHIRAKH: Thank you. Any other questions related to the communicating thermostats? Anything online?

So now we're actually moving into Section 150 which is the mandatory requirements for newly constructed buildings. There are numerous changes in these sections. In Section 150.0 (a), (c), and (d) we increased the level of mandatory minimums for ceilings, walls and floors. The ceiling mandatory requirements

went from R-19 to R-30; for walls it went from R-13 to R-15, and for raised floors it went from R-13 to R-19.

Section 150.0(j). The water systems piping and insulation. We have new requirements here. All nonrecirculating hot water piping of ¾ inch (19 mm) or larger must be insulated now so that would be a mandatory requirement if you have hot water that is coming off of either the hot water heater or the manifolds if they're ¾ inch or larger they must be insulated.

The maximum length of 1 inch (25 mm) piping in a nonrecirculating domestic hot water distribution cannot be more than 15 feet (4.5 m). The exception will be the pipes that are dedicated for tubs. They can be longer than 15 feet.

Section 150.0(m)11 is that duct leakage is now a mandatory measure. This duct leakage is now a new requirement to the standards although up to this point it was a prescriptive requirement and all we're doing is basically moving it from prescriptive to mandatory section. It's something that needs to be done for the system to work right and it's routinely being done. I think it kind of simplifies it and has the support, I think, of the Building Departments.

MS. BROOK: We just want to do a timeout, just

for a second, Mazi. This is a process check for everyone on the phone and those of you in the room. Our agenda says that we'd get to this item this afternoon so we are definitely ahead of schedule so if any of you on the phone or in the room know of people who are wanting to hear about the specific recommendations for mandatory residential requirements, we're doing it now. We're not going to revisit it this afternoon.

MR. NESBITT: Martha, Mazi. We've, I think, skipped over the Section 110.6-110.8, the mandatory envelope measures for all occupancies.

MS. BROOK: Okay.

MR. NESBITT: So do we want to—

MS. BROOK: SO what we'll do is, Mazi is going to keep going through 150. I'll go back upstairs because I was supposed to put the slide deck together and make sure that I have that section for 110—

MR. NESBITT: Okay.

MS. BROOK: And then we'll do it. Does that make sense, Mazi?

MR. SHIRAKH: Yeah. And, in any event, we're way ahead of schedule so we may not be here until five but that's the way these things work. We can't predict the number of comments we get. You know sometimes we think it's a straight topic with no comments and we get

a lot. I was actually expecting a lot of comments on the UST and we didn't get any.

So, anyway, just continuing. The maximum length of 1 inch is limited to 15 feet except for—oh, we're talking about 150.0(j), the duct leakage. Now the new requirement is just being moved from 151 to 150 so it's going to be a mandatory requirement.

These are the lighting changes so I'm going to—

MR. FLAMM: This is Gary. I'm going to do the lighting section of 150.0(k). The changes to lighting have been edited. The section has been edited for clarity. The—We've replaced the luminaire efficacy table which basically set a threshold of 30, 40, 50 or 60 lumens per watt with a default list of high efficacy versus low efficacy luminaires. The concern was have is that a lot of Building Inspectors and contractors didn't know how to interpret luminaires based on 30, 40, 50 or 60 lumens per watt and they asked for a default table instead. What we basically said is that base fluorescent is high efficacy. LEDs that have been certified through the Commission are high efficacy, high intensity discharge are efficacy. Incandescent track lighting, a few other lightings, are low efficacy. So neither the Building Departments nor the contractors

need to worry about high efficacy versus low efficacy.

One of the reasons that—another season that we removed is that is because there are ENERGY STAR lamp standard, there are Title 24 lamp standards and we really no longer need to dry the efficiency of fluorescent and LED through Title 24.

So lighting in bathrooms. In the current standards, every room is one of three classifications. Lighting in bathrooms is in a group called, in the 2008 standards, bathroom, utility, laundry and garages. And the requirement is that each luminaire has to be high efficacy or controlled by a vacancy standard. So what's changing is that a minimum of one high efficacy luminaire shall be installed in each bathroom. And that can be on a toggle switch or that can be sensor. All the remaining low efficacy lighting will continue to be required to have a vacancy censor.

A requirement that vacancy censors are installed in garages shall use ultrasonic dual technology or other method for occupant detection which does not rely on line of sight. So this will assure that these vacancy sensors will work.

A clarification for low-rise residential buildings with 4 or more dwelling units, multi-family dwelling units. If there is outdoor lighting not

covered elsewhere in Section 150.0(k) it shall comply with nonresidential outdoor lighting Standards. Outdoor lighting, nonresidential outdoor lighting, is regulated—it has been regulated since 2005 and it was inadvertent that basically for apartment complexes which multi-family dwelling units have to meet the outdoor lighting standards.

So low-rise multi-family residential buildings. Currently it says that common areas have to be high efficacy luminaires or controlled by an occupant sensor. To differentiate between a multi-family building that is predominantly dwelling units versus a multi-family building that is predominantly something other, let's say you have an office with a gym and etcetera rooms. We've broken it down into two classifications. If there's less than 20 percent common areas in a building the current requirements remained. But if there are greater than or equal to 20 percent common areas, actually it's greater than, those areas shall meet nonresidential lighting requirements. There's a new requirement that lighting installed in multi-family corridors and stairwells have an occupant sensor to reduce lighting power by at least 50 percent when no one is present.

Appendix JA-8, Reference Appendix JA-8, was

put into the 2008 standards because at that time there were no national standards for the testing of LED luminaires. What we required in 2008 was in order for any LED luminaire to be classified as residential high efficacy LED it had to be tested in accordance with Reference Joint Appendix 8. About the same time that we adopted our standards, IES adopted LM-79 which became the nationally recognized testing protocol for LED luminaires. So Appendix JA-8 has been modified. It now cites the testing protocol in LM-79 but elements of JA-8 were retained. It's been edited for clarity. One of the confusions is that the requirement to certify LED luminaires only applies to residential luminaires and there have been a number of products certified through the Energy Commission that are not residential luminaires. There are even housings that are not complete luminaires that have been certified. This is an attempt to clarify some misinformation.

Basically, an LED luminaire must be certified to the Energy Commission in order to be classified as a residential high efficacy LED. If it is not, it shall be classified as low efficacy regardless of its efficacy. The 30, 40, 50, 60 lumens per watt table that we had in Section 150.0(k) has been moved to JA-8 and the numbers have been changed.

The JA-8 establishes a minimum color temperature for indoor and a color temperature range for outdoor, not a minimum, but a color temperature range for both indoor and outdoor. There is a minimum color rendering index of 90 that has been established. A clarification that no incandescent sockets of any type shall be classified as a LED luminaire. There are minimum testing lab requirements and there are labeling requirements.

I'm turning it over to Mazi.

MR. SHIRAKH: Okay. Section 150.0(m)12, these are mandatory requirements for air filtration. Labeling of air filter grills specifies requirements for labeling of filter grills for design airflow rate and design pressure drop to assist homeowner in selection of correct replacement air filter products. That basically—this is designed so that the homeowner, when they go out and buy these filters, they choose the right filter for their home.

The second bullet, air filter efficiency – specifies a minimum MERV 6 efficiency consistent with ASHRAE 62.2 requirements.

A pressure drop specifies use of air filters that perform at a maximum clean filter pressure drop of 25 Pascals as rated using AHRI Standard 680, for the

applicable system design airflow. This is requirement for pressure drop. More stringent requirements (smaller values for allowed pressure drop) may be specified by system designers or by 150.0(m)13.

And the fourth bullet is labeling of air filter products and requires air filter products shall be labeled by the manufacturer to disclose the AHRI Standard 680 performance ratings for airflow rate, the initial and final resistance or pressure drop, dust holding capacity and particle size efficiency. They all have to be disclosed. This will enable the home owner to select an air filter that will work properly in their system.

Again, all these labeling requirements are designed to help both the homeowner and the designer to select the right filter that will work in the homes.

Section 150.0(m)13A. These are Duct System Sizing and Air Filter Grille Sizing.

The first bullet establishes the mandatory requirement to either have a size return—to properly size the return duct and the filter grills in accordance with the tables that’s going to be in the standards 150.0-A and B or basically test the system to make sure you get the proper fan watt draw and air flow requirements. You have to do one of them, not both.

You either do the return duct design and the grille sizing or you can test the system. Either one of them passes and it's good.

The second bullet has to do with the zonally controlled system. Basically this bullet says that in every mode, the zonal system must pass the air flow requirement and the fan watt draw. It also, the last sentence says bypass ducts are not allowed to be used. You can use zonal systems as long as it's not a bypass duct and if you do use a zonal system it must pass the CFM requirements and the fan watt draw in every zone. The requirements for this are included in the Reference Appendix RA-3.3.

Section 150.0(0) is ventilation for indoor air quality. We've already referred to the ASHRAE 62.2 for these requirements. The change here is that we'll be referring of the most recent ASHRAE, 62.2 which are the 2010 versions and the addendum that comes with it. It's that clarification.

The second bullet is the requirement of installation and performance of both whole-building ventilation and for local ventilation exhaust. That's the bathrooms and the kitchens fans. They must be verified by a HERS Raters. So, basically, it's adding a HERS Rater requirement to the existing 2008 requirements

for these strategies to deal with these air quality requirements.

And the third bullet is to add requirements that continuous operation of central forced air system fans used in central fan integrated ventilation systems is not a permissible. Basically you can't use your central air handler system to meet the indoor air quality requirements because those are energy hogs so you have to use one or the other strategies.

So this is a new requirement for fenestration products. Basically we never had mandatory requirements for windows in residential units before and now there is one and it's a U-factor of 0.57. And there is no SGHC requirement.

MS. BROOK: Okay. Just to clarify. I think the confusion is that on our agenda we talk about revisions to the mandatory envelope requirements in 110-110.8 and you're talking about them in 150. So maybe you could explain where they actually reside and which one is right and which one is wrong.

MR. SHIRAKH: Okay. I need to look at that.

MS. BROOK: Okay.

MR. SHIRAKH: So any comments on Section 150?

MR. VARVAIS: Yeah. I'm Dan Varvais. I'm with Spray Foam Alliance and Bayer Material Science.

Let me start by saying the SPFA appreciates all the efforts we've had working with the Commission and rewriting JA-7 and the work we've done on developing a new open cell compliance option that's yet to be adopted and the language that's been incorporated into the RA-3 document. It's an exciting time right now for us to have this access to all this building science and all the information we have to improved energy efficiency and make that all part of the 2013 Title 24 documentation.

Unfortunately, we can support the minimum R-value changes, going from an R-13 to an R-15 and an R-19 to an R-21 because it really limits the amount of products that can be used. And I think we could reach the same objective by having the insulation on the outside of a building.

If I'm building a house in Southern California with two-by-four wall construction and code now says I have to put in an R-15 insulation inside that cavity, there's one product that—maybe two products—that will do that. It will exclude cellulose. It will exclude open cell foam. It will exclude most cotton batts and there's only handful of fiberglass products that will be able to do that.

MR. SHIRAKH: I don't think we specified that

it has to be cavity insulation. It just says it has to be R-15.

MR. VARVAIS: That's what I'm saying. There's not that many products available that will do that. It's a specialty product. And I want to make that point.

In cleaning up some of the other language in the code yesterday afternoon when this comment, I'll make and say it on the tables from 150. I talked about the note when everybody was dying to go to lunch about that if you have a high-rise hotel/motel with close cell foam it requires that that product be inspected, a third-party inspector to go in and take a look at it. I talked to staff about that after the meeting and I found out that the purpose of that language was to make sure that the insulation is installed correctly.

If it's important enough for—if the quality of the insulation is important for one product than it should be equally important for all the products. One of the goals that SPFA has with this code cycle is that we're able to go through and address all the issues for all insulation products that in the 2013 version of the code it's represented fair and equal across the boat. Because to have a requirement on a high-rise building if you use spray foam, it's the—the language can be

construed dispunitive because now the property owner has to pay more money for somebody to come out and do the inspection for the spray foam insulation but they don't have to do it with the other products. See what I'm going with that?

One of the things, in conjunction with that, this year I had the privilege of attending HERS training through CalCERTS. The training that they did was outstanding. I've taken training for 20 years, various organizations across the United States, CalCERTS training was by far the best I ever attended. But they're really limited on the material they have to train HERS Raters about the proper application and inspection methods for spray foam. So even when you have that requirement in there, when the HERS Rater shows up, they're really not prepared to do what's written in the code right there.

Spray Foam has been working with RESNET. We've signed a memorandum of understanding to help train their trainers so understand the proper installation techniques and what to look for when installing spray foam. We'd like to make that same offer to the Energy Commission and to the HERS trainers in California too.

If there's a requirement for one insulation product, we'd like to see that requirement be spread

across to all insulation products. If there are compliance credits for the application of one product, we'd like those compliance credits to be available to all products. Thank you.

MR. SHIRAKH: Okay. Thank you so much. Have you talked to Payam about your concerns?

MR. VARVAIS: Yes, I have.

MR. SHIRAKH: Okay.

MR. STONE: Nehemiah Stone with the Benningfield Group. Two issues on multi-family. One in the—in what you were showing about water heating. Your slide said 15 feet of 1 inch pipe maximum but the text of the standard says 150 feet. It does say 4.5 meters so it's obviously not 150 feet but that's just a typo you should fix.

In the application of that though, I wonder if you thought through—I'm not against reducing the amount of hot water loss but I'm wondering if you though through all of the implications of this because if you have a smaller multi-family building, six units, what this essentially does is require even that small building is to go to a recirc system because—in order to meet the fixture unit requirements, you can't do that with something other—with something smaller than 1 inch pipe and so by saying you can't have more than 15 feet

of 1 inch pipe, now you're going to have to go to some other kind of system.

The other is on 150(o) and it's actually part of the language that you're not proposing to change. That looks a little odd to me. It says "All dwelling units" which means not single family but multi-family too and then the standard that's referenced 62.2 Ventilation Requirements for Low-Rise Residential. And then what's required in order to make sure that you've met that is diagnostic testing. The diagnostic testing for high-rise is not mature yet.

As you know, we have a PIER contract with you and with Western Cooling Efficiency Center to figure out what exactly needs to be done there. In a lot of high-rise you're not going to be able to—diagnostic testing isn't going to show you that you can't meet 62.2 the way buildings—the way ventilation typically works.

I don't know whether the intent was for it to just apply to low-rise residential but it does say all dwelling units. Thanks.

MR. MCGARAGHAN: Mike McGaraghan. I just wanted to ask if you guys could flash back to that slide since we got to Section 150 a little earlier than we anticipated. I know in case anyone was trying to call in and we went through it real quickly and a lot of

these comments are about the water heating, insulation sides. So at the beginning of Section 150 it might be helpful if we can flash it on the screen and perhaps leave it on the screen for some of the discussion. I think Yanda Zhang may have a comment on this too. Thanks.

MS. BROOK: [Off-mic]

MR. MCGARAGHAN: So while Yanda is—I think this may be the first time that he's seen this slide so hopefully he's online and is taking a look at this now. We wanted to flag this for a minute because I think there's a discussion that's ongoing between the Case team and the Commission and there's been some sort of last minute communication last night between Danny Tam and Rob Hudler and so some of these values, I think, are different from what was in the original proposal.

MS. BROOK: That's right.

MR. MCGARAGHAN: And we're stuck with these but—

MS. BROOK: We're not stuck with them but we should probably take it offline. But if Yanda wants to make any kind of comment now in regards to what Nehemiah said as far as the—as far as multi-family can't meet the requirements, that'd be good. Otherwise, we'll move on to mechanical ventilation.

MR. ZHANG: I can make a quick comment. This is Yanda with the Heschong Mahone Group.

MS. BROOK: Can you speak up a little bit, Yanda?

MR. ZHANG: Can you hear me better now?

MS. BROOK: Yeah, that's a little better. A little higher would be even better.

MR. ZHANG: So I have two comments, maybe the first is in response to Nehemiah's comment about small size multi-family. My understanding is that the recommended requirements—are we talking about the—

MS. BROOK: No, we're not. In fact, I don't even know if this is what you worked on, Yanda. This is Mark Hoeschle's recommendation. So—

MR. ZHANG: Right. So what I was about to say it that maybe we can talk later—this is Mark Hoeschle's proposal which is related to single family water heating system.

MS. BROOK: Okay. We'll talk later about the multi-family things.

MR. ZHANG: Right. Two things. The mandatory requirement for pipe insulation. 150(j) is not listed here. It describes pipe insulation requirements which are also linked to Section 123, now 120.3. Basically the code has relatively uniform part insulation for

(indiscernible). Yesterday we didn't make a comment because I think it's more important to make comments here.

What we noticed was that Table 123(a) has been changed to be consistent actually with 90.1. Along with that we also noticed that the row for reinsulation, pipe insulation, has been deleted and combined with space heating requirements. In our case studies, space and water heating, we've done cost effective analysis and demonstrations for pipe less than 2 inch for recirculation systems. Insulation with 1.5 inch is cost effective. We, in some way, recommend that the table be revised to reflect that recommendation. Basically for pipes less than 2 inch should be set around 1.5 inches.

MS. BROOK: Okay, Yanda. Actually, I know that staff is actually discussing this right now upstairs and so we will get back to you about the pipe insulation tables. All right?

MR. ZHANG: Sure. I just want to make comments to be on record. We did discuss with Commission staff yesterday.

MS. BROOK: I think the discussion is ongoing and we'll continue until we get it resolved. Now Bruce can you come up and talk about mechanical ventilation and respond to Nehemiah's comments please.

MR. WILCOX: Yeah. I'm Bruce Wilcox. I'm a consultant to the Commission on the Residential Standards Development.

Nehemiah, I don't believe there's any intent to try and apply 62.2 to high-rise residential. I didn't quite understand your question but 62.2 is definitely—the scope excludes high-rise residential. I don't think there's any intent that it should be applied so if there's some fault in the language here we should get that straight. Does that answer your question? Thank you.

MR. GABLE: Mike Gable. Real quick, I think the fenestration requirement should be moved to either in front of installation or right after installation because it's tucked in the back of the section. It's really important that you want to let people know that it's really there. So I'd move it up, if you would.

MR. SHIRAKH: When you do that, then it changes all the other numbers and then we have to update all the manuals and everything else.

MR. NESBITT: It's too much work, Mike. George Nesbitt. I had noticed the 150 foot on the 1 inch pipe and thought, "My gosh, that's a lot."

MR. SHIRAKH: Actually it is—what it does is we put a dash across 5 but you can't see the dash.

MR. NESBITT: Okay.

MR. SHIRAKH: Because we deleted—it was 10 and we put a dash across zero—I'll fix that.

MR. NESBITT: Yeah. Yeah. I would definitely have to agree with Nehemiah on a multi-family—

MR. SHIRAKH: It was 10 before and we tried to change it from 10 to 15 and I think maybe—

MR. NESBITT: Leave it at 10, cut it down to 5. Cross out the 1. I mean, definitely, for a smaller multi-family without recirc you might not be able to do that.

On the 62.2 just because that came up too. These are, of course, all the low-rise mandatory measures so they don't apply to the high-rise. I think in the language, once again, you've referred to field verification and diagnostic testing. It should be clear that that's HERS Rater.

On lighting, just—I think the lighting is pretty good, generally. Although, ultimately, I think we need to make lighting and residential a budget item.

On the bathroom, the requirement for one high-efficacy light, what I can see is that you put in a 13 watt bulb in the fan and then 500 watts of incandescence on both sides of the mirror. I guess the only real thought would be to either it all has to be high-

efficacy or we need to use the 50 percent rule like we do with kitchens and make them put in more high-efficacy lights to justify their low-efficacy lights which is ridiculous. That's the only thing. You could have no high-efficacy wattage and it's not used and they use only low efficacy.

Question on back draft dampers. Would that apply to a heat recover ventilation? Because I don't think most of them have back draft dampers built in. Usually we're thinking exhaust devices, kitchen/bathroom exhaust. So. Any thought on that at the moment?

