BEFORE THE
CALIFORNIA ENERGY COMMISSION

Draft 2013 Building Energy Efficiency Standards Revisions for Nonresidential Buildings	)))	Docket No. 10-BSTD-01

CALIFORNIA ENERGY COMMISSION
HEARING ROOM A
1516 NINTH STREET
SACRAMENTO, CALIFORNIA

THURSDAY, OCTOBER 13, 2011
9:00 A.M.

Reported by:
Kent Odell

APPEARANCES

Commissioners Present:

Karen Douglas

Staff Present:

Mazier Shirakh
Martha Brook
Gary Flamm
Ron Yasny

Also Present

Attendees

Jim Benya
Mike Gabel, Gabel Associates
Tom Culp
Pat Splitt
Erik Emblem
Frank Stanonik
Mark Heydeman
David Diaz
K.C. Colson
Arroyo
George Nesbitt
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Mike Fischer
Dan Varvais
Karl Johnson
Jeff Stein
Tom Garcia
Mike Thompson

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OCTOBER 13, 2011 9:04 A.M.

MR. SHIRAKH: This is Mazi Shirakh. We haven't started yet, but for people who are on the phone, we're getting a lot of background noise, static. If you can, mute yourself or move the microphone because it's very loud here in the Hearing Room.

MS. BROOK: Just for everybody on the phone and those of you in the room, we are going to wait for our Commissioner to arrive before we begin the meeting, but since it's a committee workshop, she's going to be the head of the day, so we're waiting for her.

Good morning. Just a few housekeeping items before we begin. For those of you not familiar with this building, the closest restrooms are located over there, outside the room over there. There's a snack bar on the second floor under the white awning. And in case of an emergency, the building will be evacuated. Please follow our employees to the appropriate exits, we'll reconvene at Roosevelt Park which is across the corner there, located diagonally across the street from the building. Please proceed calmly and quickly. Again, follow the employees with whom you are meeting to safely exit the building. [Pause]

COMMISSIONER DOUGLAS: Good morning. I'd like to

welcome everybody to this workshop on the Draft 2013 Building Energy Efficiency Standards. We noticed this as a committee workshop, but as some of you may know, we have made some changes in the way that we operate, and so this is now a Commissioner workshop. Commissioners are being assigned different issue areas that they have expertise and experience in and, so, this workshop is now for my benefit to hear from stakeholders, and stakeholders' opportunity to speak to the assigned Commissioner about the Standards.

I will be very interested in what you have to say and I'll be looking forward to potentially working with stakeholders, and definitely working with staff on issues that are raised today and, then, of course developing a proposal that I would take and recommend to the full Commission. So, welcome, in any case. My name is Commissioner Karen Douglas. To my right is my Advisor, Galen Lemei, to my left, my Advisor, David Hungerford.

With that, let me ask the staff to take this and introduce yourselves and get started.

MS. BROOK: Great. I'm Martha Brook, I'm an Engineer in the Building Standards Development Office, and I'll be kind of MCing today's workshop. You hopefully grabbed an agenda so you won't have to try to squint and read what I just put up online. Just to

remind you, we are talking about nonresidential standards updates today; tomorrow we'll be talking about residential standards updates, as well as the administrative sections. We're also talking about Section 110 tomorrow, which covers both Res and Nonres. I actually have one slide to follow today that will introduce the beginning because I was sort of in this Nonres mind bent, and so I went ahead and did a Nonres slide for 110, so that might get covered on both days.

Anyway, this is an updated Rulemaking Calendar for the upcoming proceeding. We updated it about just probably a few days ago and reposted it. It reflects more time to hear from you today and to respond to the comments we hear in the next two weeks on the staff draft proposed changes and that required kind of pushing things back a little bit. So, instead of a March 7th adoption date, which is what we previously had, that's now planned to happen on April 4th. Everything else is pretty much the same. Basically, all of that kind of slippage is in this beginning period where we wanted to make sure we had enough time to respond to your comments. So that is all I have to say about the calendar.

And the other thing is, before we jump into the updates, I wanted just to provide a little bit of background. Most of you have been participating with us

over the last year or more on the staff development of the updates. We've had 11 staff workshops starting in April this year and going through August. Before that, hopefully many of you participated in the stakeholder meetings that the investor-owned utility consultants held for the individual measure topics to flesh out issues and resolve them early. The staff thinks that has been a very successful process and are very happy to have the collaboration of the Codes and Standards Program that's publicly funded through the Investor-owned utilities.

The other thing I wanted to mention is that today we are going through standards language changes, we're not going to be talking about every change to the referenced Appendices. Many of the changes in the standards reference a change in the Appendices, but we're not going to go through those in detail. The other thing we're not going to be talking about in the next two days is the ACM Approval Manual, that's not quite ready, it will be complete within the next 10 days and posted. And we can still accept comments on that within the same period that we're taking comments for the staff draft that we present in the next two days.

Are there any questions about what I just said? Otherwise, I'll keep going. Oh, and maybe just process-wise, what we expect is we do have planned breaks for

comment after each major section and we'll just ask you to come up to the mic, you'll have to introduce yourself so it can be recorded, your name and affiliation, and I think that's all I have to say about process.

UNIDENTIFIED SPEAKER: When are comments due?

MR. SHIRAKH: Two weeks from tomorrow. It's, I think, Friday the 28th of October, I believe.

MS. BROOK: Okay, so now we're going to jump in and, again, this is just two items that are non-residential building-related in Section 110, which is the Mandatory Requirements for Space-Conditioning Equipment. And the whole section on 110, again, will be covered tomorrow; but just for consistency, because some of these mandatory requirements are referenced later on in other Code Sections, we've updated the Efficiency Tables for Water Chilling Packages to match ASHRAE 90.1 and we've included a non-standard equipment efficiency calculation that again was developed in ASHRAE 90.1, and so we've adopted that non-standard efficiency calculation process.

And then we've also added Closed Cooling Tower Efficiency Requirements to the Heat Rejection Equipment Table. And then the other thing that I think is worth mentioning in this section is that we've got new requirements for Evaporative or Open Cooling Towers, and this is the big water saving measure that we're doing for

the 2013 Update. Basically it's installing controls that maximize cycles of concentration and documenting the maximum cycles of concentration using a Commission provided calculator and new requirements for flow meters, overflow alarms, and efficient drift eliminators for these cooling towers. And statewide, the first year of water savings for these measures is expected to be over 30 million gallons of water.

Okay, so now we're moving on to Section 120, 120.2 are the Required Controls for Space Conditioning Systems. The first item (c) that was updated is Operation and Control Requirements for Minimum Quantities of Outdoor Air. We've added occupant sensor ventilation control device as a type of control suitable for demand control ventilation. And we've added new requirements for the functionality and installation of occupant sensors that are used for ventilation control devices.

Section (e) is Shut-off and Reset Controls for Space-conditioning Systems. We added requirements to setup and setback temperature set points and reset ventilation rates in unoccupied classrooms, conference rooms, and multipurpose rooms.

There's a new requirement for Economizer Fault Detection and Diagnostics, and so all economizers for air-cooled, unitary Direct Expansion (DX) units are

required to have a Fault Detection and Diagnostic (FDD) system. And the system requirements for this FDD system is specified in the Nonresidential Appendix 9.

§120.3 - maybe one thing I should mention because I don't know if we've ever made an announcement about this, but we are changing the numbering scheme for the standards and, so, the numbers in parentheses there are the old section numbers and the section number that is listed up front is what we've changed to. And this was required because the old numbering scheme was constrained in being able to add subsections. So we've gone to this decimal numbering scheme that allows, we think, infinite, not that we want to develop infinitely long standards, but we have more room now. So I apologize for not saying that at the beginning.

So §120.3 are Requirements for Pipe Insulation and we've updated insulation levels in Table 120.3-A to match ASRAE 90.1.

§120.5 (125) are the Required Nonresidential Mechanical System Acceptance Tests. And this section basically introduces all of the Acceptance Tests that are required and they are described in Nonresidential Appendix 7. So we've eliminated the need to do acceptance testing for factory installed economizers. We've added acceptance tests for supply air temperature

reset and condenser water reset controls. And then we've added text in there to explain that, if an Energy Management Control System (EMCS) is installed to function as a thermostat, then it must functionally meet the thermostat requirements in Section 110.2.

§120.6 (126) is Mandatory Requirements for Covered Processes. In the 2008 Standard, this section was called Mandatory Requirements for Refrigerated Warehouses. Now we've expanded this section to cover all covered processes and reorganized it so that the first element of this section is the refrigerated warehouse section.

So, we've made some changes to the refrigerated warehouses code, we've added definitions for freezers and coolers, and replaced the references to frozen storage and cold storage because they were misleading, and freezers and coolers is the more industry accepted terms and we've kind of clarified the Code in that way. We've revised the space and surface insulation requirements, clarified requirements for variable speed fan powered evaporators.

We've increased the scope of design temperature requirements for fan powered condensers to include water-cooled condensers. We've added condensing temperature reset controls, efficiency requirements for fan powered

condensers, and clarified the requirements for variable speed screw compressors.

There's a new requirement for screw compressors to vary the compressor volume in response to pressure, there are requirements for freezer and cooler infiltration barriers, and new acceptance tests for electric resistance under slab heating systems, evaporator fan motor controls, air-cooled condensers, and variable speed compressors.

So the rest of this section is new for 2013. There are other covered processes that we've brought into the Code for the first time. The first of these is Mandatory Requirements for Commercial Refrigeration. And there is a definition in the proposed language for what type of grocery stores, the scope of, the range of supermarkets and grocery stores that are covered under these requirements.

We have requirements for variable speed condenser fans, condensing temperature reset controls, minimum condensing temperature set points, efficiency requirements for fan-powered condensers, compressor suction temperature reset controls. We have liquid subcooling requirements for low temperature, parallel compressor systems, we have display case lighting occupancy or time switch control requirements, upright

low-temperature display cases must have reach-in glass doors, and heating and cooling systems must recover a portion of the available heat from refrigeration systems without significantly increasing the HFC refrigerant charge.

So before I move on, I just wanted to mention that we developed the commercial refrigeration proposed standards in collaboration with the California Air Resources Board, and they're very interested in partnering with us to look at the combined benefit of efficiency and reduction of greenhouse gas emissions. So that last requirement was an example of where we had to make sure that -- we wanted to improve the efficiency by adding heat recovery, but we didn't want the systems to increase their charge of refrigerant to accomplish that because there's greenhouse gas emissions involved in that trade-off.

The next section of §120.6 is Mandatory Requirements for Enclosed Parking Garages. These requirements apply to garages with design exhaust rates greater than 10,000 cfm. They must automatically detect contaminant levels and reduce fan airflow 50% or less while maintaining these acceptable contaminant levels. The fan motor demand needs to be less than or equal to 30 percent of the design wattage at 50 percent of airflow;

in other words, you can't just reduce the fan airflow and not reduce the fan power, that needs to be a comparable reduction in motor demand.

The Carbon Monoxide concentration must be kept at less than 25 ppm at all times; the ventilation rate of 0.15 cfm/sff must be supplied for all scheduled occupied periods of the garage.

Specifications for the CO sensor include how many you need, the redundancy of the sensors, where they must be located, how they need to be calibrated, and how their performance needs to be monitored. And there is also a ventilation system acceptance test included in the non-residential appendix.

The other new Covered Process is Commercial and Process Boilers. So, for new boilers larger than 2.5 MMBtu/hr, these boilers must have combustion air positive shut-off devices. The combustion air, fan motors greater than 10 hp need to be variable speed or have a way to reduce the motor demand such that, again, the demand is 30 percent of the wattage at half of the airflow.

And then even larger boilers, larger than 5MMBtu/hr must maintain excess oxygen less than or equal to five percent by volume. And process boilers, those serving process loads greater than 10MMBtu/hr must maintain excess oxygen at less than or equal to three

percent by volume.

We also have requirements for compressed air systems. Compressed air systems greater than or equal to 25 hp -- and this is, you know, groups of compressed air systems, it would be the whole group that would have to be bigger than 25 hp for these requirements to apply. There are requirements for trim compressors and primary storage. The compressed air system controller -- actually, there needs to be a compressed air system controller installed and there's compressed air system acceptance testing requirements.

Okay, so now we're moving on to §120.7 and Mazi is going to cover this one. We're going to go through all of the §120 section and then stop for questions, so if you can be patient, that would be great.

MR. SHIRAKH: So this is a new section. We've never had for Nonresidential Buildings Mandatory Requirements for Envelope, we've always had it for Residential Buildings, so this is all new. And typically, Mandatory Requirements are set at levels way below the Prescriptive requirements, so this doesn't impact the standard budget for the building by any means. All it means is that, if you're doing tradeoffs, you know, there's going to be some stops, there's only so much trade-off you can do against building envelope.

Currently, it's possible to go to zero insulation, not that anybody is doing it, but it is possible. So this basically puts some stops at some levels, limiting trade-off against building envelope, which we think is the best defense for energy efficiency.

So there are requirements for roofs, walls, and floors. For the roof insulation for metal buildings, the average weighted U-factor must exceed 0.065. Again, for roofs, wood framed weighted average U-factor must exceed 0.075.

For wall insulation, metal building's weighted average U-factor cannot exceed 0.113.

The metal framed weighted factor cannot exceed 0.098.

For mass walls, the U-factor cannot exceed 0.44.

And for wood framed weighted average buildings, U-factor cannot exceed 0.110.

And for floor insulation assembly, they cannot exceed the U-factor of .071.

MS. BROOK: Okay, the next section is also new, §120.8, it's sort of new, and I'll explain why. The California Building Code actually includes building commissioning requirements, they're currently in Title 24, Part 11. And that is our Green Building Standard,

but it is a requirement for all buildings greater than 10,000 square feet. And during the process of developing additional commissioning requirements for Part 6, our stakeholders encouraged us to combine all commissioning requirements into one place and to place them in Part 6.

So what we've done in this section is copied the Building Commissioning Code Requirements from the 2010 California Green Building Standards. We've removed some of the redundant requirements in that section. And we will be adding a clarification note in the 2013 Green Building Standards stating that all energy system commissioning requirements are now in Title 24, Part 6, Section 120.8.

Then, the next thing we did is we added design phase commissioning requirements to the set of Building Commissioning requirements. And I'll explain that next.

So the Summary of Commissioning Requirements looks like this. All of these except for 3 are already in the Building Code. So they are 1) owner’s and owner representative’s project requirements; 2) the basis of design; 3) design phase design review, which we added; 4) commissioning measures shown in the construction documents; 5) commissioning plan; 6) a functional performance testing requirement; 7) documentation and training; and 8) a Commissioning Report.

The new parts of that, I will explain on this slide. Design phase design review, basically tried to add the part of commissioning that really helps a building owner get what he expects to get out of the building by making sure that the design intent is captured in the construction documents and that all available efficiency opportunities are discussed, and the owner is aware of those opportunities. So that's the intent of this Code language.