MR. MILLER: I'm not familiar enough with the heat recovery devices to answer your question.

MR. NESBITT: Okay.

MR. MILLER: I think the intention definitely is for bath fans. I think it should be applied to those devices.

MR. NESBITT: It's a fan that does both supply and exhaust, so it's typically balanced ventilation; whether you recover energy from it or not—

MR. MILLER: If it creates a leak, a potential leak, it seems like there's an issue. But, again, I would have to look at the technology to answer your questions.

MR. NESBITT: Because I don't think back draft

dampers are commonly built into those.

On the water heater section, we have now requirements that basically make the water heater high efficiency ready. You need a condensate drain; you need to have an electrical outlet. You either need to have a flue or rather a vent, actually it would be a flue if it's sealed combustion it'd be a vent but it's not. Or the ability to put one in but it only applies to if you're installing a gas water heater currently. I would think that if you're putting in an electric water heater, you would still want to have the condensate feature in because you may want to put in a heat pump water heater and I believe you'll need a condensate for that. You may want to have an electrical outlet there because the whole idea is partly that you're ready for solar as well as any other high-efficacy, efficiency, water heater. I think whether—we wouldn't necessarily want to require that they have a gas hookup because they may not have gas but it should be as ready to be converted into something else.

On the slab edge insulation you're required to have slab edge insulation with a heated floor slab yet the section doesn't actually offer or reference what you're required to have. It talks about moisture absorbent and what not but you don't make any reference

to what the required insulation level is for slab edge.

On pipe insulation, and I kinda raised this yesterday, the tables are set up. You've got conductivity per inch that's required for the different temperature ranges and then you have a separate table that has, for the difference ranges and size of pipe, that you need a certain minimum thickness of insulation. For almost every range it's 1 inch of insulation and the conductivity is equal to about an R3.4 or R4. That's sort of the range. Every piece of pipe insulation that I've been in has been less than 1 inch yet the R-value has been R-4 or R-5. It would be better than rather than expressing a thickness of pipe insulation, what the minimum R-value of the insulation is. Because I don't— it's actually hard to find the insulation I buy in 1 inch. It's not stocked. I would also say that a lot of the insulation in home centers and hardware stores, it's all 3/8s and ½ wall that's in the R-2.5 range.

Then where you define the minimum insulation levels for ceilings, walls and floors. The language says, so the ceiling insulation has to be at least R-30 for a framed assembly. Is that a framed roof rafter assembly or a framed attic assembly and what is the spacing? Because it doesn't say. Is it a 16 ounce center, is it a 24 ounce center? Because those things

do matter.

You also have a section that says if you're doing continuous insulation it has to be at least equal to the framed insulation but we haven't actually fully defined which assemblies those are. We should—it should probably also include the equivalent U-value of the assembly just so it—and also the statement that you have to at least have an assembly that is equal to or better. Although, that's what all of our understandings are it doesn't actually say that.

And then one other comment on mandatory measures. We have, like I say, slab edge insulation is required for heated slab, 62.2 is a mandatory measure, we've got mandatory duct testing now. Those should also still be on the package listed. The package is a list of mandatory measures, effectively. And such things also, especially the slab edge insulation on the performance compliance forms. It does not come up on the form because it's a mandatory measure because you don't get credit for it. Yet, if it says R-0 what's the likelihood that the enforcement agency is going to enforce that? And I've had personal experience with that. Whether you get credit for it or not in the code, it should still be on the compliance form. It should be on the package list. This is just a reminder that this

is a requirement rather than saying it's mandatory so we put it off on another form which may or may not have attention paid to it.

MR. SHIRAKH: I'm not sure what you're suggesting here. Mandatory requirements used to have their own checklists. We were told to basically get rid of it and put it in CF6R. That's where they reside now. What are suggesting? That we put them back in CF1R or?

MR. NESBITT: Yeah. I mean they are currently their own form. I mean right now it's still MF1R.

MR. SHIRAKH: There is no MF1R. I mean there's the MF1R that's just a list, there's no check boxes or anything on MF1R.

MR. NESBITT: Right.

MR. SHIRAKH: It's in CF6R is where the certificate of installation is where the installer will basically say that I've installed this and that. So I'm not sure what it is that you're suggesting.

MR. NESBITT: What I'm saying is when we list out packages and also on CF1Rs there are definitely certain things that need to be reinforced as it's a requirement rather than pushing it off to the 6R which happens at the end, if it's actually even happened. Because it's not enforced. I had a heated slab project a long time ago and the Title 24 said R0 and I asked the

Energy Commission but it's required because most people leave it off. It's required but most people leave it off. I put it in because that was my legal responsibility. So if it's not there, especially on the 1R, the mandatory measures, it's less likely.

MR. MILLER: Jeff Miller. We have mandatory HERS verifications now and it presents a new implementation challenge for us that I don't know if we've worked out all the details yet. There will be decisions that have to be made at the mandatory measure level and captured in documentation. I think the installation certificate is the way we will address your concern.

MR. NESBITT: I'm just saying that if it's listed in the package requirements for all the climates it's just another reminder rather than being pushed off to the side with other things. And if it's a mandatory measure, why shouldn't it be on the compliance documentation. That's another reason for it not to be enforced.

MR. MILLER: So how the packages are structured, that's not my area but the documentation, I am looking at. Clearly there's going to have to be a way for people to understand what the mandatory measures are and to comply with them and to document them and we

went in to address that.

MR. SHIRAKH: Okay. Thank you, George. Mike?

MR. HODGSON: ConSol representing CBIA. I have some questions and I need some education so we'll start with the simple ones first.

Ceiling insulation. You're going from R-30—you're going from R-19 to R-30, for example. And on the mandatory feature form which we still use but we don't check any boxes anymore, it says R-19 and that's the minimum. But the way the code is written it says that you can basically use a weighted average. I just want to understand that by going to 30 we can still have an R-19 cathedral ceiling and an R-38 ceiling as long as the weighted average is okay or above 30 then we can move forward?

MR. SHIRAKH: Yes.

MR. HODGSON: Okay. Then I think there's going to be an issue on some of the forms. One of the issues right now is that it says R-19 and we really believe it's R-19 and we can't go below it. When we go to 30 we're going to have an issue on the mandatory feature form. We'll figure that out.

MR. SHIRAKH: It's a weighted average. We haven't changed that.

MR. HODGSON: Right. Okay. No, I know it's

not changed. It's just the way it's interpreted in the field.

MR. SHIRAKH: Okay.

MR. HODGSON: First real comment has to do with the R-15 wall insulation. Now that we have some experience using the modeling for 2013 it looks like we can actually meet compliance cost-effectively in some of the mild climate zones with R-13 batt insulation. So we really would appreciate maintain R-13 as the minimum wall insulation. However there's probably a bigger issue there and that is by specifying R-15, basically you're specifying R-15 batts because what you're requiring is cellulose which is a spray product or a low density foam which is a spray product which can't get 15 in between the two-by-four cavity then they have to go to a foam insulation. That really puts that industry in a competitive disadvantage if the builder can cost effectively meet compliance at whatever you set the target to be with an R-13 batt and now they're being pushed to do something more that their competitor's not. I don't think that's the way the Energy Commission intends these things to do. They really want a level playing field with choices so that we have competitive pricing. I think that mandatory feature should be rolled back to R-13.

MR. SHIRAKH: Okay.

MR. HODGSON: Compliments to staff on filtering labeling. I know it's been a fun issue among us for several years. I'm not sure what legal authority you have to do that but more power to you.

Also, I would like to know if the filter manufacturers have been informed of the labeling requirement and, if so, what's the reaction?

MR. MILLER: Jeff Miller. I'm not aware that we've communicated with any filter manufacturers directly. But what I can tell you is that there's a proposal introduced into the Title 20 process to require labeling on all filter products. Although it's really preliminary in terms of whether it will be accepted into the next rulemaking I was told by staff it is a very candidate for the next rulemaking. And there's good reason for us to anticipate that air filters would be required to be labeled and that would be in place in time for the effective date of the next—

MR. HODGSON: Well, we will pledge any assistance needed from CBIA to help in that and support that effort. I volunteer Bob Raymer and all of his time. No, it's a very important issue.

MS. BROOK: Right. And, in the meantime, we can communicate with the actuary committee that we have

communicated with in the past about in regards to filter labeling. That's a really good place where manufacturers go to discuss technical issue. That's a good way for us to connect with that industry.

MR. MILLER: You said ASHRAE, did you mean AHRI?

MS. BROOK: Yeah.

MR. MILLER: Okay.

MR. HODGSON: And the question then becomes if we're specifying the correct spec? Whether if it's a MERV or some other specification that the filter manufactures want. The point is that we want a good label and we want to be able to understand the pressure drops. So however we can help you, let us know. Okay.

We still have—the building industry still has significant concern about the prescriptive return requirements. They're basically doubling in size. The other alternative is to drive toward performance testing. I think that's something the Commission should actually look it. In the performance world for HERS Raters, probably the weakest link is the return air grille. We really don't have equipment in the field that accurately measures that. The way the standards are written currently with a larger, basically doubling the size of the return grille, you're going to be—

builders are going to be choosing a less cost method which is going to be performance and then rolling the dice as to whether or not they're going to pass that. It's not a good situation and the most accurate that we can make those tests, the better. That's a piece of equipment we don't have. We use the piece of equipment but I'd say it's plus or minus 20 percent. That's a little too large of a range to be accurate.

Last comment is that I was a little surprised by the 1 inch pipe regulation. The last conversations we've had that the compact design was going to be removed as part of the regulation. This sounds like this is going back to the compact design?

MR. SHIRAKH: No.

MR. HODGSON: No. Okay.

MR. SHIRAKH: The compact design is still in the language that's posted but that's going to be removed. We basically posted it with that language but there was nothing here that talked about compact design.

MR. HODGSON: Okay.

MS. BROOK: We did actually remove it and it hasn't been reposted yet.

MR. HODGSON: Okay. But there is a regulation on 15 feet of 1 inch pipe maximum for hot water.

MR. SHIRAKH: So we went from 10 feet to 15

feet.

MR. HODGSON: Right. Okay.

MR. SHIRAKH: Or 150 according to the Nehemiah.

MR. HODGSON: I think it's 150 right, Nehemiah?

MR. SHIRAKH: Compact is out.

MR. HODGSON: Okay. Thank you.

MS. BROOK: And we'll be reposting probably, I would say, within a few days because of in the process of preparing for the workshops we found some things that we've already cleaned up and it hasn't been reposted.

MR. HODGSON: Great. Thank you.

MR. DEVITO: Eric DeVito for Cardinal Glass Industries. I guess first a housekeeping matter. Should we be addressing the 110 mandatory measures now or is that going to come up again later?

MR. SHIRAKH: No, this—

MR. DEVITO: Okay. So this is it. If we have any issues with 110 mandatory, we should raise that now. Okay. I'm actually going to focus on 150, at the moment.

I gave a brief introduction about Cardinal yesterday. We're a U.S. glass manufacturer. We make low-E. We make IG units. You name it, float glass. Very supportive of implementing, and I applaud you, for

implementing a mandatory maximum fenestration U-factor. It was discussed yesterday with other envelope components why a mandatory minimum or maximum are necessary because it prevents backsliding and it prevents really bad practices from according. We certainly support including fenestration in the mix of other mandatories.

The IECC has actually had mandatory fenestration maximums since 2004. So California is jumping in and at least is going to be instituting a measure that will stay on plane with the IECC.

MR. SHIRAKH: Do you know what their level is?

MR. DEVITO: I do. It's—I'm going to get to that in a second, actually.

MR. SHIRAKH: All right.

MR. DEVITO: Excuse me. The obvious reasons for fenestration are comfort; comfort is very tied to energy use. If an occupant is uncomfortable, they will adjust the thermostat. Peak, that's a reason to have an SGHC maximum, which you haven't proposed. Also, HVAC sizing.

So, what the IECC does for California, they do it a little differently. They set a U-factor maximum for certain zones, colder zones, and then there's a break point at which it switches, where it sets an SGHC

maximum for climate zones that have more of a cooling requirement.

So for California to take the IECC requirements and mesh them together would be a 0.48 U-factor which would be the maximum that would apply to certain zones in California. In other California zones, the IECC would put a 0.50 SGHC maximum. And what the IECC does in essence it does require low-E. It would require low-E for all of California, some form of low-E. Not the extra low solar that we've been talking about but just some form of low-E which makes sense. There really is no reason to allow clear glass other than maybe a passive solar exception which we've detailed in our written comments. But that issue aside, we think that it makes sense for California to be a little more aggressive with your standard. Lowering the U-factor below 0.57 we think all the way to the IECC's 0.48 would make sense and adding an SGHC maximum.

In our written comments, we reproposed the 0.4 U-factor maximum, 0.4 SGHC max because we saw your current standard has those, basically, as the prescriptive values.

And, just another point of clarification, we don't have the SGHC in zones where you have that requirement. So if it's no requirements, obviously

they'd be exempt from the max. We think that makes sense. Otherwise another alternative, if you're not willing to go that far, would be to match the IECC 0.48 U, 0.50 SGHC which we'd certainly be supportive of.

MS. BROOK: And are those mandatory requirements in the IECC?

MR. DEVITO: Yes.

MS. BROOK: Okay. Thanks.

MR. SHIRAKH: So I think the issue with having a mandatory SGHC was—had to do with passive homes and solariums and things like that.

MR. DEVITO: Yes.

MR. SHIRAKH: Is that an issue? I think it was Ken Middler—

MR. MIDDLER: No.

MR. SHIRAKH: It wasn't you?

MR. DEVITO: We—our comments that we submitted to the docket had some ways to deal with it. Number one, in an area where weighted averages go away. Really, if you're going to allow passive—forget the solarium for a second but a passive solar design. It's really the south face that matters. So you could either flat out exempt the south face from the max or it could be gotten through the area weighted average. You can have a lower SGHC on the others and you can go higher on

the south. You could design certified passive solar acceptance if you wanted to get real complicated. In other ways there are ways to do it. I wouldn't throw the baby out with the bathwater so to speak. If that's your concern, we can craft a way around it.

MR. SHIRAKH: Actually we had—originally in the SGHC requirement, I'm trying to remember why we took it out. Does anybody else have any objection to adding it? The SGHC mandatory? Like the IECC?

So maybe we'll make an exception for passive solar then it's probably good.

MR. DEVITO: Right.

MR. SHIRAKH: All right. We can consider that.

MR. DEVITO: Okay. Thank you.

MR. GABLE: Hi. This is Mike Gable again. There are a lot of implementation problems when you set a mandatory measure as a floor to be too restrictive. We have performance standards, we have prescriptive standards for a reason and you have to demonstrate overall efficiency. So the question is why be overly aggressive with the mandatory measure, especially since this is the first window fenestration in the state. I think there's a lot of law of unintended consequences. If you set values that are too restrictive, you're tying

people's hands unnecessarily. It can be really difficult and perhaps a backlash. While you're still meeting the overall efficiency that the Commission wants but you're tying hands component by component into a building.

MR. SHIRAKH: Right.

MR. GABLE: Because philosophically you have to be really careful that you don't do that. I think, in my opinion.

The other thing is, for example, right now you have the Table 116(a) which lists dual pane, non-metal fenestration. I would almost point to that and say I'm going the other direction. Because operable custom wood windows are 0.58, doors are 0.53. You have difference values. The other thing is that you don't have any allowance for garden windows, greenhouse windows or skylights as something different from the 0.57 that you're proposing. I would look at that carefully to and maybe look at Table 116(a) and say non-metal, dual pane is the floor. For SGHC I think having some value, not no value, is probably—and I think it's good to have something there. The problem is defining passive solar. You could use the performance method; you could get the passive solar effect by glass that's a little off of south. So you just have to be really careful in

thinking through the implications of that decision.

MR. SHIRAKH: I think those are the reasons we took it out. I must mention the reason that we are making the mandatory requirements a little bit stricter is basically because we feel building envelope is really important as the first line of defense for efficiency. Especially when we start getting into some sort of trade-offs with photovoltaics and so forth. Those are the reasons that we are recommending some of these measures but I understand what you're saying.

MR. GABLE: If you're going to outlaw any kind of custom assemblies, that's fine. Just be aware that's what you're doing and you're going to have to face some issues around it, that's all.

MR. SHIRAKH: Thank you, Mike. Nehemiah?

MR. STONE: Nehemiah Stone, Benningfield Group. One of the—and this is similar to what Mike said but a little bit different. Passive solar has a pretty specific definition and if you're going to make an exception for it, you're going to have to make a pretty specific definition in the standards. If you do that then places where it makes sense to have a real high SGHC and something else is shading but you don't meet the rest of the passive solar definition. You don't have enough solar mass, for example, as targeted. You

still shouldn't have a maximum SGHC that's allowable. If you—as long as the effective solar heat gain coefficient is low enough, the fenestration product itself does not need to have a low SGHC. Then you're still going to meet the requirements even if it's not passive solar, meet the needs. Excuse me. Thanks.

MR. SHIRAKH: Thanks.

MR. FISCHER: Mike Fischer. I'm speaking for myself although indirectly representing the insulation interests. We're interested in looking at where trade-offs work and we've been hearing about the windows side of it. I do have some history in that area. I will say that some of the issues that were raised related to sunrooms or solariums, that's why the IECC has separate language in there for those elements. They requires that it be separated from them in structure, controlled by separate equipment, separate thermostats. I know because I drafted that language.

IECC also includes an exception for up to 15 square feet which gets you your sun garden windows. Those solarium windows. The IECC also includes some other provisions that make sense for this. I would say passive solar is a great thing. I have it on my house in upstate New York and Eric has heard that before. I have trees that block the sunlight on the southern side

of my house in the summer and in the winter time, those leaves are gone and I get passive solar. So there's more than one way to do it. I don't know if you can in a prescriptive part of the code address those issues. As much as I would love to say put in windows that have a U-factor of 0.10 and sell my clients more insulation, tempting as that might be, it's not good practice.

As I said yesterday, I'll use the example today of the area weighted average. You've got to put limits on it otherwise you send your kid to the beach with SPF 50 on one side of his body and he gets burned on the other. You have to have choices. You've got to let the builders have some opportunities. You've got to let designers have some opportunities but you also have to put these things within certain parameters. I would suggest to look at the IECC for some of these little issues that can be resolved. It's simple language. Thank you.

MR. SHIRAKH: Thank you. Mr. McHugh?

MR. MCHUGH: Hi. So this is Jon McHugh, McHugh Energy. I'm kind of wondering if some of these issues about passive solar, if this is not something that can be captured in the compliance software. I'd like to hear what the staff's consultant has to say about whether the software will capture the passive

solar issue. So even if you use a SGHC to set the performance baseline, if indeed the passive solar issues are captured then through the software.

MS. BROOK: That's an invitation for you Bruce, to come up and defend your software. Our software.

MR. WILCOX: I thought it had to be a public domain, is that what we're calling it? So it's not yours or mine.

MS. BROOK: Theirs.

MR. WILCOX: So I think the passive solar is pretty well handled for the current calculations for residential. I think some of the commenters have brought up the issues that when you're talking mandatory measures then that's all outside of the performance standard. I don't think you want to be in a situation where if you're going to get a passive solar credit then you have to go to some extraordinary efforts to justify not putting in a low solar gaining window in your passive solar design. I think you have to be really careful with that. I think that's an argument for not having mandatory SGHCs.

MR. SHIRAKH: I think that we've kind of heard all of these arguments and we decided it's probably safer not to have it for this time around. Unintended

consequences. So I think I'm inclined to leave it out.

MR. NESBITT: Yeah. And one of the other things with these other higher mandatory measures is in the software what's going to keep me from putting in R-19? I mean, currently when you put things in the software that is less than a mandatory you can do it. You can do it as a new assembly. If we're allowed to area weight average is the computer going to be set up so that if I put in some R-19, that if I don't put in enough R-38 somewhere else that it's going to say, "Sorry, George. You don't meet the mandatory minimum."

MR. SHIRAKH: I'd say, "Sorry, Jack." I don't know.

MS. BROOK: Well that's just a software implementation issue.

MR. NESBITT: Yeah.

MS. BROOK: It's not a core function. That can be dealt with.

MR. NESBITT: Right. It's not something that I think we're doing very well right now with mandatories.

MS. BROOK: Yeah.

MR. NESBITT: It's pretty—

MS. BROOK: Yeah.

MR. NESBITT: A couple of—I just wanted to hit

on one thing on the mandatory equipment. I used to think that setback thermostats were always required and most people I talk to still do, yet there's the exception for four furnaces, wall furnaces, most room type heaters. And I'll ask a Jon McHugh as to why. Why would—so someone fills up their house with a bunch of room heaters. Why wouldn't we want them to be setback? I mean, I can think of one answer in the sense of electric baseboard. It's very expensive to do a line voltage thermostat that's electric resistant. You know, functionally there just seems no reason why we wouldn't want it to be setback.

MR. SHIRAKH: The exception is been there.

MR. NESBITT: Right.

MR. SHIRAKH: Nobody has looked at it. You're the first ones bringing it up.

MR. NESBITT: Then, since you said you wanted comments on the mandatory enclosure section two, I had a couple more things that I had brought up earlier.

There's an exception that allows you to put insulation on removable ceiling tiles which a 2,000 square foot building is not insignificant and it just seems like that's a practice we shouldn't allow. Period.

In 2005 the window default table had a credit

for low-E and also for a large enough spacer size. In 2008 those disappeared and now there's only a penalty if you have true divided lights or two smaller space sizes. I'd like to ask that we get those back.

The other thing is that we need defaults for triple pane windows and I'm especially speaking from the passive house standard size here that a fair number of people are importing windows that are not NFRC rated and you take a real hit because of that.

I don't know why there were removed. Obviously you would like windows to be NFRC rated.

MR. SHIRAKH: That's the reason—

MR. NESBITT: That's the main reason.

MR. SHIRAKH: The whole thing is to move people towards NFRC labeling using CMAST other than using default tables because default tables don't work the way they're supposed to.

MR. NESBITT: Yeah. It would still be a large penalty over what you would get if you had rated it.

MR. SHIRAKH: Especially in residential, there's really no reason not having NFRC labels anymore.

MR. NESBITT: Other than there are small enough manufacturers where people are starting to import from elsewhere and—

MR. SHIRAKH: Get them rated.

MR. NESBITT: And anyway. The other thing is there's—so there's the whole section on windows and there's the whole section on roofing and it's quite detailed in all of the requirements. Yet those sections are almost exactly the same in 10-110 in the General Requirements Section. You go through all of that at length there as well as in this section. It just seems having the same thing in that detail in two places either leads to it not being the same, it doesn't belong in one or the other or maybe it just needs to be referenced back to the other. So.

MR. SHIRAKH: Okay. Mike?

MR. HODGSON: Mike Hodgson, ConSol. Just kind of a format review question. In looking at the 150 attachment that you've posted, typically in code language you have existing code and then you have strikeout and then you have underlined. If it's typically underlined it's new language. And in what you have, you have underlined and bold. I'm trying to figure out what you mean by that.

MR. SHIRAKH: We don't mean anything by it.

MR. HODGSON: If it's—I'll just give you an example. Just so we can interpret what you've done. Well, there's a lot of examples. I think—well, it doesn't matter. It's HVAC systems bypass ducts. That

whole section is new but it's not only underlined and in grey, rather than red, I don't care about the color but then you have blue bold text and then you have blue not bold text. I'm trying to figure out what you mean.

MR. SHIRAKH: The different colors and the underlined—

MR. MILLER: I think we posted some changes and whatever was changed from the first posting—

MR. HODGSON: Okay.

MR. MILLER: may look different.

MR. HODGSON: And that's fine. I'm just trying to—

MS. BROOK: We'll clean that up.

MR. HODGSON: Well, it doesn't need to be cleaned up. I just think there's need to be a legend.

MS. BROOK: Well, I think it needs to be cleaned up.

MR. HODGSON: I think there's a tint behind it but we just don't know what it is.

MS. BROOK: I don't think so. I think its multiple authors and we—you know, we did direct staff that all changes needed to be reflective from the 2008 standard but we're not sure that we caught all of those.

MR. HODGSON: Okay. And I think that these are all 2013 new language but it looks like it's been

revised.

MS. BROOK: Right.

MR. HODGSON: That's what you're trying to highlight?

MS. BROOK: That's what we need to clean up; we're trying to clean that up.

MR. SHIRAKH: Different colors means different staff worked on it in different colors.

MR. HODGSON: Give us the color code—

MR. SHIRAKH: The 45 day—

MS. BROOK: No, no, no. No color coding.

MR. MILLER: Bill, are you blue?

UNIDENTIFIED SPEAKER: No, I'm not. They didn't give me a color.

MR. SHIRAKH: Any other questions?

MR. FRANCISCO: I'm Jim Francisco with Sierra Consulting. I'm here on behalf of the California Spray Foam Association. Mr. Varvais spoke about the R-15 versus the R-13. There's a real problem there because you have limited who can apply insulation into a wall. Our organization has gone through, not only the 150 set of pages but we've spent a long time going through the appendices of JA-4. There are a lot of misstatements. There's a lot of assumptions and we're not happy with any of them to be quite honest.

We think that you have done a disservice to the foam industry in this state. We would like, once again, for the fourth time this summer and for about the twentieth time in the last seven years to offer to bring our building scientists in to answer questions so you have a better understanding of who we are and what we do.

We're a major industry in this state, we pay our taxes, we pay fees, we pay licenses and we think it's time that we got recognition for who we are and that means we get a chance to have our input on this. That's all I've got to say.

MS. BROOK: Okay. Okay. Thank you.

MR. FRANCISCO: Jim Francisco with Sierra Consulting.

MR. SHIRAKH: Any other questions on 150.0?

MR. LEBRUN: Yes. This is Roger Lebrun.

MS. BROOK: Can you repeat your name? It got cut off.

MR. LEBRUN: Sure. Roger Lebrun representing Velux America.

MS. BROOK: Okay. Thank you.

MR. LEBRUN: I'm going to address mandatory maximum U-factor for fenestration and I wanted to point out that it seems that that single number limit must be

a vestige of the 2008 of code philosophy when skylights and windows were both assigned the same prescriptive U-factor. That has been, most appropriately, corrected in the 2013 version that I'm looking at so far in the table I'm looking at in 150(c). Please review whether 0.57 is an appropriate hard limit for skylights that have a prescriptive maximum of 0.55. It doesn't make a lot of sense if you're looking to allow some tradeoff with fenestration, particularly skylights; you're basically taking that option away.

MR. SHIRAKH: Not to make this applicable to skylights but we may have done it inadvertently, thank you.

MR. FRANCISCO: Thank you.

MS. BROOK: Any other online comments?

MR. SHIRAKH: I would like to suggest maybe, Commissioner Douglas, if it's okay that we break for lunch because we have other topics coming up.

COMMISSIONER DOUGLAS: Yes. I think that's a great idea. So let's break early for lunch and come back at 1.

MR. SHIRAKH: Okay.

COMMISSIONER DOUGLAS: Thank you.

[Session break. Group resumes at 1:04 p.m.]

COMMISSIONER DOUGLAS: All right. Welcome

back from lunch. Do we have everybody? Mazi? Martha?

MR. SHIRAKH: Good afternoon. I think we're going to get started.

So we're going to start the afternoon session with Section 150.1 which used to be 151. These are the Prescriptive Requirements for Newly Constructed Buildings. Again, we're just showing you the major changes. Not all the requirements in this section.

150.1(b). This is the section that describes the performance standards. This used to be a long section within this chapter. We have actually deleted most of those requirements from this section and moved it to the residential ACM Manual. There's just a paragraph left in there that briefly describes the process but most of the requirements are going to be described in the ACM.

Section 150.1(c). This section describes the insulation requirements. Two big changes. This time around related to insulation, the roof deck insulation that everyone talks about, this would be the requirement to add some amount of insulation at the roof deck. Either above or below in climate zones 9-15.

So in those climates zones 1-15 for the—if the above deck insulation option is chosen, it would be R-4. This would be continuous insulation. Above the roof

deck, below the roofing layer. If it's below deck insulation it'll be R-13. This would go between rafters.

The other big change in this section is related to the walls. In the heating—excuse me, in the cooler climate zones, the proposed requirement is R-21 between the rafters—the joists of the framing and R-4 continuous insulation. This would presume that two-by-six framing would be used instead of two-by-four and in the milder climate zones, 2-10, the requirements are R-15 plus 4 inch of continuous insulation. And in those climate zones, two-by-fours will continue to be used.

150.1(c)1. That's a QII, Quality Insulation Installation; this would be a mandatory requirement in all climate zones. I'm sorry. A prescriptive requirement in all climate zones. This was a compliance option under the 2008 standards.

150.1(c)3 is the fenestration requirements. Another relatively significant change. The fenestration U-factors 0.32 in all climate zones and SGHC of 0.25 in climate zones 2, 4 and 6-16. There's a couple of three climate zones here, milder ones, where the SGHC didn't make sense.

Skylights will have a U-factor of 0.55 and SGHC of 0.30 in all climate zones.

Some clarification and changes. The first bullet—this is Section 150.1(c)7. This used to be F7 for those of you who are familiar with F7 where all the heating and air conditioning requirements were. This has changed to (c)7. Most of this is related to illumination of the performance language in the section that I mentioned above. We're in the middle of renumbering everything.

So in the 2008 standards we had this requirement for saturation temperature measurement sensors or STMS. These were devices that were meant to be put into the air conditioning system on the suction and discharge to allow people—I'm sorry. This was a device that was supposed to be installed on the coil, outside coil, that would allow people to measure the saturation temperature without actually putting gauges on the air conditioning system. What we found was this was not received well. It wasn't working really good in reality. The manufacturers didn't come up with a procedure in trying to estimate where the saturation region is within the outdoor coil is kind of a tricky endeavor. We're removing this language and instead substituting it for a requirement of saturation pressure measurement sensor or SPMS.

So STMS are out. SPMS are in as an alternate

method. These would be alternate ports that would be put on the suction and discharge that would allow people to electronically measure the pressure of the refrigerant and be used for a refrigerant procedure. These are the same devices that would be used for any CID or charge indicator display that will hopefully be available by the time the standards would be effective.

The second bullet has to do with how we're going to treat mini-splits and multi-splits for which there are no known way of measuring or verifying the refrigerant charge. So we're providing an alternative method for these devices. We're allowing the weigh-in method in installation for the installation certificate. For these devices, the alternative would be to have higher SEER or EER instead of—in lieu of the refrigerant charge verification. So we have created a table that gives the equivalent values for these systems.

So these are requirements for domestic hot water systems for systems that serve multiple dwelling units. This specifies a minimum solar fraction for serving multiple dwelling units. The solar fraction would be 20 percent in climate zones 1-9 and a solar fraction of 35 percent for climate zones 10-16.

For systems serving individual dwelling units with electric resistant water heating systems, solar

fraction of 50 percent would be required prescriptively or people can use the performance and not do this if they can trade it away.

Section 150.1(c)10 is space conditioning ducts. Currently there are three insulation levels for ducts allowed in the standards. 4.2, 6 and 8. In this proposal we're basically getting rid of the 4.2 in very mild climate zones so there are only going to be two levels throughout the state, 6 and 8. And R-6 in climate zones 6-8 and R-8 in climate zones 1-5 and 9-6 will be 6. So anyway, we're getting rid of the 4.2 and replacing it with R-6.

150.1(c)11. Central fan integrated ventilation systems. Just clarifies that these systems must be HERS verified.

150.1(c)12. Roofing products. Low-rise steep slope, all roofing products must have the reflectance of 0.20 and an emittance of 0.85 in climate zones 10-15. This is not a big change from 2008 except for the emittance and we've received comments that the 0.85 emittance may eliminate some products so we'll be looking at that and we may revert back to 0.75. But it hasn't been really decided yet.

Section 105.1(c)13. Ventilation cooling. Prescriptively whole house fans will be required in

climate zones 4 and 8-15.

I will take comments on this but I would also like to go back to one of the topics that was presented this morning related to spray foam and also the mandatory requirement in the walls that was proposed to change from 13 to 15.

At lunch time we had a discussion and I think we all agreed we're going to revert back to R-13 for the mandatory requirement in the walls.

For the ceilings, we proposed going from R-19 to R-30. We actually may institute some exceptions for that for ceiled attics but we need to actually define what that is. So we'll work with Bruce Wilcox on that.

There were also some comments on the spray foam and Dave Ware, do you want to respond to that comment quickly? And then we'll take comments on this section.

MR. WARE: Dave Ware, CEC Staff. We've worked very closely actually in the last several years with the spray foam industry. Mr. Jim Francisco in particular. Jim, he didn't—he was not specific in his comments to you, Commissioner. But one of his concerns and Jim, I'm assuming you're still—and if I'm characterizing you incorrectly or not being as wide breath as you want me to do, please correct me, Jim.

One of Jim's concerns is, in the context of spray foam, what the Commission currently allows as an R-value listing for those product types misrepresents their true performance. That may be true however what the Commission has to rely on and what building officials have to rely on in the field is tested information and information that is listed in the Bureau of Home Furnishings and Thermal Insulation "Insulation Directory of Certified Insulation Products".

So what the Commission has established in the context of spray foam, right or wrong, is that when you go through those listed products by the various manufacturers, they list the R-value per inch. There's a wide range of R-value per inch. So the Commission chose a conservative place to land on one of those lower values. Currently for open cell product types, low density materials, we list a 0.36 per inch value for light density material. I think that is wrong of Jim's concerns, that that is too low.

Our feeling is that staff is somewhat handcuffed because there's a lack of tested information provided by the spray foam industry that would allude to something different than that, number one. And number two is that from a field inspection point of view related to this class of product type, there's no way of

telling what the actual installed R-value is. There's no labeling of the material in the field. There's no information that is traditionally left on the site in the way of labeling or on the cans for the recipes of the part A and part B materials that makes up the installed product at the job site.

So the Commission has taken the conservative view that these values are listed in the Directory and that, I just over lunch looked at the Directory again and there's actually values that are listed below the 0.36 that we currently allow for open cell product types, so what the Commission has been using at an established R-value per inch is still reasonable. We have asked the industry, both Jim's organization and the National Spray Foam Alliance to work with us in coming up with a mechanism in dealing with the labeling issue. If we could figure out a way, if they could help us figure out a way or if they could propose a way that would be somewhat fail safe if you would, from an enforcement standpoint in the field. We would be happy to land with that but until that happens we are somewhat saddled with the currently the 0.36 value that we allow for open cell products and the 0.58 value per inch that we allow for closed cell material.

I believe that's the crux of what Jim's main

contention is. Thank you.

MR. SHIRAKH: Jim?

MR. FRANCISCO: That wasn't what I was aiming at but I'll start there. We offered a program, Payam and I worked on it, almost four years ago where labeling would be placed on the barrels that would be taken off and attached to the certificate at the site.

It was a concern of CEC that foamers spraying out of trucks would not think about changing the material and you would never know the difference.

First of all, when you're doing inside walls, which we were consistent of, 95 percent of all the foamers use drums. They do not use trucks. It would be just as easy to say that if you use a truck you have to go with a standard value. If you're using drums, take the label off and we will certify it. That's what we were aiming for.

Dave Ware and Payam have worked very hard with us on that. My problem is—with that whole thing is that there have been issues that have come up, concerning things like unvented attics and different times like that, that we feel the engineers here are not familiar with. We would like to have a meeting with the engineers being a one-day meeting to bring in the building science people to sit down and say, "This is

our view and this is why it's our view" so you know where we're coming from.

I stood here yesterday and watched a conversation on glazed windows for an hour and twenty minutes. A very involved conversation. At the end there was an, "Oh. We'll have to get together and have a meeting on that. Talk to so and so and we'll set it up." We made a comment yesterday that we were very concerned and the comment was, "Oh. We'll have to get back to you." We just feel that we need to have the access to explain who we are, what we do and why the product should be used in certain areas. That's all we want to do.

MS. BROOK: If you can give us some specifics, and you don't have to do it know, we can do it.

MR. FRANCISCO: Okay. If somebody will give me a contact number, I will send it to you.

MS. BROOK: Yeah.

MR. FRANCISCO: I sent you some materials which went back to Dave.

MS. BROOK: Because—

MR. SHIRAKH: You have Payam's contact information.

MR. FRANCISCO: Okay. I'll send it to—

MS. BROOK: So, for example, if you want to

talk about sealed attics we would bring some people to the table and if you want to talk about spray foam insulation in another context we might bring some other people.

MR. FRANCISCO: It would have been nice to know this—

MS. BROOK: So.

MR. FRANCISCO: four months ago when we kept offering and we're right now down to the finals here and you're starting to do your language. And it's kind like, "Oh. Are we going to have wait now for another three years."

MS. BROOK: All right.

MR. FRANCISCO: It's really been frustrating. You can't imagine how frustrating it's been for us.

MS. BROOK: Okay.

MR. FRANCISCO: All right?

MS. BROOK: Mm-hmm.

MR. SHIRAKH: Thank you, Jim.

COMMISSIONER DOUGLAS: Thanks for being here. We will be sure to follow up with you.

MR. SHIRAKH: Please identify yourself and your affiliation.

MR. TALBOTT: Gary Talbott. I'm here with Five Star Performance Insulation and also with the Spray

Foam Alliance. And, again, thanks to everyone here that we've worked with over the years and tried to come up with some answers to some interesting situations. Now that, particularly, foam is becoming an insulation of choice these days. Years ago it wasn't necessarily the case so we're kind of the icebreaker here, so to speak.

From a contractor standpoint, and we talked earlier about this on a number of subjects, any time that we sign something we are putting our license on the line. Whether somebody pulled out some documentation and then did it for us or background but anytime you sign something, it's a legally binding document so we could be held liable for this.

My thoughts are on identifying foam that's put in a house, and I do this with batting insulation, is that we have a card that's attached to the building when we're done that states exactly how many inches we applied, it states what the product is, it states what the R-value is per inch which is listed in the Bureau and we can verify that.

For instance, I don't have any—the insulation is a low different when we're blowing the insulation into a ceiling but we do put an attic card up there.

I know we've been going around and around with colors and everything else of the number of years. I

think we could address that with verifying by a card. It seems to be an acceptable application for the ceiling insulation. We could maybe adopt that on to that.

And then again with the comment on the wall insulation. We've been working to have that done. We also have the—back to the R-13 and I want to thank you. I think that's going to make some sense to everybody here. So, thank you.

MR. SHIRAKH: Thank you. Please come up to the—

MR. MORGAN: Good afternoon. Michael Morgan for Performance Foam Tech. As an insulation contractor I have to leave an insulation certificate at every single job that we do. That states the manufacturer, the R-value per inch, the amount of inches done. So many of the inspectors that we deal with over the years—that's a binding piece of paper. A lot of them don't come and even inspect because that is the inspection. A lot of our contractors get the nod to go ahead and drywall per this piece of paper. It's a standing practice and has been for quite a while, to fill out that piece of paper and leave it with the contractors—

MR. SHIRAKH: If I understand the issue correctly, it's the verification by the Building Departments. They cannot tell the difference between

the product that is R-7 per inch versus R-5. I think that's the issue. Because when someone is inspecting it how can they tell which product was actually installed. I understand that you can leave a card or a form but how do you actually tell which product was installed? And I think that's the crux—

MR. MORGAN: Well, for code, there's a labeling requirement so on the barrels, they have a sticker on them that says what they are, what their R-value is, what their flame spread is. So that's if somebody wants to poke their nose in the trailer during the time of spraying then when you're leaving, you're mandated. It's not a suggestion. It's a mandate that you leave this insulation certificate and it clearly says what brand, what R per inch it is and how many inches you did. You are the duty sworn inspector of that job. Me being the contractor I am also the inspector. It's a very common practice for inspectors to bend a knee to that. Okay Contractor, go ahead and drywall. We know that—make sure that you have in place that insulation certificate before that guy goes. We need to see that. If we come back and see rock and don't have that, there's an issue. So. It's been addressed. I think it's not broken.