So we have design reviewer requirements that vary by building size and system complexity. So, for the very smallest and simplest buildings, the design team can do their own design review for medium-sized buildings with relatively simple HVAC system. There can be somebody on the project team that does the commissioning, but they can't be directly involved in the design of the building. And then, for the most complex systems and largest buildings, it needs to be an independent reviewer that provides the design review.

The schematic design phase, there's a requirement for a kick-off meeting with the owner, the design team, and the design reviewer, and they complete a design review checklist, which is now a compliance form that they go through and basically look at best practices that we've referenced in the compliance form, and just

check that they've talked about them and that they decide whether they're applicable or not applicable to the building.

And the two compliance forms that I'm talking about now are posted for today's workshop in case anyone is interested in what they look like, and I think there's a folder we created yesterday called "Reference Material," or something online that will have these example forms.

And then the final stage of the design review is, during the plans and specifications design phase, there will be a design review where, again, there's a compliance form with list items to check off so that the commissioning measures and the efficiency measures are actually identified on the plans and specs and there's just a real simple form to complete to verify that.

So that is all we have for Section 120 and we're encouraging anybody that wants to make a comment or ask a question to come on up.

MR. GABLE: Good morning, Mike Gabel, Gabel Associates. I think the idea of the design review checklists are good, but I think what we're concerned about is how this is going to integrate with the existing forms and procedures, the Certificate of Compliance, the Installation Certificate, the Acceptance Forms, and to

make sure there's a process in place from the beginning to the end and is kind of coherent, and we know who the players are and how they're supposed to interact.

MS. BROOK: Right.

MR. GABEL: So we're looking forward to the opportunity to look at this more carefully and talk about this --

MS. BROOK: Okay, yeah, so I would encourage you to look at our administrative section because we did include this in the Certificate of Compliance section, so if there's any confusion there, that would be great to find out.

MR. GABEL: Okay.

MS. BROOK: Thanks.

MR. CULP: Tom Culp, Birch Point Consulting. As you know, later I'll be talking about day lighting, but one other comment on the mandatory sections 110.6, I think you're focusing more on the equipment, but when I was reviewing the other documents, I saw an opportunity for additional energy savings I think may have been missed, particularly on nonresidential, and it had to do with air leakage. And I don't know if that's going to be discussed tomorrow. But just real quick, I just wanted to point out that I think you have a mandatory requirement for fenestration air leaks of .3 cfm per

square foot in this section 110 --

MS. BROOK: Uh huh.

MR. CULP: And that's reasonable for residential, I don't recommend making any changes with residential; but for nonresidential, the products are doing far better than that. You know, we did a survey when we were over at ASHRAE and IECC that, you know, like 95 percent of the products are below .2, current, while storefront are below .06, and so both ASHRAE 90.1, as well as IECC lowered those numbers for not residential, but for commercial windows to .2 and storefront and current wall down to .06.

MS. BROOK: Okay, great.

MR. CULP: So I just wanted to point out that that might be another opportunity.

MS. BROOK: Great, thank you.

MR. SPLITT: Well, I couldn't not have more people speaking, so this is Pat Splitt from ApTech. A couple of comments, one just on the 120.8, and these additional forms and checklists, it's not clear to me, you know, once we get all this stuff that pertains to something that happened before the plans were submitted for a building permit, who is going to check it? What authority do they have? Can a Building Department come back and say, "Well, we don't think the building owner

considered everything they should," and you go back and look at this, and look at this, and look at that? Mechanically, have you worked out how it's actually going to be implemented?

MS. BROOK: So, I mean, our assumption is that the compliance forms have to be submitted with the Certificate of Compliance and I think, just like any other compliance process, that people learn as you go, right? So maybe there are a couple of times when they didn't do it, they didn't realize they had to do it, even though it was in the standard documentation and was called out as a requirement, and the Building Department missed it, I mean, sees that it's not there when he does the compliance check, and we have to do education and training to make sure that people know that it's a requirement. The plans and specs piece, it's really an opportunity to make sure that the efficiency measures are actually culled out and that they're going to be in the installation and construction processes because they're in the plans and specs. So it's a real reasonable recommendation to make that check happen and any recommendations that you would have to integrate it into the compliance process, you know, we'd love to hear about it. But we think we're kind of setting it up like all the other compliance requirements.

MR. SPLITT: Well, I haven't seen the forms, they just were posted. But it just seems like it could be really intrusive and I could see a lot of building designers and architects really objecting to you interjecting yourself into their design process.

MS. BROOK: But it's part of their team, I mean, that's the -- the requirement is that they have a member of their team that does the review, except for the very largest buildings where they have to find an independent reviewer. But, by the way, they already have commissioning requirements that they're at least expected to meet and commissioning usually requires for the largest buildings to also have a commissioning agent that could also provide the design review.

MR. SPLITT: Yeah, I work with a lot of industrial agricultural buildings that the building is actually very large, but it's just a large shell, and I could see some people objecting to having to bring in a third party --

MS. BROOK: Well, that's actually a really good comment and we should -- if there are exceptions that we need to add, so if it's a huge simple building, that's a good point and maybe we could do something about that.

MR. SPLITT: Okay. So it may work out, I just see some problems that might be ironed out.

MS. BROOK: Okay.

MR. SPLITT: Another thing, just in general about all the mandatory requirements is the last go round had a little bit of success getting some installation certificate requirements put in place and it worked out better on the residential side where there's requirements for the installer to actually check off that he actually installed things correctly, and the form actually informs them of what they are supposed to do to install things correctly. But on the nonres side, the forms basically are just blank. And unless somebody actually fills something in, there's nothing there and, of course, the installer isn't going to fill in more stuff for himself to check, so I think there has to be a lot more work done on the nonres side into developing installation certificates that match up with all these mandatory requirements so that you don't wait until all these acceptance tests come along that you're implementing, to have people come in and say you did things wrong. You should put a little bit more effort into actually trying to tell the installers how to do it right the first time.

MS. BROOK: Uh huh.

MR. SHIRAKH: So the forms are part of the compliance manuals and, you know, we'll probably start working on those in the March time frame, and after that

we'll be happy to work with you to get your comments.

MR. SPLITT: Okay.

MR. SHIRAKH: Thank you.

MR. EMBLEM: Good morning, Commissioner Douglas, Martha, Mazi. I'm Erik Emblem. I'm with the Joint Committee on Energy and Environmental Policy. This is a committee that was put together by the Sheet Metal Workers Local Unions in California and their contractors, the Sheet Metal, Air-Conditioning Contractors. And, one, I like the new format, I like the Commissioners being involved and particularly you, I know that you're very involved and care a lot about energy efficiency, so I think this is very positive.

I work a lot on energy efficiency and environmental policy, I also work a lot with contractors and technicians and training in HVAC, in particular. Just in general, we really support the idea and the concepts that came out in the California long term plan. And the key is that we can write standards all day long, and we can write codes, but the truth is they're not being enforced. You know, I mean, in general we could say Codes aren't being enforced. And if these new standards that we write aren't implemented and enforced, then who loses? Well, actually, you know, the taxpayers, the community, the person that writes the checks loses

because we're going to determine or we're going to state that we've determined that all of these standards are cost--effective. In other words, when implemented through the lifecycle costs of the systems we're installing that the purchaser is going to reap the rewards of a good efficient system, so it's very incumbent on us to understand that from the beginning, to begin with the end in mind that we want an efficient performing system installed in buildings whether they're residential or nonresidential in California.