MR. SHIRAKH: My understanding is the

resolution of this issue doesn't depend on adoption of the standards. We can do that. We have to address this but it's not part of the 45 day language. We'll need to work on this.

MR. MORGAN: Excellent. Thank you.

MR. SHIRAKH: Thank you. Any other comments on the 150 insulation stuff. Mike?

MR. HODGSON: Yeah. We'll stick with 150 for the time being. The question I have, and I'm glad you brought it back up, I wasn't thinking of it and I think Bruce alluded to this just now. We do have condition attics that are going on with condition foam. Typically that's an R-22. When that happens, I'm thinking the R-30 requirement would (indiscernible) that. So I think we need to think about that. Because that is probably one of the more efficient ways we see buildings going and we want buildings to go. We may have to—

MR. SHIRAKH: Well that's what Bruce talked about at lunch.

MR. HODGSON: Yeah.

MR. SHIRAKH: So—

MR. HODGSON: And I think it's a great idea to go to R-13.

MR. SHIRAKH: Yeah.

MR. HODGSON: And I'll reserve my comments on

the package until you say they're ready to go.

MR. SHIRAKH: Is there any other comments on 150?

MR. NESBITT: George Nesbitt. I have to tell you as a HERS Rater I've been out to jobs where R-13 went in the two-by-six walls despite the fact that it was on the CF1R, on the subcontractor's contract. It just wasn't on the installer's truck. The Building Department wouldn't have had a problem with it. The General Contractor wouldn't have had a problem with it. I had a problem with it. I've been in attics that were under blown. You gotta come back. You actually have to insulate to the R-value that it says. So just because someone says that they did something on a form doesn't actually mean it happened. We could call them perjury statements in some cases. And I don't mean that to be totally—I'm a contractor. For the record, I'm a licensed general contractor. I install insulation. It's just that is one of the realities in the marketplace.

We currently—so currently in the Appendix lookups for spraying insulation, it's assuming a low density foam or a cellulose or a fiberglass. Yet, ironically, in QII we've only allowed high density foam and yet none of the assembly lookups reflect the higher

R-value per inch. Then also, yes, it's becoming more common to have unvented roofs and we don't have an appendix lookup for unvented roofs. We have ventilated rafter roofs but not unvented.

MR. SHIRAKH: George, are you talking about JA-4?

MR. NESBITT: Yeah. JA-4. So we have ventalized rafter roofs but not unvented rafter roofs. Also—well, on a recent job that happens to be low density foam during QII on it, the industry tends to push a lower R-value because foam is superior yet the computer says R-19 is—or R-22 is worse than R-30, because it is. While it may be better in real performance compared to say a vented roof rafter with fiberglass, that may be the case, but I insisted on this job. I said, I told the architect, "You have to stay with R-30. You're going to get severely penalized and we're trying to do rebate programs and what not." So less R is less good.

I will, since—you said QII was in each climate? It's not 5-10 in the package.

MR. SHIRAKH: You're probably correct.

MR. NESBITT: Yeah. And then, just on the insulation, you're going to talk more about the package requirements and the different R-values or do you want

me to address—

MR. SHIRAKH: Unless there are no more comments on 150 then I can move to 150.

So there are a couple of more comments on 150—

MR. NESBITT: Okay.

MR. SHIRAKH: If you can hold on and then there are comments online too.

MR. PETERSON: Rick Peterson, Eagle Roofing Products. Also representing Rick Olson, the TRI. A couple of issues here on 150.1 on the R-4 above the deck. I already talked to Payam but I wanted to bring it into a formal discussion. We were concerned at the TRI that it could possibly raise a wild and urban interface issue and I guess, Payam, you said—

MR. SHIRAKH: Is that a fire issue?

MR. PETERSON: Yeah. A wild/urban interface. It's adding the extra fuel above the deck.

MR. SHIRAKH: Yeah. We've talked with the state fire marshal about this. Basically the roofs that use the insulation and put it between the deck and the—they have to get retested for either Class A, B or C. So that is a requirement.

MR. PETERSON: We were also wondering if added footnotes at the bottom would help in describing what the choices would be.

MR. SHIRAKH: The choices would be explained in our compliance manual.

MR. PETERSON: Right. Just referencing it—

MR. SHIRAKH: Okay.

MR. PETERSON: And that brings me up to the second point in 150.1 on the ¾ inch airspace. We presume that it's still in the calculator? We talked to Payam about that and he said that it was still there in the performance—150.1? Ohh. 150.2. Okay. So I'll save my comments for the next session. Thank you.

MR. SHIRAKH: Thank you. Tom, did you have any comments? And then, sir, you can come after Tom.

MR. GARCIA: This is Tom Garcia, representing CALBO. Every once in awhile I try to stay back and just let these things go in the meetings but I wanted to clarify a couple of last comments. (Indiscernible) do not just accept the insulation certificate. We do do the inspections. Contrary to what George is saying, an inspector wouldn't just settle for an R-13 in a two-by-six stud wall if the plan calls for R-19 or R-21. I needed to make it clear that as a general course of business, Building Inspectors do do the job of inspecting buildings.

MR. SHIRAKH: Thank you, Tom.

MR. MORGAN: Further clarification. I believe

the question was how does the inspector know the R-value. You walk up and you've got yellow foam. One yellow foam has one R-rating. One yellow foam has another—it's yellow foam when they walk up. The question was how does somebody know the R-rating and the certificate is the vehicle for that. If the trailer is not going to be inspected during the time of insulation when you can read it off of the B barrel the only vehicle for that is now whether somebody tried to purposely or accidently not put enough of it in. That is an inspection area.

MR. SHIRAKH: I think then what you're proposing would work if the Building Inspector or the HERS Rater was there at the time so they could inspect the truck. I guess the question becomes what if that doesn't happen and the guy shows up three hours later after the truck has gone?

MR. MORGAN: Well that explains—the certificate is the bond. That's the product used. That's its R-value. There's unfaced fiberglass that doesn't say on it what manufacturer it is and what R-value it is at a glance but that insulation certificate says there's cellulose blown in. It doesn't say the manufacturer when you walk up or the R-value so. There's a vehicle in place to leave that information

behind and to challenge that information. I think it's there.

MR. SHIRAKH: Okay. Thank you. Mike and then that gentleman.

MR. HODGSON: I'm sorry. Just a real quick question. On the table of 150.1(c) which is basically the new Package A.

MR. SHIRAKH: Package A. Right.

MR. HODGSON: There's a footnote, because of the editing it gets kind of cumbersome to look at, but I'm just trying to understand what footnote 3. Bruce, I'm on the roof deck insulation. Footnote 3 says, "Air permeable insulation materials installed directly below the roof deck shall be covered with Class 2 vapor retardant." Can you explain that?

MR. WILCOX: The best explanation is that I asked for that footnote to get deleted and I thought it had been done.

MR. HODGSON: Okay. All right. So can we delete that footnote?

MR. WILCOX: I'm sorry.

MR. SHIRAKH: I think Dave Ware wants to respond. Yeah. We can set up here.

MR. WARE: The footnote's intent is to acknowledge that there are some climate zones that have

some moisture dynamics because of the temperature ranges that when insulation is placed below the deck we need to be cognizant of it. So the purpose of the footnote is to say exactly what it says except for we forgot to express which climate zones that footnote would apply to.

MR. SHIRAKH: So presumably climate zone 16, right?

MR. WARE: Climate zone 16. That help?

MR. HODGSON: Yeah, it did.

MR. WARE: And just to add, that footnote would then be consistent with the requirement limitations or concerns that are expressed in the IECC code and was also recommended to us by—in the Supporting Moisture Report to the work Bruce Wilcox has done on the above deck insulation.

MR. HODGSON: Okay. I think I understand Dave's comments but currently that footnote is for roof decks and it's in climate zones 12-15 and in climate zone 16 there's no requirement for roof decks.

MR. SHIRAKH: That's the reverse. Okay.

MR. WILCOX: That's why I asked for it to be deleted.

MR. SHIRAKH: Yeah. We understand. Footnote number 3 is messed up.

MR. NESBITT: George Nesbitt. In the Berkeley/Oakland area there's a lot of jurisdictions that have outright not done insulation inspections in the past. Although it is changing.

MR. SHIRAKH: I don't want to get into this with—

MR. NESBITT: No, no. Yeah, yeah. But I guess with the change in the building code they are starting to, although they still don't know what they're looking at in some cases. But, I think, on the spray foam, with cellulose and fiberglass you have a relatively tight R-value per inch on a spray in. Unfaced batts are sprayed with ink as to the R-value. Maybe not necessarily the manufacturer. The manufacturer doesn't matter. The spray foam between low and high density we've got definitely a lot more variation in R-value per inch. I think in that sense yes, identifying what there is is a lot more difficult without, like you say, someone actually seeing what gets sprayed or what's labeled on the container. It is then really a matter of them saying I sprayed this and it has these values. We either have to accept that or we're really not—

MR. SHIRAKH: I actually have a question for you.

MR. NESBITT: Sure.

MR. SHIRAKH: Is it reasonable to schedule the HERS Rater to be there at the same time that they're spraying? Is that practical? Or is it like even one out of every three times they can do it? It's kind of like sampling. Is it something that—

MR. NESBITT: I would say in the context of trying to do something as QII and not having worked with an installer, yeah. I've been out on the site while they're spraying and have had them add more because based on the R-value per inch they told me and I look up at the rafters and I say, "No. I don't think you have the seven inches you say you do."

MR. SHIRAKH: But my question is are we able to schedule you to be there at the same time that they're doing it?

MR. NESBITT: I don't think it's totally unreasonable. I don't think it's always going to be practical. It's not—you know depending on the job, the scale of the job, how long they're going to be on the site. I mean, ideally, if we're doing QII we're doing a pre and a post. Or if we're just doing a basic utility program verification it would just be a post and is it the R-value? So we wouldn't necessarily be there. So even doing QII we wouldn't necessarily plan on being

there while they're spraying. For me, as a Rater, I'd much rather tell them what they need to do to make it right while they're there then say bring your truck back out and fix it. I'd rather make it less painful and less expensive. Personally I always try to come in early to make sure that we're on track. But I'm not going to say that's going to happen as a matter of course.

MR. SHIRAKH: Okay. Well, I have some ideas but we can talk about this later—

MR. NESBITT: Yeah.

MR. SHIRAKH: And not resolve it here.

MR. NESBITT: Yeah. I think on some end we trust cellulose and fiberglass. We're going to have to trust that they've installed the product. I think we can distinguish high density from low density through touch and probing but beyond that I think it's difficult.

MR. SHIRAKH: Thank you. Whoever wants to come up.

MR. VARVAIS: Dan Varvais with SPFA. I don't want to get into this ad nauseam anymore but we can come up with a very simple labeling program, following the requirements that the state uses for the Cool Roof Rating Council with what they label. We have tester

products listed with the Bureau of Home Furnishings. We have tested R-values. We have offered to put a label system like this together. We can solve it in 15 minutes offline.

MR. SHIRAKH: Okay. Thank you.

MR. VARVAIS: So.

MR. THOMPSON: Mike Thompson. I'd just like to address your questions. I think to expect a HERS Rater to be there at a specific time is going to add tremendous complications, probably another $250 to most jobs.

MR. SHIRAKH: Actually, what I'm thinking is if that's the requirement but even if it happens once out of every three times. As long they don't know if you're going to be there, that's kind of like sampling basically. If they'll take a chance and they don't want to do it but there's a good chance that the HERS Rater is going to be there. Something along those lines is what I'm thinking. This is not the forum to be forming new ideas. We can talk offline.

MR. FRANCISCO: I'd like to make one final comment. Jim Francisco, Sierra Consulting. And to sort of close this off, for your information too, I realize that there's a large concern from the CEC that these contractors are going to cheat. It comes up over and

over and over again. The industry is very well regulated by itself. Every time that we have found a problem in the field we have jumped on it to correct it immediately. The only problem we've ever had is with the State of California just as because when we ask for somebody's license to be taken away, they give it back to them in six months because it's a revenue problem. But every time that we have found a problem, we have moved with the state to correct it. Just for your information.

MR. SHIRAKH: Thank you.

MR. TALBOTT: Gary Talbott. I wanted to address what Mike from ConSol brought up about the footnote in relationship to a vapor barrier and climate zones. There are some foams that are designed, that are manufactured, to qualify as a Class 2 vapor retarder and there are foams that don't as well. I would say suggest maybe a clarification on that footnote would be some do require that.

MR. SHIRAKH: I don't think that comment had to do with product availability. I think the footnote has the wrong climate zones.

MR. TALBOTT: Oh. Okay. All right. But we do do that. And as far as ceilings and under roof decks as a contractor for inspectors to verify what we put up

there. All right. Because sometimes when we're, for instance, depending on the product we use, it could be 10 inches of insulation under a roof deck. We install attic rulings up right up against the roof deck. Now this has a dual purpose.

For us, for instance, when we're applying these products, you get up in the roof and you're spraying and you're doing multiple layers at a time, you're almost in a snowstorm so you don't have real references, so to speak sometimes. And again with inspections as well, that gives us a guideline. So there again there is a simple way that we've developed so that we provide those to the inspectors so they can make sure we're using the product. We put an attic card there which specifies what we did, product and R-value.

MR. SHIRAKH: I thank you. I think we understand that we need to come to some resolution on this.

MR. KLINK: Hello. My name is Frank Klink. I'm with 3M. I do have a written comment here and it's really aimed at both yesterday and today for both the commercial as well as the residential side but I'll restrict my comments here just to the residential portion of it. But I'll give you a copy of it.

MR. SHIRAKH: Can you send this to us

electronically too?

MR. KLINK: I can. I lead the laboratory for 3M's Minerals Division. We're a leading granule producer supplying the asphalt and granulated metal roofing industry. We support approximately 60 of our customer's plants around the country including six here in California from our four roofing granule plants including one here in Corona, California.

Starting with the original development of ceramic coated roofing granule more than 79 years ago, we have been pioneering numerous innovations in the roofing industry including algae resistance and more recently solar reflectance granules to enable cool roofing. We continue to find this as an area that we want to innovate in and continue to invest in.

We certainly recognize and value the leadership the State of California in encouraging manufactures to develop ingenious, cost effective products to improve energy efficiency. The code changes that you enacted in 2005 and 2008 are driving change and will continue to do so for many years yet to come as roofs are replaced, as manufacturers develop more products in response to them, as code awareness builds and as enforcement increases.

Both solar reflectance and solar emmitance are

straightforward to measure and have impact on local and global climate. We encourage the CEC to be open in the code to develop—to recognize the development of roofing products and assemblies that can increase building energy efficiency via additional mechanisms such as insulation or convective vending.

Recent publications from Oak Ridge National Labs state that improvements in the thermal management strategies of the roof and the attic space have demonstrated the potential to reduce residential energy use by 20-30 percent in both hot and cold climates. Our research we've done at 3M tends to lead us to support that statement.

While they contribute focusing solely on the solar reflectance and thermal emittance when testing and rating the energy performance of rating roofing products limits what we can consider, narrow where manufacturers focus their development efforts and reduce what improvements we can ultimately realize.

You've achieved a lot in these last two code cycles on improvements in the solar reflectance of roofing in California. We feel that it'd be more beneficial to shift your development efforts and to encourage ways to directly measure the total energy performance of roofing products in the future. This

will not only encourage those who have picked up the challenge of increasing their product's solar reflectance in response to the current code but coupled with directly measuring the energy performance of the roofing products should motivate the development of more energy efficient roofing products in the future. Thank you.

MR. SHIRAKH: Thank you for your comments. Andre?

MR. DESJARLAIS: Good afternoon. I'm Andre Desjarlais; I lead building research at Oak Ridge National Laboratory.

As an advocate of getting above sheathing ventilation included in the 2008 version of Title 24 I was disappointed that in review of the new version that it's been removed from the list of footnotes as a cool roof exception. I'd like to offer the proposal that CEC reinstate above sheathing ventalization as a cool roof exception both for residential and nonresidential construction in steep slope in new and retrofit.

There seems to be two contentious issues associated with the use of above sheathing ventilation. There are some opinions that above sheathing ventilation doesn't save energy. I'd like to offer some evidence today that that opinion is a minority opinion and that

the bulk of the evidence, both nationally and internationally, shows that it actually saves more energy than the cool roof requirement that you're introduced into the building code.

Secondly, there seems to be a question about whether this form of roofing compromises the fire safety of roofing. I'd like to address that comment as well at the end of my presentation.

But first, I'd just like to talk about the energy considerations. All of this work kind of goes back to a thesis by Dr. Hollands who published in the Journal of Heat Transfer back in 1976 and said that if you have an inclined air space and you preferentially heat one said like you do in a roof when the sun strikes the roof, that you draw air up through that cavity through natural convection and that gives you free cooling. I have a copy of his paper here and many others. I won't read them but I will give them to you, Mazi, so that tonight when you try to fall asleep you can read them.

MR. SHIRAKH: Why don't you read them for the record?

MR. DESJARLAIS: But I don't have electronic copies of all of them. This is going to be my filibuster. I hope you have a lot of time,

Commissioner, for the rest of the afternoon. I'm going to sit here until I get my way.

MR. SHIRAKH: Senator Desjarlais.

MR. DESJARLAIS: The Oak Ridge National Laboratory has been investing both sheathing and ventilation for the last six years. We have about a dozen publications. I have three of them in this package. One of the things that we've done is that we've developed a computer simulation of above sheathing ventilation which we've attached to our attic model. In the 2008 cycle we demonstrated in California climate zones 1-16 that the use of above sheathing ventilation was equal to adding 15-20 points of solar reflectance to the roofing surface which is more than what you're requiring in your steep slope requirements today. I think what we've done is we've ended up throwing away a more energy efficient technology than we're requiring in a code.

The State of California has actually undertaken this research as part of a PIER project. Oak Ridge National Lab instrumented an above sheathing ventilation home in Fort Irwin and you have a report somewhere in archives that shows this technology saves energy compared to cool roofing.

We're not the only U.S. researchers that have

done this work. Back in the 1990's Florida Solar Energy Center published a paper in ASHRAE that demonstrated the energy savings associated with above sheathing ventilation. Two years ago Roodvoets, Mallinger and Banks published a paper in RCI that extolled the benefits of roof sheathing ventilation as a means of controlling roof surface temperature. Numerous national publications but there are also international ones. In 2007 a gentleman by the name of Dr. Ono from Japan measured 25 degree temperature drop in the surface of his roof temperature, of his roof, comparing a tile roof directly attached to the surface versus a tile roof with above sheathing ventilation.

Also in 2007 Nigel Cherry, of LaFarge in the UK, modeled the energy savings of above sheathing ventilation. He showed that in climate zone 15 in California you could save up to 15-35 percent of the roof's energy simply by the addition of above sheathing ventilation.

And finally in Germany the Deutshes Institut fur Normung, DIN, their standard 4108 which is entitled Thermal Protection in Energy Economy of Buildings requires use of above sheathing ventilation in German construction.

I think the bulk of the information, of the

testimony, internationally and nationally suggests that this is a good idea. And to simply throw it away because it's inconsistent with one set of experiments I think is foolhardy.

I want to talk a little bit about fire since several people said above sheathing ventilation may compromise the fire performance of roofing.

We're not talking about something new today. Above sheathing ventilation is a very, very common practice in the State of California. In Northern California my colleague Mr. Peterson, his company and all tile companies, mount their tile products on battens which create above sheathing ventilation. And since they represent about 80 percent of new construction, you've already got a huge number of roofs within the state of California that have this technology and the number of roofs are growing every day.