So here are some thoughts, and I just received this yesterday, so I haven't really internalized it, but I know that the Commission through the California Commissioning Collaborative had a study done on the effectiveness of the acceptance forms, it was done by PECI and it was issued September 2011. I think we have to pay attention to this because, really, what that is, what has happened on the installs out here since our last code cycle, or during it, we're still right in the middle of it, what they found were, 1) the forms are confusing, right, 2) that Code officials were not clear on whether they even needed to collect them, 3) mechanical installation contractors are probably not the best suited contractors to fill out the forms, 4) that probably TAB

Mechanical Contractors are. So let's pay attention to what we've had here. The people that fill out those forms and verify the data that is eventually uploaded to the Energy Commission is crucial. In other words, you can't design future Codes and Standards if that data is faulty or non-existent. So the person that fills out that form is key. And it gets back down to whether it's the installing technician, the installing contractor, or who should be filling out these forms. If Engineers -- it even says in here engineers have a hard time with the forms, and that's understandable too. So when you look at engineers wrote the forms, I'm going to say your high-level contractors through your workshops have worked with you on them and most of them have engineers on staff, are saying these are good forms, but we are finding in practical applications that these forms are hard to fill out and hard to read and hard to understand. But we found out that there's a sector of the industry, the Mechanical TAB Contractors, that have a high level of expertise, that understand the forms, and understand how to fill them out. So what do we do with the information? Do we do more of the same? I mean, do we just roll this thing out and say let's wait until 2016 and let's get some more forms in that may or may not have good information on them? And then let's write the 2020 Code

based on the information that came in the same way it came in in 2012? I think we need to reevaluate how the forms are constructed, number one, and I'll be happy to work with you on that, but 2) who fills them out, who fills those forms out. I think that relying on the installing technician based on the information that we have today, whether it's residential or nonresidential, is faulty.

MS. BROOK: Okay, well, thanks Erik. And we are taking the results of that CCC study and we have already clarified and fixed several of the acceptance tests based on that report, and there are also a large number of recommendations that we'll be including when we do our compliance manuals and forms design work. And we have a meeting on our calendars next week to have a staff discussion about the responsible party to talk about who should be responsible for completing the forms, and we'll definitely get back to you on our kind of internal decision and talk with you about what you think about that, and anybody else that is interested.

MR. EMBLEM: And I don't mean to be here to criticize without a solution, so I'm putting this forth as kind of a solution, how we could work with you to cost-effectively, perhaps, put some requirements in there to use these alternate people to do these certifications

and forms, people who are certified and trained to do the work.

MR. SHIRAKH: Are you suggesting we should use TAB Contractors to do the acceptance forms? Is that what you are suggesting?

MR. EMBLEM: Nonresidential, in particular, yes. And I'm going to go one step farther here in my next little piece of this, and Mazi and I have talked a little bit. I also serve on the Green Technical Committee of the International Association of Plumbing and Mechanical Officials, and at their last Green Technical Meeting, they approved a requirement that all ducts be tested. It doesn't matter what pressure class, all ducts be tested. And that's based on the Berkeley reports, on the cost-effectiveness of duct testing and sealing.

Now, I noticed in this, and we've talked about it, that we haven't done much, actually done anything in this proposal as far as duct testing beyond small commercial systems. And I'd like to challenge that the duct testing that we're doing in the small commercial systems under the current Code are ineffective and that we need to step back and look at residential and nonresidential HVAC systems with two different pairs of glasses.

Commercial buildings are much more complicated, have much more systems integrated into them, it's a whole different animal. It doesn't matter if it's 5,000 square feet, or if it's 10,000 square feet, if you have 50 units serving a building that have 5,000 square foot zones, that's a big building, yet you're saying that we can send a HERS Rater in there to test the ducts in those systems, and I just don't think that's right. They don't have the training and the certifications weren't meant to do that. So let's use the information that we have at hand, let's go back to the reports, and say, "Do we have a method to do it?" And the answer is yes.

If you go out into the industry and you see what's happening in the industry and what I call the medium to high level installations and performing installations, you're going to find consistently -- consistently -- that design engineers specify that these systems have to be installed to a standard and tested to a standard, and most of the time they'll refer to the procedural standards, the Associated Air Balance Council, the National Environmental Balancing Council, or the Testing and Adjusting Balancing Bureau, that's from the GSA through all of the different military, that's required. It's actually in Section 24 of Master Spec put out by the AIA.

So let's not try to recreate the animal, let's look at what they're doing day after day in California today in those buildings, and let's see how we can integrate that cost-effectively into our standard. And I'd like to work with you on that, too. I think, again, I don't want to come up and just attack, I want to come with some solutions.

But, in all, I think the staff was great, they have an open line, they're very good at communicating with me and I appreciate that, and if there's anything that we can do as an industry to help out, we're here. Thank you.

MS. BROOK: So just one question, Erik. It's been at least my understanding based on the past work I've done as managing PIER research with LBNL on nonresidential duct leakage and duct sealing that we're still waiting for that kind of holy grail of an affordable test procedure for duct sealing in the large systems, that we know that they're an issue, that those systems need to be tested, but there's no comparable duct blaster technology that is affordable for those nonresidential systems. Am I incorrect there?

MR. EMBLEM: Well, I know that they're working on a study right now, in fact, Craig Ray and his group are working on one, I think that they're at the Cal EPA

building --

MS. BROOK: Right, that's the one that we were doing years ago.

MR. EMBLEM: And they're looking at a total system process of testing nonresidential systems, which we support and, of course, SMACNA is a part of on the ASHRAE Committees.

MS. BROOK: Okay.

MR. EMBLEM: We think that that is something that is probably going to roll out and be available by the 2016 Code cycle.

MS. BROOK: Okay, okay, great.

MR. EMBLEM: So what do we do in the interim? Do we just turn a blind eye? Kind of residentially, you looked at, 1) we know in our industry that on new systems and on major remodels, on new duct, that the added cost to test and seal the duct is about three percent of the duct system on new installs. So if you were to start in this Code cycle and say all new installs in major remodels with duct over so many feet would have to be duct tested, it adds about three percent to the cost of the duct to seal it and test it. So that doesn't address our issue, though, on existing buildings and going back on retrofits, and I think that's where Craig Ray is going with his, is how do we go back in these buildings where

we know it's leaking already and we look forward towards building benchmarking and those systems? How do we effectively and cost-effectively test those systems and seal them? And I agree, I don't think that we have something out there yet.

MS. BROOK: Okay, all right.

MR. EMBLEM: So I'm looking at new and prospective.

MS. BROOK: Oh, okay, thank you.

MR. SHIRAKH: I have a question. Back to the forms using TAB, you're just suggesting them for the acceptance forms, the mechanical-related acceptance forms, not for all acceptance forms? Does that include like lighting?

MR. EMBLEM: I'm here speaking obviously with the HVAC industry, but I do collaborate with my friends in the electrical industry in their Advanced Lighting Center, and I know that they have some certification work that they're working on. I think that, when you start looking at the integration of these systems, and you start looking at the zero net energy, that the integration of the electrical systems, the lighting systems, the mechanical systems, and future and today some renewables, those control systems are pretty complex. And understanding how they interrelate is going

to have this cross-over effect. So when you start looking at commissioning a system that is controlling these in buildings, I don't think that just anybody can do it, so I would think that the electrical people feel the same way. When you look at the envelope issues, when you look at the issues with infiltration and moisture and all of that, I think you have similar issues. It's just not a form filler that can go out there and check boxes, somebody needs to collect data, and that data needs to be reliable data so that the people who want to see the data can evaluate, "Is this thing working the way we anticipated it to work?" So in general, I would say it needs to be an upper level type person that fills those out, that has some good education on building and systems and how they operate, and how to collect data and understand instruments.

MR. SHIRAKH: And on the question of duct sealing in nonresidential, I think when you and I talked, you know, it is a good thing, but any major expansion of the scope of this stage of this proceeding is going to be a big challenge because of -- and I think you understood that, you agreed that --

MR. EMBLEM: I understand that. I mean, I know that these things don't just come out of a shoebox and we do them, you have to really evaluate them. So what I'm

proposing, again, I want to have a solution instead of just say that we're not addressing it, which we all know that we're not, is there a solution moving forward? We think there is, it may be too late in this cycle to address it, but I can tell you from an International Code authority that's looking at their Green Mechanical Code, IAPMO, our committee -- there was one vote against in the committee to test all ducts.

MS. BROOK: And you have a referenced standard that you test to?

MR. EMBLEM: Yes. We're using the AABC Chapter 5, that's from the Associated Air Balance Council Chapter 5 Duct Leakage and Pressure Testing --

MS. BROOK: Okay.

MR. ELBLEM: -- which uses a percent of fan flow.

MS. BROOK: Uh huh. All right, thank you.

MR. SHIRAKH: Thank you, Erik.

MR. EMBLEM: Thank you.

MR. STANONIK: Martha?

MS. BROOK: This is Martha. Who are we talking with?

MR. STANONIK: This is Frank Stanonik at AHRI.

MS. BROOK: Oh hi, Frank.

MR. STANONIK: Hi. I've got a basic let's call it a format question that may have -- will have a lot of relevance to what extent we provide some technical comments. You went quickly through the sections and 120.6, okay, the major heading of that section is Mandatory Requirements for Covered Processes, okay?

MS. BROOK: Uh huh.

MR. STANONIK: And then subparagraph (d) under that major heading is Mandatory Requirements for Commercial and Process Boilers.

MS. BROOK: That's right.

MR. STANONIK: I read that to say that those requirements for commercial boilers only apply when those boilers are being used for covered processes.

MS. BROOK: Okay, so that's actually a really good point, Frank, and maybe what we need to do is leave the process boiler requirements in that section and then basically just copy them for commercial boilers and put them in another section.

MR. STANONIK: All right, so the intent was you're writing requirements for all commercial boilers?

MS. BROOK: Yeah, of those very large sizes, yes.

MR. STANONIK: Okay, all right, then when we get to talking about that further, we do have -- as I

mentioned in the email, we have some major concerns with that.

MS. BROOK: Well, so actually, Frank, if you were intending to make those comments today, now would be the time because we don't have -- we're not going to cover commercial boilers anywhere else today.

MR. STANONIK: Oh, okay. Well, unfortunately at the moment because we're still pulling together some of the information, they would be very general, but I think we do have some -- in terms of the general issues, we think that many of the assumptions that went into justifying some of these things for process boilers do not translate to commercial boilers that are used for either space heating, or even hot water supply. And then also, I think just some of the information, as an example, implying that parallel positioning controls are commonly used on low and ultra low NO_x commercial boilers, we're going to try and pull together as an example the commercial boiler listings from South Coast AQMD, and identify exactly how many of those do employ parallel positioning controls because I think the number is very -- I just think that's some misinformation, but --

MS. BROOK: Okay, all right.

MR. STANONIK: At this point, all I can do is point out where we're going to try and address some of

the issues, I don't have the data at the moment.

MS. BROOK: Okay, so is it clear -- what I'm understanding and I just want to clarify, then, is your industry's issues are with commercial boilers and you're relatively okay with the process boiler requirements?

MR. STANONIK: Correct, yeah. I mean, this started, well, you're certainly familiar with the development process, this started out as the template for process boilers and then, if you will, it kind of I'll say bled over into commercial boilers, and that's where we became much more concerned, yes.

MS. BROOK: Okay. And you and your industry do have until October 28th to file comments, the earlier the better, and we'll keep talking. Thank you.

MR. STANONIK: Okay, thanks.

MR. HEYDEMAN: Martha, it's Mark Heydeman.

MS. BROOK: Hi, Mark.

MR. HEYDEMAN: Hi. I just wanted to follow-up on Erik's statements and we look forward to working with Erik or continuing working with SMACNA on these issues. I just want to point out that the research that you guys were talking about from Lawrence Berkeley National Labs, one of the surprising findings, everybody thought that all the leakage was up at the high and medium pressure ducts, but, in fact, 50 percent or greater of the

leakages that they found in the field was at the terminal units and the low pressure ducts. And that's the problem there is to try and detect where that leakage is and how to address it, particularly with terminal units, there are standards, ASHRAE standards, for leakage testing of those units, but the manufacturers have pushed back about having those standards adopted as Code, and to provide that testing in the factories. And so I think when we talk about duct work, and there is fan energy involved there and there is loss of cooling and heating, we need to talk about the entire system from one end to the other, and there needs to be some research done before that becomes codified.

MS. BROOK: Okay, thank you.

MR. HEYDEMAN: And work with the industry.

MR. SHIRAKH: Again, this sounds like a serious topic for the next round of standards and we look forward to working on this topic. There is someone in the room that wants to make a comment.

MR. DIAZ: Good morning, everybody. I'm David Diaz. I'm a Business Rep for Sheet Metal Workers Local 104. I'm going to talk about duct leak testing really quick, too. With the SMACNA standards, if you build the duct work and you seal it to SMACNA standards, honestly, it should pass the test. The problem is -- I used to

work in the field and I'm a business rep now, so I don't get my hands dirty much, but I used to work in the field and I was a Foreman, and a lot of my projects that we worked on had duct testing, okay, just because it was part of the specs. The problem is I had guys, apprentices that got lazy and they would seal the duct work on the bottom so when the Inspector would walk by and look, and go, "Wow, okay, cool," and test it and it failed. Well, when you only seal two-thirds of the duct, guess what? It leaks the other part. So you have to test just because people cheat.

On acceptance forms, I've talked to some technicians, union, non-union, on that installing on the residential side and a lot of them tend to falsify the reports because they know they're never going to get caught.

MS. BROOK: Ah, uh huh.

MR. DIAZ: We can't have that. Now, if we want to meet AB 32 requirements and all that other stuff, we can't have that, so we have to have people that a) aren't going to falsify, and some kind of teeth if they do, like if they're certified, get their certification taken away, whatever it is, but we have to have some kind of teeth that way. And then I also, like Erik, I recommend TAB people doing it because these guys know what they're

doing and they can't be dumbed-down forms, either. Or put "N/A" on everything and, "Okay, here, the form is done." You know, we can't have that, at least that's my opinion anyhow.

MS. BROOK: Okay, thank you.

MR. SHIRAKH: I'm just going to briefly mention something that's going to come up tomorrow, but that is related to nonres, actually. We're going to recommend changes that the nonres forms will also be required to be registered and uploaded electronically to some databases, so at least there will be some data to look at for the next round of standards.

MS. BROOK: Do we have other comments online?

MR. YASNY: Yeah, what I'll do is I'll read some comments from Jay Salazar. Let's see. "The standards are enforced at the local level. The acceptance forms are completely ineffective. Building officials are not required to collect the forms." And then he said, "Ninety percent of all permits are alterations, unitary equipment. The podium is talking about less than 10 percent of the permits." And then he said, "The solution to replacing acceptance forms for alterations is to have Prescriptive details that can be easily inspected. New buildings can still use acceptance forms." And then he said, "Acceptance forms are not totally failed, but they

are not matched well to field practice for local jurisdictions. In my jurisdiction, this boiler requirement represents less than .1 percent of our permits, so when we do get a set of plans, we won't remember the requirements. I have no idea how we as smaller jurisdictions would enforce this section. Falsify reports? Really? Where is his data? An anecdotal conversation is no way to make public policy." And I think that covers Jay's concerns.