I think what you need to do is give these people a fair shake so that they can claim the energy benefits of the way that they're creating in installing roofs as opposed to just giving people one choice or one option.

If the issue is of drawing embers from within the airspace, I can't believe there aren't any engineering solutions such as vents or blocks that can

be put along the perimeter of—I mean it seems crazy to say you'll get embers up there. There have got to be ways of blocking that.

Even more interesting than that, Oak Ridge published a paper last month at the 2011 International Roofing Conference that was sponsored by the National Roofing Contractors Association in Washington, D.C. and we showed that you could actually draw the air from the attic to feed above sheathing ventilation. That you don't even need an outside source by simply creating a slot in the roof deck, you can bring the air from a ventilated attic into the airspace. So never having the perimeter of that airspace completely closed.

In conclusion, I think we'd like to request that you put above sheathing ventilation back into the code as an alternate for solar reflectance. I think all you'll be doing is giving credit to what's already going on in the state of California. I think the amount of information and literature is overwhelming in terms of the amount of energy savings associated with it and I think you can construct these things so that they're safe from a fire perspective. Thank you.

MR. SHIRAKH: Is there any response to Andre's? Thank you. You don't have this on electronic, do you?

MR. DESJARLAIS: I have some of them. But some of those are so old I don't think we have electronic back then.

MR. SHIRAKH: Send me a link and I can do searches. All right. Thank you.

MR. HITCHCOCK: Hi. Good afternoon. Reed Hitchcock with ARMA, the Asphalt Roofing Manufacturers Association.

Just real briefly, I'd like to sort of chime in on the tail end of Andre's comment. Going back to 2005, organizations come here with the standpoint of there needs to be options in the code. While above sheathing ventilation doesn't generally impact asphalt roofing directly it is a compliance option and it's an energy savings options. So just to chime in on Andre's comment I'd like to see that stay in there as well.

Also, I'd like to add on to the tail end of Frank Klink's comments from a moment ago. Frank made some very good points, I won't reiterate them, but I think it's important that the Energy Commission consider if there have been a lot of technologies driven from the 2008 requirements. Still working on getting the acceptance. Still a well documented cost premium for cool steep slope roofing g products and I think a change at this point is problematic as we've discussed in other

offline inquiries in the emittance right now, we don't support—we can get into the technical rationales and what have you behind that but right now there doesn't seem to be a good, solid technical basis behind that increase. In the interest of consistency with the existing code and across the board, keeping that at the 0.75 would be our preference at this point. We're still working on getting acceptance of the products that have been developed. So I do echo Frank's comments as well. So I just wanted to share that with you.

I do also think that there's some impact from the discussions yesterday on cost justification on this side of the aisle and I think that needs to be a discussion offline as we're talking about that issue as well. There have been questions raised from the 2008 process, the cost justification numbers were questioned on some pretty sound technical bases. I think that needs to be part of the overall discussion on the costs.

MR. SHIRAKH: They have raised some questions related to the 2008 costs and we have offered an alternative to use the pre-2005 condition as the basis and reset everything. I think we understand the situation and we can talk on Monday and see what your coalition thinks about that.

MR. HITCHCOCK: Very good. Thank you.

MR. SHIRAKH: Thank you, Reed.

MS. DEUKMEJIAN: I'm Sarah Deukmejian from ACS Building Products. We are a steel building products manufacturer, headquartered in Sacramento with four manufacturing plants in California. We support the efforts of the CEC, particularly as it relates to the energy efficiency benefits of roofing products.

Metal roofing can provide these energy benefits both through painted steel as well as the way the roofing products are installed above sheathing. So we request the inclusion of the above sheathing ventilation as an exception to the cool roof requirements.

MR. SHIRAKH: Thank you. Now do I understand that we do allow credit for this in the performance method? For the above sheathing?

MR. WILCOX: The airspace that's involved in tile roof construction is included in the simulation model for tile roofs in the performance method. There's no credit because the current structure of the ACM rules says that a tile roof gets compared to a standard design tile roof. So they both have the airspace. Asphalt shingles get compared to standard design asphalt shingles. Neither case has the airspace. The airspace is in there so we get a correct thermal calculation and

we get the right loads and all that stuff but there's no compliance credit for airspace in a tile roof space under the current rules.

MR. SHIRAKH: But both are on the standard and proposed design unless we make asphalt the basis for our standard design.

MR. WILCOX: Well, right.

MR. SHIRAKH: Okay. Thank you.

MR. DEVITO: Thank you. Eric DeVito with Cardinal Glass Industries. I'll be very consistent with the other comments that have been made yesterday and today. We support where the staff is going with your prescriptive requirements for windows, specifically. The new values that you're proposing are the nice, next progression where we believe you need to be going.

We've talked about the IECC and other national standards. This would put California back on par with the IECC. Right now the 2012 IECC basically requires either a 0.35 or 0.32 U-factor for California and for most of California a 0.25 SGHC at least where you require it. So this puts you right where you need to be. These are the right targets as far as technology goes and the market transformation we've talked about before.

The only other issue I'll bring up is the

product availability. This kind of came up yesterday and I attempted to address this yesterday. I don't think I did a very good job of it so I'll try to clean that up a little bit.

In 2009, there's an NFRC certified products directory that lists U-factor and SGHC. In 2009, which is fairly dated now, over 51 percent of the products could meet the standards that you're about to set. So that's a—I believe that's a very high percentage and obviously support for what you're doing.

The glazing that's required to meet your requirement is not proprietary. It's made by four of the six manufacturers, it's widely available. Something, in terms of looking at product manufacturer's listings of their products, I've looked at four national manufacturers as an example. They have matrices of hundreds of combinations which may look like they have 6,000 products or 3,000 products or whatever it is. Maybe only 10 percent of them meet these requirements but, again, that's not—that doesn't have any bearing on the quantities that are manufacturer available. That's just the whole breadth of options that are available from that manufacturer. I wouldn't take to heart something you pull off a website that says what the manufacturer data means. That's not indicative of the

total number of products.

The only other point I would make is that in my comments I submitted to the docket, I made a detailed example of a picture window. That really is, probably is, because it has the thinnest profile and not operable it would probably have the hardest time at meeting these new standards because of the majority of the glass. And all of the manufacturers I just referenced, they all have a picture window product that will meet these requirements.

That basically from there on up indicates that you're in the right direction. It's achievable and it's the right way to go. Thank you.

MR. SHIRAKH: Thank you. Any other comments on Section 150.1, the prescriptive requirements? There's a comment online, Jon, then we'll get to you.

UNIDENTIFIED SPEAKER: This is from Eric Banks. His comment is that BASF Corporation spray systems, markets and sells spray polyurethane foam and insulation systems in California.

We are an active participate with the Spray Polyurethane Foam Alliance and Center for Polyurethane Industry Foam Coalition. We agree with and support the previous statements provided by Mr. Talbott and Mr. Francisco and Mr. Varvais.

Spray polyurethane foam insulation is an extremely useful material providing both insulation and air seal that are critical to energy efficiency and indoor air quality.

BASF Corporation spray systems is an active participant in the SPFC industry groups and is more than willing to assist with discussions related to SPF.

And then we also have a comment from Ed Osann.

MR. OSANN: Hello?

MR. SHIRAKH: Go ahead. We can hear you.

MR. OSANN: Good. This is Ed Osann with the NRDC, Natural Resources Defense Council. I have a couple comments on Section 150 of the mandatory with regard to low-rise residential. 150(j) on water pipe systems.

MR. SHIRAKH: Yes.

MR. OSANN: I may have missed this in an earlier discussion or in the text but there doesn't appear to be a requirement for insulation under slab in nonrecirculating systems.

Additionally in nonrecirculating systems, I believe the IECC 2012 is now requiring insulation specifically to as far as the kitchen sink. The current text calls for insulation for the first five feet.

MR. SHIRAKH: Yeah. Those are existing

requirements. They are not in Section 150; I think they're back in 118 or 117, one of those areas. It hasn't changed. That's why we didn't display it today.

MR. WILCOX: I think the answer is that there is a requirement for buried pipes to be insulated.

MR. SHIRAKH: Yeah. And again we haven't really changed anything but it's just not in 150. It's in—we're just highlighting the changes today not all of the requirements.

MS. BROOK: So we're encouraging you to look at the mandatory section in 110—

MR. SHIRAKH: I believe in 115-188, in one of those sections.

MS. BROOK: So because we think we have those same requirements for insulating hot water pipers—

MR. SHIRAKH: Under slab.

MS. BROOK: Under slab.

MR. SHIRAKH: yeah.

MR. OSANN: Okay.

MS. BROOK: I don't know if we have the kitchen insulation requirement. Does anybody know? Insulating the hot water pipes to the kitchen? That's what I thought. That's what I thought. So those are existing in our current code and like Mazi said we're just talking about changes to that code today.

MR. OSANN: Right.

MS. BROOK: Okay.

MR. OSANN: The third item, and again we may have missed it, it appears to be an omission of demand activation for recirculation pipes in domestic hot water.

MS. BROOK: Okay. We'll take that comment and—

MR. OSANN: Okay.

MS. BROOK: check with our staff.

MR. OSANN: Okay. All right. Thank you.

UNIDENTIFIED SPEAKER: What was the question?

MS. BROOK: Was there demand activation for recirculation loops.

MR. OSANN: In domestic hot water. If that's required.

MS. BROOK: Is it required to have demand controls for recirc systems?

MR. OSANN: As opposed to timer—

MS. BROOK: As opposed to timers.

MR. NESBITT: Not currently. I don't think you've made that a standard or a mandatory requirement. Other than the multi-family—the multi-family recirc systems that standard design would be a demand controlled, in 2013.

MS. BROOK: Okay. Okay. Your comment is for us to—you're encouraging us to consider using—giving more credit or requiring demand control rather than the other controls for record systems?

MR. OSANN: Correct.

MS. BROOK: Thank you.

MR. ZHANG: Can I make a comment? This is Yanda with the Heschong Mahone Group.

MR. SHIRAKH: Yeah. Go ahead, Yanda.

MR. ZHANG: Regarding his question on recirculation systems. The—for multi-family there is a recirculation system we proposed demand control as a prescriptive requirement so that energy budgets will be set according to demand controls systems. For compliance, other control systems can be used and their performance will be different from demand controls. You may have to come up with other measures to match with the demand control in the prescriptive requirements.

MS. BROOK: Okay. But that's, again, for multi-family. I think the question is in regards to single family.

MR. ZHANG: Okay. Single family. The last time I discussed this with Mark and Rob and Danny, I think, I haven't checked draft code but the conclusion we had is that the prescriptive requirement is no

recirculation systems in single family homes. If you do have recirculation systems, then you're going to have penalties for more distribution heat loss. But if you have recirculation and demand control that recirculation penalty will be less.

MS. BROOK: Okay. That's what I thought.

MR. ZHANG: So it's not required but they've left it in compliance.

MS. BROOK: Oh. Okay. So basically we think we are making—we're accounting for the efficiency differences between demand control and other controls of recircular loops in our performance approach for single family because, again, recirculation systems isn't a prescriptive requirement or isn't really referenced in the prescriptive approach. But in the performance approach it is allowed and the credits differ between the types of control systems you use on that recirc system.

MR. OSANN: Right.

MS. BROOK: So you wouldn't have seen that because it'll be a rule that's implemented in our performance compliance approach. So we'll—I'm encouraging you now to pay attention to our listserv and when we Notice and have a Workshop on our Performance Rule Set which will be in the spring, then that's when

we'll be discussing the details of implementing the performance approach.

MR. SHIRAKH: Thank you Yanda for the clarification. Any other questions on sections 150.1, the prescriptive requirement? Go ahead.

UNIDENTIFIED SPEAKER: Roger?

MR. LEBRUN: Yes. This is Roger LeBrun. Can you hear me?

MR. SHIRAKH: Yes.

MR. LEBRUN: Thank you. On the prescriptive for fenestration, the implementation of the table values in 150.1(a)—3A you talk about area weighting the average vertical fenestration U-factor but not the skylight U-factor. Was that intentional? And, if so, can you give me a reason?

MR. SHIRAKH: So you're saying how can we allow area weighted average for vertical fenestration but not for skylights?

MR. LEBRUN: That's the question, yes.

MR. SHIRAKH: I don't have the answer to that.

MR. LEBRUN: Okay. Well the same question would relate to Section 4 under that same heading for solar heat gain. And similar to a comment I made earlier in the mandatory section, the second for U-factor uses, for skylights, 8 square feet of skylights

can go up to 55, 0.55. Well that's the same number that's in the table so the exception has little to no value so I'm wondering if that was a vestige from the 2008 code that needs to be updated?

MR. SHIRAKH: Probably, yes.

MR. LEBRUN: And, also, I noticed in the shading part, the exception there has been fixed from what I had downloaded last week. But now you have it repaired as far as relating to SGHC but it also gives the same number as in the table. So again the exception doesn't have much value.

MR. SHIRAKH: Okay. We can look at those exceptions.

MR. LEBRUN: Thank you very much.

MR. SHIRAKH: Mr. McHugh?

MR. MCHUGH: Thank you, Mr. Shirakh. Jon McHugh with McHugh Energy. Overall, the main crux of this is Package A which sets prescriptive requirements for buildings which, as many of us know, people don't actually build buildings this way. It sets a performance baseline and sets the energy budget for new homes.

First off, I'd just like to endorse where you've come out on in terms of the window properties. Taking advantage of the technology that's readily

available and something that's an extremely cost effective measure with minimal cost.

In addition, the insulation of roof decks drops the attic temperature and creates a great benefit to the energy consumption of buildings.

The place that I think I have a little heartburn about and also I would like to try to clear up the record. In the earlier meetings we had heard from Bob Raymer that going from two-by-four to two-by-six walls was going to have—you know we talked to various people and that this was going to have this huge impact on the forest, forest health, size of logs, logged etc. I have contacted essentially all of the contacts that he suggested, talked with the mill operator at the Quincy Mill and talked with Steve Brink over at the California Forestry Association and the fact of the matter is we don't cut single size lumbar out of wood. To actually maximize the amount of lumber you take out of a log, you have multiple sizes and dimensions of lumber to maximize the resource efficiency. If you look at the overall consumption of wood in homes, the walls studs is but a small fraction of that. In addition, new home construction consumes about 35 percent of total lumber, dimensional lumber products, sold to the state.

I think Bob and I have already talked about

this offline but I want to put it in the record that there is not this environmental impact and, in fact, if certain things are done in terms of engineered framing, that sort of thing, you can actually reduce the cost of the building and reduce the amount of wood in the building. There are actually opportunities for the industry to reduce their cost and increase energy savings.

Recently we were involved in some discussions and CBIA's Advisor's Counsel had provided cost data for construction of buildings using 6 inch studs and using R-21 plus 4 inch rigid insulation on the outside of the building.

I took their cost data and combined that with the energy simulations that I believe were done by Bruce and Ken Nittler which is contained and documented in the HMG Case Report on Increased Insulation of walls.

When I do that, I find a couple of things. First off is that—and I described some of this earlier. I think it was the presentation on the 23rd. That there's a number of climate zones where the savings are approximately twice the cost of the incremental cost.

So for climate zones 2-5, 9 and 10 which currently the current Package A is proposing 4 inch wall sections of R-15 plus R-4, taking the results of the

work, that cost information from ConSol and the simulations done by the CEC's consultant. I put that information together and I found that increasing insulation in these climate zones is cost effective. On average has a benefit cost ratio of 176 percent so that's approximately twice the savings as the incremental cost.

If I take a look at that and take the extremely low construction rates that we're talking about right now, the 22,000 homes instead of the typical 100,000 plus homes, this is actually a loss in wealth to the state of about $16 million. For at least each year of new construction. If we look at, under normal situations, with five times the number of homes built we're looking at a net loss of wealth for the state of $80 million to the citizens of the state.

I commend all of the—many of the other measures in here but this seems to be an egregious lapse. Earlier I presented an evaluation I think it was at the meeting on the 23rd which described the cash flow analysis. When you start looking at benefit cost ratios of around 180 percent, even if you look at the down payment included, you find that you end up with a positive cash flow after the first year. I'm just at a loss as to what is the financial benefit. What is the

energy benefit for not looking at these particular climate zones. In addition, these climate zones, in terms of the projections of construction, what we're talking about is not including the cost effective insulation levels for those climate zones that make up 43 percent of the new construction activity. So, essentially, almost half of the climate zones in the state where we could be essentially requiring a higher baseline, saving a fair amount of money for the consumers in the state. I just guess with that, I'd be interested in understanding the rationale behind sticking to the lower efficiency standard for those walls.

MR. SHIRAKH: You want a response from us?

MR. MCHUGH: Yeah, that'd be good.

MR. SHIRAKH: It's basically—I'll make a brief remark about it. It's basically that it's not something that we had proposed. It was not part of the package that we had included in the cost. When we approached CBIA and ConSol we didn't want to change the numbers. We were concerned about the total cost of the packages and how much impact it would have on the statewide cost. There were several things that we tried to exclude, not include, to keep the total cost at a reasonable level. I don't dispute the energy savings in that. Cost

effectiveness is not the only measure that we consider when we look at these measures in the packages.

MR. MCHUGH: Just related to that. The climate zones that you're not including the higher R-values are those climate zones that, essentially, have lower costs associated with the packages because understandably the higher costs of the packages are for those hotter climate zones because those buildings consumer a lot more energy and it's not surprising that those houses might have more energy efficiency features. This thing would actually—the places that would be left off the list where it's cost effective to add more insulation. Those are in the climate zones where the cost of the packages are lower because, well, for the other measures that's where it wasn't cost justified to actually have other requirements. I think you might find for many of these climate zones it might help level out the total cost.

MR. SHIRAKH: I don't understand. The two measures that you mention, the roof deck insulation and the two-by-six, are actually the most expensive measures. That would greatly impact the total cost of the-the weighted average cost for the whole state. So, again, it was an attempt to keep the cost more manageable.

MR. MCHUGH: Thank you.

MR. NESBITT: George Nesbitt. A couple more items on the 150.1. The central fan ventilation requires HERS verification of the fan watt draw so it'd be nice if it, once again, clearly states HERS verification and on the package table it either needs to say it right there, that it's a HERS measure or certainly in a note.

My biggest—one of my big concerns is high rise multi-family which currently the only HERS credit you can get is duct testing. Therefore your compliance margins are much smaller in high rise multi-family if you take the same building and model it as low rise and high rise, your compliance margin goes down in half.

So the new package requirement for domestic hot water is going to be a—is going to have a solar fraction as well as a well designed recirc loop with demand control. Now high rise multi-family uses the low rise multi-family—or uses the low rise water heating budgets. We're going to be comparing a building that already has a lot less options for credit when comparing it to the best system which is going to make compliance a lot harder. Especially on affordable housing to get the California tax credits. They have to be 17.5 percent above code. This may become extremely

difficult.

The other—on the wall assemblies. I guess you're saying—are you sticking with R-15 plus 4 for the package? And the mandatory is going to R-13, right? Okay.

MR. SHIRAKH: The mandatory has always been R-13.

MR. NESBITT: It's going to stay?

MR. SHIRAKH: We're going to keep it at R-13.

MR. NESBITT: Are we going to require that people build the wall that's R-15 plus R-4 or does it have to have the equivalent performance?

MR. SHIRAKH: As a U-factor.

MR. NESBITT: Right.

MR. SHIRAKH: Whenever you have a U-factor it means you can come up with other alternatives, right?

MR. NESBITT: I mean the tale just says R-15 or R-19 plus R-4.

MR. SHIRAKH: It's out there someplace that there's an equivalent U-factor.

MR. NESBITT: There is? Okay. Maybe I missed that.

MR. SHIRAKH: I'm getting two nods here.

MR. NESBITT: Okay. Maybe I missed that if it wasn't I think we need to make it clearer both on the

package and on the mandatory requirements that you can do the weighted average or you have to have an assembly with an equivalent value. Just so that people don't literally think they have to do exactly that. That they have options. So. I think. Yeah.