MS. BROOK: Okay, thank you.

MR. YASNY: And then we have some folks that want to chat. Let's see, there is Casey and let me unmute her.

MR. COLSON: Hi. This is Casey Colson.

MR. SHIRAKH: Yeah, we can hear you. Go ahead, please.

MR. COLSON: Hi, can you hear me?

MS. BROOK: Yes, can you hear us?

MR. COLSON: Yes, I can. Great. Good morning, everybody. Casey Colson from Target Corporation. We have several comments under the brand new retail refrigeration section. Do you want me to go through all the comments at once? Or should I just do them one at a time?

MS. BROOK: Actually, we probably -- we won't

be responding to them, we'll be accepting them at this time because I know that you've been working with our consultant on this and we know we have some outstanding issues that we'll be working with you on, so go ahead and state your concerns.

MR. COLSON: Okay. Under 120.6.d, we ask that the exception based on square footage be defined in terms of total refrigeration load or square footage of the retail grocery area. It's possible that the retailer may have a refrigeration system that has an equivalent load of a small supermarket, or less, but have a sales floor area of a big box store. The Supermarket Energy Efficiency Report released in September did not take into consideration the efficiencies and scalability of these technologies for this particular situation. We believe that for small refrigeration loads that utilize distributed equipment to reduce the charge, energy consumption will increase to some of these measures which is counterproductive to the goals of Title 24.

MS. BROOK: Okay. You're kind of breaking up, Casey.

MR. COLSON: Okay, sorry about that.

MS. BROOK: That's okay. We're still listening.

MR. COLSON: Okay, under 120.6.d of 1 a through

c, item c states in response to ambient wet bulb temperature, the intent of the language to require condenser control based on single variable value, we ask that the committee consider expanding the language to include the options of controlling based on some temperature dry bulb temperature head pressure. The use of other devices will allow the same energy reduction and reliability of control as a wet bulb temperature.

MS. BROOK: Okay. That sounds possible.

MR. COLSON: Okay. And then under 120.6.d.iv, we have several comments related to refrigeration heat recovery. We'll submit those comments via email, it's quite lengthy, but the gist of it is, we believe with the high efficiency refrigeration system, utilizing floating condensing temperatures, that there's little available usable heat at low ambient temperatures, and basically that heat is not required in the system and it allows -- it decreases flexibility of design in the equipment and for certain considerations, it might cause increased energy demand.

MS. BROOK: Okay, and I know we do have a statement that says the heat recovery, you know, based on what's available as heat recovery, and so you seem to be describing an instance where there would not be any heat recoverable. But I would encourage you to send me your

comments and also put them into our docket, and we'll work with you and our consultant on this and hopefully get all your issues resolved.

MR. COLSON: Okay, thank you very much for your time today.

MS. BROOK: Thank you.

MR. ROY: Good morning, Martha. This is Aniruddh Roy with AHRI.

MS. BROOK: Yes, hello.

MR. ROY: Yes. I just have a quick question with respect to your comments that are due. The notice says that the comments are due on October 30th, which is a Sunday, so would you consider pushing it to maybe Monday October 31st? Or do you still want to keep the deadline the 28th?

MS. BROOK: We'll definitely accept your comments on the 31st, but don't tell anybody.

MR. ROY: Okay.

MS. BROOK: Okay?

MR. ROY: Thank you.

MR. SHIRAKH: We won't be here Sunday at midnight anyway, so….

MR. YASNY: Okay, and then George Nesbitt has a comment.

MS. BROOK: Okay, George, we're here. Are you

there? George?

MR. YASNY: My fault. Oh, here we go. Okay, George.

MR. NESBITT: Can you hear me?

MS. BROOK: We can. Can you hear us?

MR. NESBITT: Yes. Okay, two things. I guess I didn't realize there were not mandatory minimum insulation levels for assemblies, so that's definitely a good thing to add. And then the other thing is on pipe insulation. You specify a U-Value per inch depending on temperature range, and then a minimum thickness, yet some insulation materials would exceed the minimum, but not meet the thickness, so if I'm using a polystyrene or an elastomeric three-quarter-inch wall pipe insulation and it's got an R-4 or R-5 value, but it's not one-inch thick, yet it would exceed the equivalent R-Value that you would require. And so it seems, rather than specifying thickness of insulation, it would be better to specify the minimum R-Value.

MS. BROOK: Okay, if you could send me a few of those examples and we could work through them with that table and see, that would help us understand the issue that you're raising.

MR. NESBITT: Yeah. Okay, great.

MS. BROOK: Thank you. Anybody else?

MR. YASNY: One more, Sandy.

MR. SAMILAN: Yeah, hi. My name is Sandy Samilan and I just have a question and then a potential comment. I have a question and concern with Appendix A-5, the Reach Goals for Commercial Refrigeration. Is this the appropriate time to comment on that? Or would you prefer just to have a written comment?

MS. BROOK: Well, we want your written comment, but we also are going to talk about that at the end of the agenda, so --

MR. SAMILAN: Okay.

MS. BROOK: So you're definitely --

MR. SAMILAN: Do you want me to hold off, then?

MS. BROOK: Yeah, for now, hold off because nobody will know what you're talking about and, then, feel free to chime in when we get to that part of the agenda. Right now it's scheduled for almost 4:00.

MR. SAMILAN: Three o'clock, okay.

MS. BROOK: Four, our time. But if you can't for any reason attend later today, then please send your written comments.

MR. SAMILAN: Okay, I'll do that. Thank you.

MR. SHIRAKH: Don't take these times too literally because we always deviate from them.

MS. BROOK: If we're good, then we can move on

to Section 130, I think. And right now, just for the record, we're on time.

MR. YASNY: Just one quick question. Someone asked where 120.7 is, that it wasn't posted.

MS. BROOK: Oh, okay, well, you get to answer that one, Ron.

MR. YASNY: Oops.

MR. SHIRAKH: Well, we'll post it.

MR. YASNY: Oh, that's right, yeah. I think it's behind 120.6, it's just not labeled.

MR. SHIRAKH: Yeah, it is after the one --

MS. BROOK: In the same document as 120.6.

MR. SHIRAKH: The 20 series goes all the way up to 120.8, so this should be in there.

MS. BROOK: Okay.

MR. FLAMM: Okay, my name is Gary Flamm. I'll be presenting the Lighting issues. And I want to confirm that our consultant, Jim Benya, is online. Are you there, Jim?

MR. BENYA: Yes, I am. Good morning.

MR. FLAMM: Good morning. Okay, I'm going to go through the 130 suite of documents, 130.0 through 130.5.

§130.0 (130) goes through the general lighting requirements and how to determine Luminaire power, so

it's been edited for clarity. Basically, these are the different classification of Luminaire, Incandescent, Luminaires with Ballasts, Low-Voltage Luminaires, Track Lighting, LED Luminaires, and miscellaneous. One of the changes is, in the current standards for Incandescent Recessed Luminaires, there is a table of different minimum wattages that can be claimed on the label, and we simplify that to just say the minimum that you can go to for a recessed Luminaire is 50 watts per socket, clarifying that there's no such thing as a permanent adapter. We have that language in the manual already and there still seems to be some misinformation. There is no such thing as permanent.

We clarify also in the language that Lamps do not change the classification of a luminaire type. Luminaires are based on what the manufacturer created them for, not based upon Lamps that are put in them. And there is a general statement that lighting controls shall comply with §110.9, which used to be §119, and be installed in accordance with the manufacturer's instructions. Now, that statement, that lighting controls must comply with §110.9, was stated a number of times, or is currently stated a number of times in §130.1 and, rather than stating it over and over and over again, I just moved it here and said it once. And also, the

"installed in accordance with the Manufacturer's instructions" is existing in §119 and it really belongs in the application standard of controls, so it was just moved here, so that language as existing is just moved.

So there is another document I want to point out, it's called the "Nonresidential Appendix 8, which are Default Luminaire Power Options." This is a document that's been around for a long time, and it lists a significant number of different Lamp Ballast type combinations and it's a convenience where, if the Designer doesn't know what the product, the ballast system that's going to be installed, they can use this number instead of manufacturer data or cut sheets. And it's always conservative numbers that are on the high end, and it's actually, if the designer wants to use lower numbers, they can actually use the cut sheet.

A lot of the information in that document is quite dated and a lot of the technologies in that document are really not used very much at all. So the document has been cut back significantly down to probably 25 percent of its current content, and basically it's covering mostly modern technologies, electronic ballasts, T8 systems, T5 systems, and it's not intended to use every type of system that's available, which is confusing right now because we get calls on, "Well, I don't have

this technology listed. What do I do?" And so it's a voluntary option and it's been cut back significantly.

Moving to §130.1, which are controls that need to be installed in each room. It's been edited and rearranged for clarity. Subsection (a) are Area Controls. That basically says you need a switch in every room and that that has to be a manual on and off, and it could be a dimmer as long as it has manual on and off. And one of the clarifications is that, in every room, you would need a Manual OFF/ON switch or you can have something called an Annunciated Switch in another room, and that's quite confusing currently and so we list certain big box bases where you can have an annunciated switch in another room. But for the most part, every room has to have the switch in the room.

Now, this next section is another combination that was just combined into one statement here instead of put in many places in the standards. So basically we're saying, or we're continuing to say, that all lighting systems have to be separately controlled. The general lighting has to be separately controlled from all other lighting. Floor and wall display, floor display, case display, ornamental and special effects, each has to be separately controlled.

And the only new language is a clarification

that track lighting, if you're using track lighting, it really has to be multi-circuited track if you're going to put general, display, ornamental, special effects on a track.

So Multi-Level Controls, this is probably one of the most significant changes in the Lighting Standards. Basically, what remains pretty much the same is that, if general lighting in a room that is greater than or equal to 100 square feet and has an installed load greater than .5 watts per square foot, and it is currently .8, must meet the requirements in Table 130.1-A, and I'm going to go over that in a couple of slides and I'll explain the difference. In addition to meeting the multi-level switching, each luminaire has to be controlled by one of the following methods: manual dimming, lumen maintenance, which is basically to maintain -- designers typically put in more lumens than they need because they're designing for depreciation, so you can maintain your lumens by tuning down the power and actually initially get only as much light as you need; tuning, which is very similar to lumen maintenance, an automatic daylight control, or demand responsive control.

So the current multi-level control requirements basically say that you need, in addition to 100 percent and zero percent, you need something in the middle,

something around 30-70. And the reason we have that broad range currently is because sometimes you have three lamp luminaires, sometimes you have four lamps, you might go checkerboard, you might go alternate rules, so there are a number of ways. So we let that -- currently the standards say that interim, that middle level, can be somewhere between 30 and 70 percent. So here is the table. So what the new table says is for multi-level, if you have incandescent sockets that are for LED or GU-24 with LED, it has to be continuous dimming. So you need a continuous dimming system that will take an incandescent socket between 10-100 percent.

If you have GU-24 sockets for CFLs that are greater than 20 Watts, or Pin-based CFLs greater than 20 Watts, you need continuous dimming between 20 to 100 percent.

The next classification is if you have GU-24 CFLs less than or equal to 20 Watts, Pin-based CFLs less than or equal to 20 Watts, Linear fluorescent and U-bent fluorescent less than 13 Watts, you need a minimum of one step between 30 and 70 percent, that is the current language, actually, and you need to be able to dim or switch alternate lamps, or that can be done through dimming or switching of alternate lamps.

The linear fluorescent or U-bent fluorescent

fluorescent lamps that are greater than 13 Watts, you need a minimum step of all of the following: One step between 20-40%, one step between 50-70%, one step between 80-85%, and one step at 100%, in addition to zero. Subsection (a) basically says you have to be able to turn your lights off. And that could be stepped dimming, continuous dimming, or switching alternate lamps in a luminaire provided that luminaire has at least four lamps.

The next classification is Track Lighting, a minimum of one step between 30–70%, and that can be step dimming, continuous dimming, or separately switching circuits with a minimum of two circuits.

And the last classification is High Intensity Discharge (HID) Lamps, that means middle, high pressure sodium, that are greater than 20 Watts, Induction Lamps greater than 25 Watts, and all other light sources shall have a minimum of one step between 50-70%, and it may be stepped dimming, continuous dimming, or switching alternate lamps in luminaires, provided they have at least two lamps in luminaires.

(c) Shut-off Controls, we continue to have shut-off controls, which it may be occupant sensing devices, automatic time control, a signal from another building system, or other device capable of automatically

shutting off the light. So, in addition to manual controls, we require the ability to automatically shut off lighting when the space is typically unoccupied.

We clarify that no countdown timer switches shall be used to comply with the shut-off controls; that has been the case for all of the cycles of the Standards, however, there is some misinformation that countdown switches, which are basically really cheap wall switches -- most of them are -- that you can just spring wind, and it makes no sense to allow a big space to put in a several-dollar switch that can be easily removed. So what we've added, though, is an exception, so this is actually an inclusion of allowing countdown timer switches which currently are not allowed, into bathrooms and closets that are less than 40 square feet and which have a maximum of five minutes.

So the new Shut-off requirements are a Partial Off Occupant Sensor which is an addition to the Automatic Shutoff, so for aisle ways and open areas in warehouses, and in library book stack aisles and corridors and stairwells, they need to basically be able to shut off -- I believe it's about half, I don't remember the percentage -- of the lighting when nobody is present.

And then there is a new classification of partial Occupant Sensor (OS) instead of shutoff. And

these are stairwells and common areas of high-rise res and hotel/motels, have to be able to shut off the lights half-way when nobody is around, and parking garages, parking areas, and loading and unloading areas have to be able to shut off the lights part way when nobody is around.

Automatic Daylighting Controls, we continue to have definitions for Skylit, Daylit Zones, Primary Sidelit Daylit Zones, and Secondary Sidelit Daylit Zones. They've been edited a little bit for clarity. There are mandatory daylight controls currently. There are some Offramps to the daylighting controls, and those Offramps are gone now. If you have Luminaires in a daylight zone, they have to be controlled now, so they are mandatory requirements.

A requirement that all Skylit Daylit Zones and all Primary Sidelit Daylit Zones have to be shown on the plans. Luminaires in the Skylit and Primary Sidelit Zones have to be separately switched. There are spelled out requirements for the installation and operation of these daylight controls, and there are new requirements for parking garage daylighting.

There continues to be a requirement for Demand Responsive Controls. That gives a buildings the ability to be shed, the lighting when it's needed through an

emergency signal, or a price signal, the ability has to be there. It's not required that the building be demand response shed, but the controls have to be there. So buildings that are greater than 10,000 square feet have to have this control, and that is changed down from 50,000 square feet building.

And so, whenever §130.1(b) is required in those same cases are when you're required to do Demand Responsive Lighting Control. So the controls are one of the two, either 15 % of full power for continuous dimming systems, or, when you look at the table one level below full ON in accordance with the Table 130.1-A for stepped dimming or stepped switching.