It might not be a bad idea to put on the Package Table that no recirc system is allowed under the package. I'd have to say I imagine quite often recirc systems are installed and they were never run on the performance path. Even though it's not part of the default, it's just one of those things that are often ignored.

MR. SHIRAKH: Thank you, George.

MR. STONE: Nehemiah Stone, Benningfield Group. Just a couple of clarifications to what George said.

The tax credits are the minimum, better than the standards of 15 percent, not 17.5. And you get more credit for being 20, 25 or 30 percent better and builders are taking advantage of that because you can get there.

It's not—it really is not that hard except when you have a building that has central ventilation shafts. Then it's almost impossible. But if that's not the case, then it's all right. I also recommend the

note George was talking about and putting at the bottom of the prescriptive table that you not do that because that table also applies to low-rise residential and you have other details in the standards that say for water heating systems that serve multiple dwellings and you have more than eight units in the dwelling, then you have to have recirc system as far as the prescriptive goes. It would be very confusing to people to have a note that says don't have—

MR. SHIRAKH: Don't have it.

MR. STONE: it. I would think it's clear enough that people don't just read what's on the table and say here's how I'm going to build. They use the manuals. They use certified energy analysts to help them out. It's not that confusing.

MR. SHIRAKH: That's a good point. For every value that's Package A there's a paragraph in that same section that describes the requirement.

MR. STONE: Yeah. That's a good idea.

MR. SHIRAKH: The table is just supposed to be the summary.

MR. STONE: Actually, I have one other thing. It's just a suggestion. I don't know if Yanda looked at it or not but in 150.1(c)8D. There's a requirement for all of these, if you want to have electric resistance

water heating, you have to do all of these other things.

One of the things that, seems to me, makes as much as sense as all of these other things is or for your electricity for the electric resistance hot water comes from renewable source on site. That kind of then cuts through all of the rest. Right now it says you have to have that solar hot water system that provides at least 50 percent. I don't know what the rest of it is but it should just also say or on site renewable energy.

MR. SHIRAKH: Oaky. Thank you. Pat Eisler?

MR. EISLER: Hi. Pat Eisler. PG&E. I'd just like to follow up on Jon McHugh's comment. The analysis that he described basically says that if the cash flow is going to be positive in the first year like insulation that he's looked at in various climate zones that would actually increase the affordability of these homes. I guess the question back to you once again why the Commission should not go back to the drawing board.

MR. SHIRAKH: We've talked about this.

MR. EISLER: We have.

MR. SHIRAKH: Several times.

MR. EISLER: But not in front of Commissioner Douglas.

MR. SHIRAKH: We have—

COMMISSIONER DOUGLAS: It's appropriate.

MR. SHIRAKH: We can discuss that. Again, it's trying to keep the cost of the package manageable and we had that scenario of Package A1 which had 50 percent savings and they were all deemed to be cost effective but it would have cost about $10,000 statewide. It's a—typically you have to consider other factors and where you want to draw the line. It's a policy question. What do you want to do with that?

MR. EISLER: Well, you know. From a high level, the demand for housing in this state is going to be driven by interest rates. The economy as a whole, etcetera, etcetera. If you just look at that and the fact that this will actually make the houses more affordable, again, I'm just asking you to reconsider.

MS. BROOK: Appreciate that. Thank you.

MR. SHIRAKH: Thank you, Pat.

MR. MORGAN: Michael Morgan, Performance Foam Tech. Responding to the learned gentleman to my right. I'm a builder first and a foamer second. The goof alert went off when I heard how insignificant the lumber gobbling would be going form two-by-four to two-by-six. That he quizzed folks and they said—it stands to reason that a bigger stick eats up more trees. It doesn't matter how you cut it. You've got to get a bigger stick

out of it. Bigger sticks weigh more on a truck and so then you get less of them and it costs more to truck it. It takes more nails; it takes three instead of two. And it takes another guy to help you stand it up on a wall than—so—and the hangers and the hardware and the depth of the jams. And, so, collectively it's not insignificant and it adds up. For the goal is to get a higher performing house to meet that goal. Not all R-s are the same, apparently. I've been spraying foam now for a long time. A spray house performs different. That insulation is much more expensive than batt insulation. Already when we give someone a foam house, I'm quite proud of the difference that we've given them. It's getting harder and harder to afford that with oil prices going up effects and it affects our product. Just the willy nilly toss extra Rs everywhere we go. When we're talking about it being a foam job, it's—they can get back down to the two-by-fours but the foam is costing more. If it's not foam then they're buying more lumber. We are eating up some more forest. If it's necessary, then it's necessary. If it's not then we're gobbling something up that doesn't need to be gobbled up. Maybe you are on the right track.

MR. SHIRAKH: Jon, do you want to respond to that?

MR. MCHUGH: Yeah. Just briefly. So the costs that I used were the costs that ConSol had collected contractors or builders so they're not my costs. They're the costs that are from the industry. So, yes, the cost was more. The costs were about—were around 60 percent of the value of the energy savings. If you're just looking at it in terms of the present valued cost then this is a lower lifecycle cost wall for those climate cycles. It should be noted that climate zones 6-8 I wasn't recommending going to the R-21 plus 4. Thanks.

MR. PANDE: Abhijeet Pande. Just a couple of comments. First, in terms of the process, Mazi. We've been looking at two-by-six for a while. It's not something that was started at a late stage so, I think, just to sort of clarify for everyone that the team has been looking at for a long time along with the CEC, this issue of two-by-six. We looked back at the two-by-six for the climate zones where the CEC is recommending those as part of the same effort. So if the analysis has been going on for awhile and it's not something that you're bringing in after the package is established, just put that on the record.

Second point on the cost again. We have costs from two data sources, as Jon mentioned. We have cost

from CBIA and from the contractors. We also have costs from (indiscernible). They don't agree with each other but either way you use them, the measure is cost effective. Yeah, sure, you use more money but you get more back from it. I don't think the first cost should be an issue here.

MS. BROOK: Abhijeet, could you give a card to our court reporter? Thanks.

MR. SHIRAKH: Thank you, Abhijeet.

MR. FRANCISCO: Jim Francisco with Sierra Consulting. There was a study done five years ago by Roger Morrison, the Chief Engineer for NCFI, myself and the Forestry Department and the Bureau of Land Management. It is not true that going to a less use of lumber from the forest when making two-by-six walls. Two-by-six walls come out of the heart of the tree. You only get so many out of the heart of the tree where two-by-fours come from the whole tree. That means you increase the lumber, according to the Bureau of Land Management, to the tune of about 198 additional acres a year in the state just for the state. So when we're talking about it, I understand that there are climate zones where you need a two-by-six wall, maybe a two-by-eight wall but you've got to be very, very careful with it. The United States Forestry does not support this at

all. They understand the loss of forest that's going to happen with these types of proposals.

MS. BROOK: It sounds like there's a conflict between different forestry departments.

MR. SHIRAKH: That's not what we found. We talked to the California—

MR. FRANCISCO: I will try to get you the information. It's been five years but I will get you the information that we gathered. They used their supercomputer back in Washington, D.C. to do the calculations in California and they, at that time, called your—called the Energy Commission and talked to them about it.

MS. BROOK: Well then it has to be right. I'm kidding. And because they used a supercomputer, that's really their—

[LAUGHTER]

MR. FRANCISCO: Well, you know, it might be a joking matter but it's not.

MS. BROOK: I'm sorry.

MR. FRANCISCO: There's a conflicting view here. I just want to make sure. There are two sides to the story.

MS. BROOK: It would be great to get—and we have heard you say that a couple of times. It would be

good to get the documentation.

MR. FRANCISCO: I will try to find the documentation, it's been awhile.

MS. BROOK: Okay.

MR. FRANCISCO: But we did a lot of work on that.

MS. BROOK: Okay. Thanks.

MR. HODGSON: Mike Hodgson, ConSol representing CBIA. I just wanted to make a couple of general comments because I think this is going off into other areas, I think, than we had anticipated at this time.

Just to kind of respond to what the comments on the table are. I think CBIA has worked very closely with the Energy Commission and the consultants this time. We're very close on costs. We can agree that we can get the costs within literally hundreds of dollars which normally is thousands of dollars.

So from working together we may not agree on exactly what costs are but the packages we think are in the $4,000-7,000 range based on whether you're using tile or asphalt roof.

When we do preliminary lifecycle costs on that, in its entirety, the majority of the proposed Package A are not cost effective and we'll present that

in public comments to the Commission and staff in a short period of time. That is a concern. Obviously we have a difference of opinion there and we need to figure out why.

The larger concern, and I'm not saying that cost effective is not a big concern, it is to us, is that we're adding $4,000-7,000 to the cost of a house. That impacts affordability. The housing industry is a fairly significant driver of the economy. We know where the economy is right now in the state of California. If you're going to have a negative impact on housing which this does. It doesn't have a positive impact on housing. Then we have to take that into consideration.

The point we're trying to make here is that we're close on costs. I think we have a disagreement on how we do cost effectiveness which we can come to another discussion about. In the long term, that's going to have a negative impact on the salability of housing which, in turn, has a negative impact on our economy.

MR. SHIRAKH: Thank you, Mike.

MR. STONE: Nehemiah Stone, Benningfield Group. What Mike just said has been said every round of standards that I can remember. From the ones that I was first involved in and then when I was Chief Building

Inspector in Humboldt County. All the ones I was involved in when I was here. All the ones since. When we were going through the ’92 standards and we did some research here. I’ve tried to find it but nobody seems to know where it is. But what we did is that we went back in time in looking at the major costs, the two major costs, of homebuilding. Labor and lumber. And we took a standard home, a standard design, and looked at the sale price of that over that same period. What we saw was when costs of inputs were going up often the sale price of the house was going down. When the sale price of the house was going up, often it was the same times that the inputs were going down.

The cost of the house to the public is more tied to demand than inputs. That is true more than almost any other sector that we can think of. It is not driven by inputs, it is driven by demand. It’s a reasonable argument for BIA to say you’re cutting into our profits by adding these costs. We will make less money than we would otherwise. But to say that it affects the affordability of homes is absolutely wrong. I would suggest that the Energy Commission replicate that study with current, more current, data with maybe a broader reach than just the one market that we looked at at the time. But this same argument is trotted out over

and over again and it'd be nice to put that argument to bed. Finally. Thank.

MR. SHIRAKH: Thank you, Nehemiah.

MR. GABLE: Mike Gable, Gable Associates. Some of you know over the last many years we've been doing a lot of work on cost effectiveness of REACH Codes under the current standards, looking at seating current code by 15, 20, 25 percent looking at cost. I think that it's true that when people do research in anticipation of a code they may over estimate the cost of things because they can't figure out all the permutations of how to meet code and exceed code.

We did our work pretty much after the 2008 standards were in effect, or about to be in effect. I think that the $4,000-7,000 is high. I think it may very well be in the $2,500-$3,000 range and I think the building industry will historically find very smart, effective ways of reducing costs to meet code. Thank you.

MR. SHIRAKH: Thank you.

MR. KINTNER: Avery Kintner with Empowered Energy. I just want to comment on a couple of things I've been hearing. I was a financial officer and a national builder for 15 years in my career.

There are three major costs that drive the

costs for a builder. It's land and labor and materials. Typically land is a residual value on a performa. The builder considers all of the costs that are involved with a project and they look at where they can position a product and they make a bid on the land, based on what that cost structure and that revenue structure is. I think from a broader perspective it would be important to remember that when we're looking at code that'll go into effect or standards that will go into effect three or four years from now, a pejorative amount of the costs is going to be factored into the bid on a piece of property four years from now. Which hopefully will not be land that's owned today by the builder.

I think it's really important to consider the effect of having a higher cost for a builder. If it is going to be factored into future land purposes consistently across the board for anyone who's competitively bidding for land in the future that it's really going to have an effect on the net land value of what the builder might pay. The effect of that higher cost and performa and the lower number land bid, if you will, would be effectively a higher return on the investment because you have less—it's $7,000 upfront and that comes off the land residual. That's $7,000 I'm not putting out on the land and holding the land for the

entitlement period until the chance I get to build it.

I think it's important to have a balanced argument. We're not just talking about the effect of a cost to the builder and the impact to profits solely because there's $7,000 of cost coming out. I think, in the broader sense, when you're looking at the land residual value that's factored into future land purposes it actually contrives some good metrics from a return standpoint for the builder. Especially if it's planned for and it's known and people are bidding out in front with the knowledge that that higher standard is going to be coming down the pike.

I think that should be brought into the conversation as far as how much the cost is to the builder and what the impact is on their profitability. I think that should also, the other point I wanted to make is that I've been requesting and looking for a roadmap for the builders to follow that helps them understand today's code and the 2020 code objective. I really feel that it would be important for the builders to understand in 2014, 2015, 2017 what is the roadmap and what does it look like from a cost perspective if we are going to, in fact, achieve a 2020 objective. And then we can have these discussions with the tradeoff value of doing a higher standard now versus a higher

standard later. So that was essentially what I wanted to share.

MS. BROOK: Thank you. Avery, would you be able to help us find the sources of data that would help us document that land residual value and how builders make bids on land based on their—

MR. KINTNER: Sure.

MS. BROOK: That would be very helpful, I think.

MR. KINTNER: Okay. Thank you.

MS. BROOK: Thank you.

MR. RAYMER: Bob Raymer, Senior Engineer with the California Building Association. There are actually four major costs looking back to 1992. Things have changed. You've got your land. You've got your materials. You've got your labor. But you've also got fees.

Local fees, if you look at Rancho Cordova, before you break ground and move forward with the house, you've paid over $100,000 in school fees, transportation, park fees, etc., etc. It's quite a laundry list. That is not uncommon through the state of California. It is very common to see a six figure set of fees. That's a fourth area that gets involved here.

Moving back to the affordability issue.

There's affordability of operating the home. Clearly if you're paying smaller energy bills or if you're paying no energy bills, that's a very good thing. That provides you with a better cash flow on a monthly basis. Clearly that's a good benefit.

There's' also the affordability of being able to purchase the house. Unlike 1992 or at any time over the last 30 years of developing energy regs, we find ourselves in a bit of a predicament. This gets to the standards in their totality right now and the rest of the building code, particularly for Commissioner. I'd like for you to understand that we're in the middle of a four year period where we're seeing an unprecedented of building code mandates take effect, unlike anything I've seen in 30 years of doing this.

In particular, we had the last energy efficiency standards update in 2010. That was about $2,000 per house. In 2011 we saw the imposition of the HCDE mandatory green building standards, depending on method of compliance and where you're at in California, that'll range from $500-2,000.

Most significantly, we're one of the two states in the nation that chose to adopt the national code provision requiring mandatory residential fire sprinklers. Once again, depending on local add-ons, if

you simply comply with what the state is requiring without any local fire department add-on, sprinklers is about a $3,000-5,000 price tag, at a minimum. That's not counting any local fees. That's not counting any add-ons for addition meters or whatever else that the local fire department might have.

So just in the last two years we've added about $6,000-10,000 to the upfront cost of a home. We're now looking ahead to the energy regs here. As Mike indicated, we're looking at a low of the $3,500 to a high of the $7,500 range. On top of everything else that we've already done.

While the Energy Commission doesn't really need to focus on what the state fire marshal does. We have to. We have to comply with it all. And we have to market it to the home buyer.

You also consider the unfortunate economic circumstances that we find ourselves in and that 2007 was an absolute terrible year. We'll be providing all this data to you in our submittal by the 31st. We would have to increase production today by well over 100 percent just to get back to the state of being terrible like we were in 2007. We're currently building at a rate of 15 percent of normal. That's having a huge impact. We're now in competition, new homes are in

competition, with the distressed properties that were built three to four years ago. A property that may have sold for $450,000 right here in town is now selling for about $200,000. That creates a very difficult situation where a 3,000 square foot home selling for $200,000. The builder who wants to market the newer home has to effectively come up with a smaller square footage but something that can compete with that home. We're very concerned, since the lending intuitions—quite frankly the lending institutions and the appraisers, really don't do a very good job, if any job, of giving us credit for higher levels of energy efficiency and solar which is a huge problem. Once that problem gets addressed. That'll be a game changer for a whole lot of this.

Right now we have a hard time getting the appraiser to even acknowledge higher levels of energy efficiency. With that, we find ourselves trying to market sprinklers, green building standards, energy efficiency standards and now energy efficiency standards plus. That is a real issue.

Furthermore, during the downturn the economy as we hit 2007 and 2008, a lot of builders and some divisions of large companies have kind of gone into dormancy for awhile. They put plans on shelves. The

plans they put on the shelves in 2007 and 2008 are going to need massive redrawing. They may have been very marketable back then but they're not going to comply with fire codes, energy standards and building standards. They're going to have to do a major rewrite. All of that needs to get done effectively overnight. The homes that we'll be building January 1, 2014 should be planned for right now.

By and large all of this is coming together in a perfect storm. Unlike 1992, because we have to pay-- the homebuyer has to pay 15-20 percent down payment instead of 0-5 percent, that's a big deal. And if all of a sudden we've added $10,000-20,000 to the total price of the house that gets factored into the down payment. You're knocking people out of the market. Yet there will be people that will be able to afford the home. That's not the issue but this will have an overall impact on upfront affordability for California.

And we'll turn some numbers into you and if you need help identifying all these different fees or some of the other land things, we can help you with that. I can tell you right now that the land value in Rancho Cordova is negative numbers and it has been for a couple of years. Thank you.

MR. SHIRAKH: Thank you, Bob.

MR. NITTLER: I've been standing there so long I forgot what I was going to say.

[LAUGHTER]

MR. NITTLER: Ken Nittler with ENERCOMP. I worked on the case study on fenestrations so we're back up just a little bit. In this section in 150.1 Section 3 and 4 there was the issue of skylights.

Originally the case team or at earlier workshops Rodger LeBrun testified and suggested that we needed to do something about skylights so we looked at them and our recommendation is a little bit different than what showed up here.

After studying it for awhile, our recommendation was first of all, you not add the skylights to Table 150.1-c. What we proposed and what did get written in here was that we treated skylights as an exception prescriptively so that you could always add at least one skylight and we specified the same performance numbers that were found in the 2012 IECC.

We need to revisit this language and I'll work with you folks to get it cleared up a little bit. Thank you.

MR. SHIRAKH: Thank you. Any other questions on Section 150.1 the prescriptive requirements?

MR. MCHUGH: I just have a couple of comments.

This is Jon McHugh, McHugh Energy.

One of the issues with affordability, I looked at Zillow for some of the statewide costs of housing and Bob's absolutely right. This actually—Bob and Nehemiah are right. It's what all the houses are which drives the cost of housing. If you look on a statewide basis, the average cost is $300,000 right now for the average cost for a house in California. Some areas, of course, are more and some are less.

I think one of the important things is that we really want to help the building industry market all of these added efficiency features. I believe there's a proposal to look for the REACH codes for all new homes and, ideally, a date certain rating of homes so that consumers can actually see upfront that this older house is the same size and in the same school district but I'm going to be spending a couple more hundred dollars per year on the bills for this house. I'd like to see what the Commission and other interested folks can do in terms of making this a reality. I think it's something that we all agree on that's important.

MR. SHIRAKH: Thank you, Jon. Any other questions online?

MR. OSANN: Yes. This is Ed Osann. During an earlier comment on domestic hot water pipe installation,

staff referred back to, in the range of, 115 and 118 which are the mandatory requirements for all occupancies. Quick check there indicates that there does not appear to be requirements for insulation of nonrecirculating domestic hot water under slab. There are requirements for insulating heated slabs but not for insulating hot water pipes themselves. Nor is there any reference to the length of pipe that needs to be insulated in nonrecirculating systems. So maybe it's someplace else in the code but it doesn't appear to be in the points referenced by the staff. We'd just like to renew the request that this be considered.

MR. SHIRAKH: Bruce Wilcox—

MR. WILCOX: I think the section you're looking for is in 150(j).

MR. OSANN: That was the point that I brought up originally was 150(j) and the lack of reference to it there.

MR. SHIRAKH: I think it's just a matter of where it is. We need to look and find it.

MR. OSANN: Thank you.

MS. BROOK: I'm not going to send you off to another code section.

MR. NESBITT: Yeah. George Nesbitt. It is somewhere in 150. There is language that underground

pipes need to be insulated.

MS. BROOK: If you can send me or Mazi your contact information, we can get back to you once we've identified where it is in the code or if it's not in the code we can confirm that with you.

MR. OSANN: Okay. And the speaker is?

MS. BROOK: This is Martha Brook.

MR. OSANN: Okay.

MS. BROOK: I don't know if we have our email address on there. Mine is probably the easiest. It's m-b-r-o-o-k and then the Energy Commission extension is @energy.state.ca.us.

MR. OSANN: Okay. Thanks.

MR. SHIRAKH: Any other questions online?

UNIDENTIFIED SPEAKER: Elizabeth McCollum.

MS. MCCOLLUM: Hi. So I'm going to return to the issue of increasing wood use and deforestation with the two-by-six stat. If the average diameter of logs used to mill these studs is nine inches, cutting a six inch stud out of that is not going to increase the size of tree that we're cutting down.

Also, we're just talking about the exterior walls of a home not all of the walls of a home. If we take the worst case which is a home built with two-by-four studs, 16 inch on center to two-by-six studs, 16

inch on center the total impact is only a five percent increase on that home. If we move it to 24 inches on center, it's only 1.7 percent increase per home. At the nationwide level if the total lumber use—of the total lumber use in the state 35 percent is for residential construction. Overall, even if every home is built to two-by-six, 16 inch on center as compared to two-by-four, 16 inch on center the increase is less than 2 percent. I just want to put things into perspective. Yes, we might use a little bit more wood but it's really not that big in the grand scheme of things.

MR. SHIRAKH: Thank you, Elizabeth.

MS. CHAPPELLE: Can I clarify—Cathy Chappelle, Heschong Mahone Group that Elizabeth McCollum from HMG did the initial case study on the two-by-six framing for the IOUs.

MR. SHIRAKH: Our investigation into this so far has also determined that there is not a significant impact.

Okay. Any other questions on section 150.1, the prescriptive requirements or the previous section? One more online questions.

MR. LEBRUN: Rodger LeBrun.

MR. SHIRAKH: Go ahead, Rodger.

MR. LEBRUN: If you've got me with a raised

hand that was an error. I'm sorry.

MR. SHIRAKH: No other questions online? Anybody in the room?

Okay. We're going to move to section 150.2. These are the additions and alterations. So that first bullet basically says that there are some requirements for buildings that are less than 1,000 square feet and glazing modification for less than 50 feet. In 2008 standards we just made some clarifications for them. We didn't really significantly change them.

The exception 1 to 150.2(a) clarifies that for additions less than 1,000 square feet, mechanical ventilation for whole-building ventilation airflow is not required; however, all other applicable requirements of ASHRAE 62.2 will be required. For additions less than 1,000 square feet you don't have to do the whole-building ventilation airflow but everything else applies.

Exception 2 to Section 150.2(a) where the space in the attic or rafter area is not large enough to accommodate the required R-value, the entire space shall be filled with insulation provided such installation does not violate Section 1203.s of Title 23, Part 2. Basically this says that if you don't have enough space in the attic, you just fill it as much as you can.

Exception to Section 150.2(b)1B Glazing Properties. Replacement fenestration up to a total area of no more than 50 square feet with a U-factor no greater than 0.40 and in climate zones 2, 4, and 6-16, a SGHC value no greater than 0.40. Basically this exception defaults back to the 2008 levels for SGHC and U-factor for small amounts of glazing.

Sections 150.2(b)1D and E eliminated the 60 percent leakage reduction method for duct ceiling because we found that—this was subjective views and could not be enforced or verified so that we're getting rid of that exception. There are a lot of other alternatives in there however that remains.

Section 150.2(b)1H Roofs. The reflectance and emittance requirements have been changed to be consistent with the prescriptive section that was previously described. Basically it's a reflectance of 0.20; I can't remember all the climate zones and the same emittance.

The off ramps for the ¾ inch above deck air space and increased free ventilation area have been eliminated. I think several speakers have already spoken for this measure, I think Andrea and others.

The third bullet specifies that the reflectance requirement for low-slope roof in alteration

is 0.63. This kind of mirrors the nonresidential requirements for alterations. We were specifying different reflectance which is 0.63. If you recall that for new construction we're recommending 0.67.

The last bullet says provides continuous insulation as a prescriptive alternative to the cool roof requirements. Basically it's the same thing as yesterday, where we allow tradeoffs between roof reflectance and continuous insulation. There's a table in here that will allow people to trade off (indiscernible) insulation against reflectance.

Section 150.2(2) Performance Approach for Alterations. This sets the ground rules for how the performance budget is set for alterations for the standard design and the proposed.

For ceiling, roof, walls, and floors it provides partial credits for altered components that exceed mandatory requirements. Basically what it's saying is that for these system where roofs, walls and floors. You have to meet the mandatory requirements for those altered components. If you exceed the mandatory requirements you will get a partial credit. However the second sentence says provides full credit if 2013 prescriptive requirements are met. If you bring those altered components to the full 2013 prescriptive levels

then you get the full credit. That's a big credit actually.

For windows provides partial credits for altered components that exceed the 2008 prescriptive requirements because we didn't really have this prescriptive requirements before and so now we're basically saying instead of using a mandatory requirements for fenestration and U-factor and SGHC we are using the 2008 levels. If you bring it up to 2008 levels then there is no penalty or credit. If you exceed the 2008 levels that it'll be a partial credit. If you come up to the full 2013 prescriptive requirements they'll be a whopping credit, actually. The whole thing when they do alterations is to come up to the 2013 levels.

Section 150.2(b)1F Altered Space-Conditioning System –Mechanical. So it's basically—this requirement for refrigerant charge verification for alterations to HVAC systems. It's been there since 2008 but there's been some clarification for that language.

The second bullet is refrigerant charge verification was clarified to be in climate zones 2, 8, 9, 10, 11, 12, 13, 14, and 15.

And added the same requirements for systems such as mini-splits and multi-splits which we talked

about earlier today. Because some of the systems, it not possible to do the refrigerant charge verification and the air flow requirements like we do with the split systems so we have other off ramps which is essentially higher SEER and EER requirements.

Any comments on alterations 150.2?

MR. PETERSON: Greg Peterson, Eagle Roofing Products also representing the Tile Roofing Institute. I'd just like to, for the record, reiterate and reaffirm Andre's statements on the air gap and ask that it be restated in the residential additions and alterations. If we're so fortunate to have it reinstated, it could be dually referenced in the performance model, maybe as a footnote.

Then, also, another point, and I already talked to Payam about this, I'm not sure if this is the section but where the ASTM standards are listed. A lot of them, or at least some of them, ones that we saw were outdated and we suggest either listing the standard itself without the date or the correct date.

MR. SHIRAKH: Okay. That's a good comment. Thank you. Payam, you know what's going on? All right. George?

MR. NESBITT: George Nesbitt. Let's say like when you open up a wall, my electrician friends tell me

that if you open up a wall you have to bring it up to the electric code. Reading through this section again, it would appear that anytime you alter anything or add you have to meet all of the mandatory requirements for all occupancies as well as all the 150.1 low-rise residential mandatory requirements. And you have to bring it up to the prescriptive level unless you do performance. Certainly the practice has not been that. People open up walls, don't insulate them, close them back up.

One situation especially with ducts, duct ceilings, being exempted in the heating only climates like climate zone 3 San Francisco / Bay Area, let's say you have a floor furnace and you put in a new central heating system with ducts. The prescriptive requirement would be that they have to be HERS rated. The practice has never been that so removing the exemptions for duct ceilings is extremely good. I look forward to that.

I had noticed that the refrigerant charge had not exempted climate zones in the 2008 code although they certainly taught us HERS Raters that it was only for some of the climate zones.

I have to say that climate zone 4—you take San Jose that whole area, large parts of zone 4 and climate zone 3, you get into Benicia and Vallejo which are still

in zone 3. None of the builders are building houses without air conditioners. Now granted you don't have as big of a load or as big of a demand through a season but certainly air conditioning is standard. I think especially zone 4—persaonlly, I would say none of them should be exempted but certainly zone 4 seems fairly heavy air conditioning and I don't think it should be exempted.

The language saying that if you have a cavity with the rafters or walls or floors, if they're not large enough you don't have to bring them up to the prescriptive requirement is really good. It's just—I think maybe it should be a little more clear that you have to pick the right assembly. So if you have a two-by-four, you should have to put in the R-15. Whatever the highest R-value is for the frame size cavity is, it should be what you have to put in. I think that should be a little more clear.

Also think, back when we're talking about definitions, the definition of an addition has always been adding condition floor area and volume yet I can think of projects or houses where people do not add floor areas but they add volume. So let's tear out that R-30 ceiling and go up to that two-by-four roof and make a vaulted ceiling. We'll we've just done an addition,

although we have not added condition floor area, so I would change the definition to adding condition floor area or volume with the exception of the greenhouse windows and I think bay windows as long as they don't go down to the floor would be a reasonable thing to do.

The rule that when you're doing an existing plus addition in the performance method, I'd say generally when you're doing existing plus addition or alteration compliance has been relatively easy. So the rule has been, and continues to be, that if you do not improvise an assembly to the current package requirement you're then going to be compared to that requirement. I think that as we have raised the minimums and we're raising some of those requirements that will become harder for existing homes. I think it's maybe not the worst thing at the moment but we could see a point in time where that will make compliance fairly hard.

I think I'll leave it at that for now.

MR. SHIRAKH: Thank you, George. Any other comments to alterations and additions?

MR. DEVITO: Eric DeVito, Cardinal Glass Industries. Just a point of clarification. I'm just trying to make sure that I understand this correctly. Right now there's a provision in this section for replacement fenestration having to meet the prescriptive

tables which I think I mentioned yesterday and is even more true for residential, for all practical purposes there's not differences between a window for new and a window for replacement. It's the same product so there's no reason that it can't meet the same standards.

The exception under the performance approach for fenestration and alterations for the .4 .4, I'm just trying to get clear that a situation where you would just replace the windows. You're not doing anything else to the structure. You're just replacing the windows. It can't—it can't now avoid meeting those prescriptive tables by going under this section.

MR. SHIRAKH: The prescriptive still has to comply with—if they want to comply prescriptively they have to put in the 2013 levels.

MR. DEVITO: Right.

MR. SHIRAKH: If they use performance and, again, you have to think within the context of additions and alterations.

MR. DEVITO: Right.

MR. SHIRAKH: Like if they're doing an addition and they're putting in more glazing, that they cannot—like maybe it's more than 20 percent of the condition floor area or the west facing and they want to do some tradeoffs then they can go to the existing part

of the house and bring or change out some of the windows. The way it's structured, if they come up to the full prescriptive levels of 2013 they get a big credit that they can use for tradeoffs against the addition. At the minimum they have to come up to 2008 levels and still if they do that they won't get any credit. If they go beyond 0.4, they get a small amount of credit but, in reality, if they're doing an addition and they go to 2013, they get a big credit which they can trade off against with the addition that they're doing.

MR. DEVITO: I do get that part of it. I guess my concern is if you're just replacing the windows, no other measure. You're not doing any other—

MR. SHIRAKH: If you're not using the performance path you have to use the prescriptive and it is the 2013 language.

MR. DEVITO: And replacement—just replacing fenestration you have to use the prescriptive path. That's your only option.

MR. SHIRAKH: Well, you have to trade if off against something.

MR. DEVITO: But you have to do some other measure. In other words, you have to do some other measure. Just windows only and prescriptive is your

only option.

MR. SHIRAKH: Yeah.

MR. DEVITO: Okay. I don't know if there's a way to make that clearer in here but as long as that's the way you're going to implement it, I think that's fine.

MR. NITTLER: Ken Nittler with ENERCOMP. I think the language with which Eric is talking about is 150.2(b) Item 4. Hypothetically, if you were bringing in an alteration in and the only thing you changed was the windows, you could go in the performance path and instead of using the new package, the 2013 values, you could use the .4 .4. That was the only thing that you did.

MR. SHIRAKH: No, you don't get any credit. But I think I understand what you're saying.

MR. NITTLER: So there needs to be something that—well, we need to think about.

MR. SHIRAKH: I understand what you're saying. We might have upgraded a loophole here.

MR. GABLE: The way to close that loophole is to simply to give no credit to the 0.4 until you get to the prescriptive. We can talk about it but there's a way that you can make it energy neutral so there's no advantage to using the performance approach compared to

the prescriptive approach. We can talk about that.

MR. SHIRAKH: Okay. Thank you, Eric, for bringing that up.

MR. STONE: Nehemiah Stone, Benningfield Group. I'm asking this question because as I read through it I can't see the answer in it. When it says that you're for an alteration or addition using prescriptively you have to go back to 150.0(b) which gives you the new construction performance method and then it references all the prescriptive requirements and mandatory requirements. That sets your standard budget for—

My question is does that mean that the new requirements for solar are included in the standard budget for when you're doing an addition or alteration? For water heating, well-anyway. It's just not clear if that's the case and if it is, it sets a pretty high bar, particularly—well, it seems to me that that's particularly true for residential, not even high rise, but that has less roof area per condition floor area than single family homes do.

MS. BROOK: Your concern is with the solar thermal requirement for electric water heating?

MR. STONE: Yeah. Well. That's one part of it. Also, the requirement that for water heating there

is a requirement for solar in the new construction now.

MS. BROOK: You mean solar ready. Is that what we're talking about? I'm sorry—So you're worried about whether, basically, about not having solar access whether it's thermal or electric.

MR. STONE: Let me restate the first thing I said, Martha. I'm asking this question because I can't really see the answer in there. I'm not saying it is one way or the other but as I look at it, it looks like when you're setting the standard budget when you're doing an addition or alteration—

MS. BROOK: Mm-hmm.

MR. STONE: Means that you have to include solar into that standard budget which means then that you're—it sets a pretty high bar for something you're not changing very much.

MR. SHIRAKH: So—

MR. STONE: If I'm reading your body language correctly, Mazi—

MR. SHIRAKH: Well—

MR. STONE: I'm way off base here.

MR. SHIRAKH: No. No. Patrick can probably answer that question better than I can.

MR. SAXTON: Well, I think—are you saying, Nehemiah, specifically for multi-family with central

water heating that now has the prescriptive solar fraction requirement?

MR. STONE: Right.

MR. SAXTON: I don't know the actual answer to the question but I wanted to narrow the question. I think the answer is probably yes that the answer is in the budget but I don't know that for a fact. We'll have to check.

MR. STONE: Okay. I'd like to talk to you offline about that.

MR. SHIRAKH: IF you think that's a problem, we can probably handle that through an exception.

MR. SAXTON: And then as far as the solar ready stuff, its additions and alterations are excluded from those requirements.

MR. STONE: Thank you.

MR. NESBITT: George Nesbitt. To actually clarify the question on window replacements. So if you did not want to meet the package requirements you would run the building through the performance as a pure alteration. You could put in whatever windows you want and as long as you're net energy budget does not increase, you've complied.

And it's all based on the vintage of the house and the code when the house was built. As long as

you're not—it may be if you're altering other things and you're not able to come up to the current requirements, that may actually now force you to do a little bit more than you had to just because some of those requirements have increased. There's nothing potentially stopping you from doing the performance path.

Actually on the window issue, I meant to talk about it in the prescriptive, with solar heat gain coefficients, the—in the heating climate zone 3 as well as on the coast there is no requirement for solar heat gain coefficient yet in the performance path the computer is assuming about a 0.6 solar heat gain coefficient. If you're putting in a new window in a heating climate, you're required to meet a U-value but you're not required to do anything on the solar heat gain coefficient.

The problem is low solar heat gain coefficient windows are the standard essentially for all the manufacturers. It's what's in stock. Home Depot, Lowe's, every lumber yard. That's what you're going to get. So in the heating only climates, you're going to put in a window that meets the U-value but has a much lower solar heat gain coefficient which is actually going to, in comparison to a higher solar heat gain coefficient window, you're going to increase your

heating energy use.

I would say for the heating climates, we need to set a solar heat gain coefficient that is the lowest number because it's working against us. I've run enough buildings, I've actually done enough multi-family HERS II and I've showed the client, actually I get a higher percentage improvement by going to a low solar heat gain coefficient window yet these are buildings that have no air conditioning. That reduces my heating budget less than going to the high solar heat gain coefficient. I get more credit on the cooling side but I don't have any real cooling energy use. The performance method gets it right because it will penalize you for the low solar heat gain. Prescriptively, we're not getting penalized for it when we should.

Just the other thing is that ASHRAE 62.2 should not be exempted for additions less than 1,000.

MR. SHIRAKH: It's not exempted. The only thing that's exempted is the whole-house requirements. All the other requirements still apply.

MR. NESBITT: Okay. Well, I would say 62.2 would apply to existing homes completely. I didn't read it necessarily that way so I'll go back and read it but I would say whole-house should apply.

MR. SHIRAKH: Any other comments on 150.2?

Anything online?

MS. MCCOLLUM: Elizabeth McCollum. I guess have to unraise my hand. I don't have any other comments.

MS. BROOK: Oh. Okay. You're officially unraised.

MR. SHIRAKH: So we're going to move to REACH Standards.

MS. BROOK: Well, it's the part you've been waiting for. All day. Sorry. I don't know what happened here.

So as I explained yesterday, I'll do a re-do for those of you who weren't here. This code cycle update, the Energy Commission will be adopting the Energy Efficiency component of the Green Building Standard here at the Commission within our part 6 rulemaking proceeding. In past years we're worked with the Department of Housing and Community Development to get energy efficiency sections updated. They manage the entire green building standards update process. This time we're going to be adopting here at the Commission and then handing it over to the Building Standards Commission for inclusion in the Green Building Code.

What we're proposing for the 2013 building code update is that similar to what's in the current

standard it's 15 and 30 percent for Tier 1 and Tier 2 here explained as 85 percent for Tier 1 of the Part 6 Energy Budget. And we're also adding an additional requirement for a calculated total building electricity consumption of less than 10,000 kWh. For buildings that—for homes that have a calculated exceedance electricity consumption, an electricity consumption that exceeds 10,000 kWh, that needs to be met either with the energy efficiency or on site photovoltaic system to reduce the calculated electricity load down to that budget level.

And then for Tier 2, similarly, it's 30 percent better than Title 24 or 70 percent of Part 6 Energy Budget and calculated total building electricity consumption drops to 8,500 kWh. So it's an equivalent level of reduction of the cap of the electricity consumption that gets set in the compliance software and above that to be compliant with Tier 2 you would have to use additional energy efficiency measures or on site solar electric system.

And then there are a few prerequisites. The prerequisites, again the prerequisites we're proposing as mandatory so these are voluntary REACH standards but if a local government adopts them as mandatory in their jurisdiction then we would be basically specifying that

they should make these following measures mandatory for all homes constructed under that REACH standard.

The first one is that Jon McHugh mentioned earlier. It's a home energy rating system rating computed by the compliance software and included on the certificate of compliance. This will be—we're calling it a "Design Rating" because it wouldn't require all of the requirements of the HERS whole-house program in terms of measurement and recommendations for improvements. It would just be a rating based on the consumption of the house that's estimated by the Compliance Office Software.

The second prerequisite is Quality Insulation Inspection. This is a prescriptive requirement as proposed in our 2013 base standard. We think that this is a really important measure and would like to get it into as much homes as possible. We'll likely in future base standards be making these a mandatory requirement so we're proposing it as a mandatory requirement. We're proposing it as a mandatory requirement under this REACH standard.

The following item is in the current green building standard for energy and that is that builder provided appliances need to be ENERGY STAR label if there is an ENERGY STAR available for those products.

The Indoor Lighting prerequisite is as follows:

All permanently installed lighting is high efficacy with vacancy sensor controls. Permanent lighting must be installed in kitchens, bathrooms, utility rooms, and garages at a minimum. Every room has either permanent lighting or at least one switched receptacle. Builder provided ceiling fans installed with ENERGY STAR light kits.

For outdoor lighting, all permanently installed lighting mounted to building is high efficacy with photocontrolor time clock controls.

That's it. We can back up if anybody has specific questions or you can come up and make any specific comments that you want.

MR. THOMPSON: First of all, I want to congratulate Martha and Mazi and Bill. This has been an exciting two days.

MS. BROOK: Can you again for the record just restate your—

MR. THOMPSON: I'm sorry. It's Mike Thompson, CBPCA.

Seriously, it's been a great example of collaborative rulemaking. I wish more agencies in the state would follow your example.

The fact is though that this is the easy part, what we've done here in the past couple of days. I would like to make a special appeal to Commissioner Douglas. I have many friends in the Enforcement Division, I've worked with them for many years, they have serious doubts about whether they'll be able to implement the measures that are being included in this final document. The fact is that they essentially can't enforce the measures in the old rules.

I would ask you to do two things. First, I would ask you to ensure that Enforcement has input, adequate input, in to this process so whatever we come up with they at least buy into. That they can enforce what we come up with.

And, two, the end result of this, whatever document we produce, I ask you to make sure that Enforcement has adequate resource to enforce them.

And I suggest that that would be the first. So I appreciate your attention to that. Thank you very much.

MR. STONE: Nehemiah Stone, Benningfield Group. Martha, unlike all of the other documents, I couldn't find this one on REACH standards on your website.

MS. BROOK: Yeah.

MR. STONE: So—

MS. BROOK: Anybody else have that problem? I'm pretty sure that we posted it.

MR. STONE: All right. Speaking to what I saw on the slides then, it looked to me then you're defining residential to me as single family. I'm wondering if there a parallel REACH standard for multi-family?

Obviously, the 10,000 kWh per year would be per dwelling. Abhijeet was just showing me (indiscernible) data that says in California it's closer to about 8,000 usage right now in single family and about 6,000 in multi-family. That's standard usage.

MS. BROOK: So are you suggesting that—so just to answer your question, we do have a little bit of a weird thing right now because the Energy Commission defines residential and nonresidential buildings in one way. HCD and Building Standards Commission do it differently. So we have to be careful that we map our codes back together in the right way. Our intention is that there should be REACH standards for both residential and nonresidential and multi-family falls in one or another. So we want to make it right.

MR. STONE: (Inaudible)

MS. BROOK: Yeah. Exactly. So are you suggesting that we change that limit to be a lower

number for multi-family dwelling units?

MR. STONE: I'm suggesting that it looks to me—

MS. BROOK: It was based on single family analysis.

MR. STONE: Exactly.

MS. BROOK: Yeah.

MR. STONE: That's what I—and there ought to be a specific analysis done for multi-family to find out what's the right level for REACH codes.

MS. BROOK: Okay.

MR. STONE: And it will be different.

MS. BROOK: Okay.

MR. STONE: For low-rise multi-family versus high-rise multi-family. That's typically where the codes make the distinctions at three stories or less and four stories and more.

MS. BROOK: Mm-hmm. Mm-hmm.

MR. STONE: And that's where high-rise residential falls into the, nominally, nonresidential code. Anyway, the numbers are up there and made sense sort of and Abhijeet, as I said, had just pointed out the numbers show that typical homes now are below that number.

MS. BROOK: Okay. Well—that's okay. If

they're below. I mean, it's not okay but they're different but these—the number there is for a relatively large house, single-family house. The idea is that at some point because we have an energy intensity unity of measure, at some point it gets a little unfair. The larger and larger house gets easier and easier to comply with as it turns out. Just because it's an energy intensity unit. It's always been a bit harder for smaller houses to comply than larger houses. At some point, it just gets a little silly to keep extending that linearly. We're kind of putting a cap on it. The other thing is that we're putting a cap on it on the place where it's very cost effective to do solar installation because they're hitting the highest rates at those levels.

MR. STONE: So you don't think it makes sense to set the limits on reach code at or below what the average home in California—

MS. BROOK: Well, the way that we did this analysis and our justification for setting it at this level is based on cost effectiveness of solar. That's really driven by the rate structure in the state. You have to get to that 10,000 level for it to be—to hit the highest rates and therefore solar is very cost effective. So it's not based on just average

consumptions, it's really on expected costs of that energy and that's sort of how we set that limit.

MR. STONE: One more nugget to think about on that then. Since the—the REACH code means you have to be at least 15 or 30 percent below standards anyway. Then having a kWh cap that is essentially 30 percent higher than what the average home in California uses right now means that you're encouraging people—it means that it would be—the unintended consequences that you would be encouraging people to move to more electric use because if you're going to get to 30 percent below the standards between your gas and electricity use and you can use 30 percent more electricity than the average home in California then what you're saying is, "Well, let's reduce the gas use." to get to that 30 percent.

MS. BROOK: I don't get it but that's okay. It's been a long two days.

MR. STONE: I don't have a chalkboard board but—

MS. BROOK: I don't have one.

MR. NESBITT: George Nesbitt. I've been a HERS II rater for a decade and through three trainings, painful as it is. It's painful to pay for three times let along sit through it, well okay. I did not sit, for the record.

I want to quote from the Commission's HERS booklet.

"The California Energy Commission has developed the California Home Energy Rating System, HERS, Program to cover almost every type of residence in California. This includes new and existing single-family homes and multi-family buildings of three stories or less."

Yet, the past three years since we were in this room working on the HERS II Title 20 regulations, I have heard time and time it does not apply to multi-family and it does not apply to new homes. Hopefully this will dispel that and, of course, the fact that you're putting it into the REACH code for new homes will dispel that too.

MS. BROOK: But it is clearly different and that's why we need to name it something like a "Design Rating" because it really isn't implementing all of the rules of the HERS whole-house program.

MR. NESBITT: Well, the HERS Title 20 regulations and the HERS Technical Manual specifies how to do a rating on a new home versus on an existing home.

There are some minor differences so and who can actually produce this rating is regulated yet you

can buy EnergyPro and anybody can buy the CAlCERTS module and some of the other modules like the Green Point rated module. They can all produce a HERS index yet the regulation clearly says that only a HERS whole-house home energy rater or a home energy analyst are the only ones that can calculate an index so Green Point rating calls theirs a Green Point Rating Index. Well, it looks like a HERS Index, it walks like one, it quacks like one. It's a HERS Index.

MS. BROOK: So just to be clear—

MR. NESBITT: It is quite clear in the regulations that in a new home an analyst can produce the Index, although they're supposed to be under the direction of a whole-house rater, and if there's any credit taken for any HERS measures, that data has to be collected by a, forgive me, a Field Diagnostic whatever, blah-blah-blah Rater. I'd call it a HERS Verifier because that's just we've really been doing for the last decade and with HERS II we now have a rating.

That's all there. It's clear. It shouldn't be a matter of discussion.

Also, heard that we haven't defined net zero energy. Well we defined it as net zero timed dependent value three years ago. We may not like the definition. We may not agree with it. No it's not perfect. To

Nehemiah's point yeah, probably some of the values when doing a rating on a multi-family, some of those defaults should probably be different than from doing the rating on a single family. I believe from the 2004 RAS the average residence uses about 20,000 kWh if you convert the therms into kilowatts and add it together, maybe it's 16,000. It's somewhere in that neighborhood. Anyway, I'm assuming that the—Are your kilowatt thresholds only electrical or is that total?

MS. BROOK: It's electricity.

MR. NESBITT: Okay. I'd say 8,500 or 10,000 or—it's still quite large.

MS. BROOK: So, again, we're not doing this based on the stock of homes—

MR. NESBITT: Yeah.

MS. BROOK: We're doing it based on what—where solar is a cost effective option because of the expected rate structure of the high consuming home.

MR. NESBITT: So you're essentially taking a usage amount that would give you a high enough bill that makes solar cost effective based solely on the price of electricity?

MS. BROOK: Yes.

MR. NESBITT: Okay. All right. I understand that. I won't argue with it. I mean, I could argue

with it but okay. Where you came up with those numbers I did not know. So. I guess that answers the question of whether it's the right number—

MS. BROOK: Right. Right.

MR. NESBITT: I, for one, cannot wait to see the HERS Rating System implemented and used more. I'll be—I have a passive house project that's about 70 percent above code and right now it's modeled in MICROPAS right now. I'm going to also model it in EnergyPro and run the rating. I mean I've run ratings on a variety. I've been working on 324 multi-family units for tax credit allocations. I'm told it can't be done, I guess, or that we have to somehow create a new system for multi-family when the regulations already tell us because it's all based on the Energy Code.

MS. BROOK: Okay. Thanks, George.

Do we have any other Green Building Standard comments? Jon?

MR. MCHUGH: Yes. Hi. Jon McHugh, McHugh Energy. I think this is a great move for preparing the market for the next code cycle and preparing the building stock for zero net energy by having this potentially PV requirement or cap for these really large spaces.

One of the things that I noticed in the

requirement, and I totally support this idea, about—for REACH codes having a basically a residential lighting requirement for all high efficacy. However, the history has been that we spent a lot of time for the state and, I think, looking forward for municipalities that might adopt this standard. And having some fairly simple off ramps for the high efficiency lighting requirement I think is desirable so typically what happens is a small fraction of the market wants to have lots of incandescent lighting for the cherry cabinets, etc. These typically higher income, more expensive homes and—

MS. BROOK: Does cherry look better under incandescent light?

MR. MCHUGH: Well, because it's redder. It's a redder light, so you know.

MS. BROOK: All right.

MR. MCHUGH: Yeah. So, anyway, what I'm suggesting is that in addition to the PV allowance to use for helping people meet the potential cap, also allow a watt per watt trade off with low efficacy lighting. If you look at PV systems, they typically produce about somewhere between 1,200 and 1,400 full load hours of peak energy generation. If you look at residential lighting, typically it's around 1,000 hours of operation or less so using something simple like

this, the state actually gets a little extra energy but not much. It's fairly comparable and something fairly simple for someone to comply with and to enforce.

Also related to the vacancy sensors, I would recommend that you look at not requiring the vacancy sensors in bedrooms and kitchens. I think requiring these in the other spaces that are infrequently occupied makes a lot of sense but I don't really want to set people up to be disgruntled with a potential REACH code.

MS. BROOK: You said bedrooms and bathrooms?

MR. MCHUGH: Bedrooms and—no, no. Kitchens. No, bathrooms are actually a great place—

MS. BROOK: Okay.

MR. MCHUGH: To put vacancy sensors. And then the current standards also have, for garages, the need to have the sort of dual technology or something that uses something other than a light of sight technology.

MS. BROOK: I think we should be encouraging dancing in the kitchen and if that's what it takes to get the occupancy sensors to work then—

MR. MCHUGH: Yeah. Yeah.

MS. BROOK: What's wrong with that?

MR. MCHUGH: Okay. Thank you.

MS. BROOK: Sorry.

MR. MCHUGH: It's late. Anyway, thank you

very much.

MR. SHIRAKH: Actually, I agree with Jon but for sensors in bedrooms.

MR. NESBITT: George Nesbitt. Now, at the August 23 workshop, those of us on the phone got cut off, we could hear you but you couldn't hear us and those of us on the phone could talk to each other. We're in there the whole time, raising our hand chatting, we've got comments. Mazi is just--- I'm emailing other people and they're emailing you and finally we get an email, "Sorry. We haven't been getting your chats."

MS. BROOK: That was the best (indiscernible) we ever held.

MR. NESBITT: That was a disaster so if you've asked why I don't like to do it on the phone, well. That's why.

So you were talking about, in the REACH, allowing credit for renewable—for certain, I forget, I guess lighting appliances—

MS. BROOK: That's what Jon was suggesting was an off ramp with PV for high efficacy lighting.

MR. NESBITT: Right. Well. So, in the HERS rating system you model all of that and you get credit for it.

I guess the one question I then have is that you may need to define either your threshold is your consumption before you've gotten credit for other things. I'm not sure. It's—I don't know if—I mean the way the rating system is supposed to work is that you're supposed to get a rating for the building for all the efficiency measures including lighting and appliances and then you're supposed to get a rating number with renewables. Now I'm assuming—so the question would be if you want to have the two Tiers, the two thresholds, is that going to include modeling all high efficacy lighting and appliances and/or does the renewable count to meeting that threshold? I guess that would really be the big question. Currently you're not getting both thresholds in the software. They do not come up on reports.

MS. BROOK: Are you talking about with and without renewables?

MR. NESBITT: With and without renewables.

MS. BROOK: Okay. All right.

MR. NESBITT: So.

MS. BROOK: We'll work with you on that.

MR. NESBITT: I guess the one thing you do need to do is clarify what counts towards meeting that threshold.

MS. BROOK: Okay.

MR. NESBITT: And ideally it is excluding renewables, although I imagine you should just allow whatever credits are allowed otherwise in the rating system—

MS. BROOK: Okay.

MR. NESBITT: To account towards the thresholds. Although you are requiring them, therefore you should take credit for them.

MS. BROOK: Okay. Thanks. Any other comments? No. If there no other comments on the green standards, we are at the end of the day. If you have general comments, this is a chance for anyone on the phone or in the room--

MR. SHIRAKH: Yeah.

MS. BROOK: Nevermind.

MR. SHIRAKH: I have one. We actually found the missing language for buried pipes after an exhaustive search. It's in Section 151, I'm looking at 2008 standards, so I don't know if the commenter is still online but it's section 151(f)7E. "All buried hot water piping shall be insulated to meet the requirements of Section 150(j)2 and B installed in a waterproof and noncorrosive casing and sleeves." So basically that's where it is. It's in the prescriptive section. I have

no idea why. It should be in the mandatory section.

MS. BROOK: Well, let's move it. Let's move it to mandatory.

MR. SHIRAKH: I knew it was there someplace.

MR. GABLE: Mike Gable. Quick question. Whatever happened to the idea of solar meeting up to 10 percent of the standard design to meet the code? Wasn't there some talk about that among staff at some previous workshop? Is that still hidden somewhere in some future ACM Manual or is it—

MS. BROOK: Yeah. It's in that ACM Manual--

MR. GABLE: Okay.

MS. BROOK: It's in the code—

MR. GABLE: So there's nothing in the code language that takes that on or address it—

MS. BROOK: Right. If you think it's important then—

MR. GABLE: No. I just wanted to know if it disappeared.

MS. BROOK: Yeah, no. It hasn't disappeared.

Okay. Any final comments before we turn it back to the Commissioner?

MR. EMBLEM: Martha, this is Erik Emblem.

MS. BROOK: Hi, Eric.

MR. EMBLEM: I've been listening and it's been

a great meeting. I just want to compliment everybody. The web and the phone today have worked great. It's been great following you and all the quality of the sound has been good. So if we can do this in every meeting, it's a great way to meet. Thank you.

MS. BROOK: Yeah. I've heard. Somebody else told me that the acoustics were really good yesterday so that's good news. George?

MR. NESBITT: George Nesbitt. A couple of question. So we're not directly going to have a workshop for the appendices or—

MS. BROOK: I think based on the comments we heard today, I think staff needs to talk about that. I don't think that's a done deal.

MR. NESBITT: Okay. And then in coming months, we'll have something for the ACM's Residential Manual?

MS. BROOK: Yeah. It won't be-

MR. NESBITT: As they start coming out.

MS. BROOK: until after the adoption of the standards.

MR. NESBITT: Okay.

MS. BROOK: We'll see the approval manual soon. It'll be posted probably next week but not the reference manual that has all the details to how the

software rules have to be applied.

MR. NESBITT: Okay. So the reference manual—

MS. BROOK: The one you probably care about is the reference manual and it will be done after the adoption of the standards.

MR. NESBITT: Okay. All right. Just some general comments.

Definitely as we move toward our net 2020 net zero energy goal as well as the goal of 40 percent reduction in existing homes I think the HERS II system has to become the basis of the Energy Code. Also, I'll reiterate my big concern with the 2013 update which is the potential impact on high-rise multi-family and want to repeat my comment from yesterday on the phone that currently in nonres you basically get no credit—you get credit for doing everything right even though the gentleman from (indiscernible) said this morning quality insulation is not standard residentially or nonresidentially. So, currently, you get no credit for basically anything other than duct testing. You can't get credit for QII or you don't get dinged for not doing QII so really for nonresidential, especially high-rise multi-family, we need to extend the HERS (inaudible).

WebEx has said George has run out of time. Actually, I got dropped in and out yesterday a couple of

times.

MS. BROOK: Okay. So. And I did hear you yesterday; you think that we need to provide more credits for the measures in high-rise multi-family more akin to how we provide those credits in single family?

MR. NESBITT: As well as nonresidential because certainly quality insulation is installed typically poorly as the fellow this morning said duct leakage, air flow leakage, all of these are pretty universal. That's something that I've been saying although it hasn't been—it hasn't really been on the table.

And then, I guess, the last thing that I'll bring up is that Patrick Splitt had reminded yesterday that currently at EnergyPro you can take credit for solar hot water space heating. I referred to this back in August of 2010 at the Commission during the CHEERS decertification hearing and have brought this up once in the past year at a workshop so this is not something that is allowed by code so I would like to see some action from the Commission Monday morning calling Martin Dodd at EnergySoft and having it removed. And then sending out a letter decertifying all previous versions of EnergyPro because it's all too easy to mistakenly or purposefully wipe out your heating budget.

I'd say also that there are a lot of issues with EnergyPro in forums as well as the whole existing Plus Addition method. You can actually not alter a space heating boiler. You can't alter it. There's a lot of measures. You cannot go from a preexisting condition to an altered condition so I've been doing these two large multi-family projects and I cannot model it in HERS II which is based on the Energy Code. I cannot model as intended and envisioned in the software because there is not choice on the alteration tab. I've got a long list of things. I would like to see some action and very soon on the solar hot water because the only—I'd rather not have to file a formal complaint. It just—you know. It's messy. So I'd like to see action. I'll leave it at that.

MS. BROOK: Okay. Thank you, George.

COMMISSIONER DOUGLAS: Thanks for your comments. Let me ask in this closing round of comments that commenters keep their comments high-level and maybe see if you can get through them in three minutes or less, if you possibly can. This is really—we've gone through in great detail and we've had detailed opportunities to offer comment in the individual sections so this is about your overall impressions and your parting words, the high-level thoughts you'd like

to leave us and in particular me with.

MR. STONE: In 30 seconds or less?

COMMISSIONER DOUGLAS: I would love that so, go ahead.

MR. STONE: Martin Dodd is already aware of the issue that George has brought up about boilers and Doug Beeman and Martin and I are working on a solution so.

COMMISSIONER DOUGLAS: Okay. Great. Thanks. Thank you.

Other commentors? I didn't mean dissuade anyone. I just want you to use your time very wisely for the last 2-3 minutes of this workshop. Anyone else? All right. I don't see anyone eager. What about on the phone or on the web? Nobody. Okay.

I would like to thank everybody here for this workshop. It's been a very interesting two days especially for those of us who are steeped in and fascinated by the ways building work. It's been a great time.

[LAUGHTER]

COMMISSIONER DOUGLAS: Excuse me. So, with that, we're adjourned.

[Meeting is adjourned at 4:05 p.m.]

REPORTER'S CERTIFICATE

I do hereby certify that the testimony in the foregoing hearing was taken at the time and place therein stated; that the testimony of said witnesses were reported by me, a certified electronic court reporter and a disinterested person, and was under my supervision thereafter transcribed into typewriting.

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

IN WITNESS WHEREOF,

I have hereunto set my hand this 21st day of December, 2011.

Kent Odell

Kent Odell
CER**00548