§130.2 is Outdoor Lighting Controls. And so there has been a clarification and a simplification of outdoor incandescent luminaires that are greater than 100 Watts shall be controlled by a motion sensor. This has been significantly simplified. There were lots of exceptions, it talked about generic luminaires, but what we're really talking about are incandescent luminaires. And what this is saying is, if you need a bright lumen package, it would be better to use a high efficacy source, to use either HID, or fluorescent, or LED. So if you're going to use a bright luminaire and you're going to use a 100 watt rated luminaire, that it has to be

controlled by a motion sensor.

And there are luminaire cutoff requirements. Currently we say luminaires that are greater than 175 Watts in specific areas have to be designated cutoff, that is basically a shielding. We've reduced that from 175 Watts to 150, and there is a new metric that has just come out called "BUG," which is a Backlight Uplight, or Glare Rating. And so we added that as an option for cutoff. So you either need to do the old cutoff designation, or the new BUG rating.

So the Controls for Outdoor Lighting are that all outdoor lighting has to be controlled by a Photo control or astronomical time control. Outdoor lighting has to be controlled independently from other electrical loads. If you have certain luminaires that are lower than 24 feet, they have to be controlled with a motion sensor to turn them half-off. And other spaces which are sales frontage, sales lots, canopies, have to have either a distributed part-night device, which can either be motion sensor or time clock where the light, let's say, you're open until 9:00 and you want the lights to stay on the rest of the night, what you can do is at 9:00 program the light to go down by 15 percent, so that's what a distributed part-night device is for each luminaire, or a motion sensor to do the same thing.

And for this other classification of building spaces, a façade, Ornamental Hardscape, and Outdoor Dining, you have three options, the distributed part-night device, a motion sensor, or a centralized time clock.

Section 130.3 are Lighting Controls for Sign Lighting, and no substantive changes, just some edited for clarity.

Section 130.4 are the Acceptance Requirements for Lighting Controls. And so the actual testing protocol are listed in Nonresidential Appendix 7 (NA-7) and that's been edited to be consistent with the current changes. This section has been edited for clarity. And the lighting systems that need to be acceptance tested are lighting control systems. Now, what I'm going to bring up, and we're not addressing Section 119 until tomorrow, is that lighting control devices are being moved from Title 24 to Title 20, and lighting control systems are being left in Title 24. And Lighting Control Systems mean that you have one or more components to do the functionality of a lighting control device. And so lighting control systems will no longer have to be certified to the Energy Commission, which is kind of clumsy because manufacturers currently have to certify all the components to make up a control system. And

we're saying, in lieu of doing certification to the Energy Commission, that lighting control systems have to be acceptance tested.

Also, Energy Management Control Systems have to be certified acceptance tested that they meet all the functionality of a control. If you have a Line-voltage track lighting integral current limiter, that is a device that we certify that is built into the track lighting itself, or if you have a supplementary track lighting overcurrent protection panel, in order to use that, you have to have the acceptance test.

If you have lighting shutoff controls and automatic daylight controls that comply with Section 131, they have to be acceptance tested.

There is an option in Section 140.6 that allows uncertain circumstances to have a redundant lighting system as long as they're interlocked with a non-programmable double-throw switch. And what we're saying is that, if you're going to use that exception, it has to be acceptance tested.

There are lighting controls that are voluntary that allow you to earn a Power Adjustment Factor (PAF); if you're going to earn those, you need to have those acceptance tested. There is additional wattage that you can earn for a videoconference studio and, in order to

earn that, part of it is an acceptance test, and outdoor lighting controls have to be acceptance tested.

Section 130.5 is a new section. 130.5 is Electrical Power Distribution Systems. The current construct of Sections 130 through 130.4 all have to do with lighting, and now we have some requirements that are not specific lighting, and so we created a new subsection to address these new issues that are not lighting only.

So there are requirements according to Table 130.5-A where some spaces have to have accessible metering of total electrical use, so this is so the consumer can see how their electricity is being used. There are certain situations according to the table where loads have to be disaggregated, so you need to have your lighting load, your plug load, your mechanical loads, all on separate circuits. There are minimum voltage drop requirements, which I believe are identical to ASHRAE 90.1.

There is a new requirement for circuit controls for 120-volt receptacles in private offices, open office areas, receptions, lobbies, conference rooms, kitchens and copy rooms. This requirement says that, for every non-controlled receptacle, you have to have a controlled receptacle -- I believe it is within six feet, with a few exceptions -- and this in the CASE study talks about task

lighting controls, but we put it in this section because the circuit doesn't know if it's going to have task lights or something else. So this gives the occupants the ability to plug-in their devices into either a control circuit or an uncontrolled circuit.

There are specifications for what we mean by a Demand Response Signal and this is where we parked those specifications. And it also spells out when an Energy Management Control System is used as a lighting control system, or is used as a thermostat system, that it must meet all the applicable functionality in all the subsections of the standards to be able to be used. So this was put in at the request of the EMCS industry, where they have been denied the ability to use their systems because it wasn't understood whether they could comply with the standards or not.

And so those are the Lighting Control and Building Power changes. And we're open to comments now. Any -- Pat?

MR. SPLITT: This is Pat Splitt from ApTech. Just a couple of comments. One, now is a requirement for plans for some daylighting, but only if you think that you're going to go over the requirement. But I'm assuming now that the requirement for doing the daylighting plan is general? Or is there some cut-off to

when you need it or when you don't?

MR. FLAMM: So -- I wasn't sure if it was on -- so the current requirement for daylighting controls basically is, if you have above 250 square feet of daylight footprint in a room, you have to have a manual -- segregated manual switch.

MR. SPLITT: I'm talking about the plan, when one has to submit a --

MR. FLAMM: I'm building a framework for that. And it also says that, currently, at 2,500 square feet, that manual control has to become an automatic control. Now, it says that at 250 square feet of daylight, you have to have the automatic control. So basically all spaces have to have that -- if they have more than 250 square feet of daylight, they have to be shown on the plans.

MR. SPLITT: But I'm talking about the daylit area which is in a different -- it's sort of maybe in the envelope, but the problem I have now is that, say we have one of these large warehouses that is unconditioned, 12,000 square feet, right now, in general, people assume that, well, that's unconditioned, so all we have to do is lighting. So somebody will go off and have an electrical contractor, electrical engineer, do the lighting, but nobody has provided a daylit area plan, which would be

required in this large building because it's got skylights, it has to have skylights, but it's not his responsibility to decide what is the daylit area, it's the function of the person who designed the building. So you have to tie these together somehow so that somebody knows that, even though theoretically you're only doing lighting compliance, that in that building there's a Certificate of Compliance for skylights, it's an envelope requirement that is totally ignored. And if it's ignored, then that's the end of it, you know, there's no daylighting controls either. So I think the problem is that, where there is a requirement that the daylit plan be provided, you never state who has to provide it, and I think it has to be provided by the architect or the envelope designer. They're the ones that are actually putting in the holes in the building; they need to know that there are consequences of them doing it. If you just say it's required, but you don't say who has got to do it, they won't do it. The electrical engineer says, "Well, that's not my job." So everybody thinks it's somebody else's job and it will never get done, so you actually have to call out who is going to do that and then have, in your calculation requirements, have the person who is doing the controls -- require that they refer to that plan and make it clear that if they didn't

get the plan, well, they have to ask for it. You know, it's not up to them to come up with something because what happens is it just gets sort of creatively created, and if they do anything, they'll just put some numbers but they never actually design the daylit area so you know what fixture is actually in the daylit area, and which fixtures aren't in the daylit area. You know, you need a plan.

MR. FLAMM: I hear you, Pat. And perhaps we could clarify that in the manual. What I'm concerned with is that we, by specifying who can do this, we're actually specifying who cannot do it. And we wanted to let the market decide whether it was the envelope guy, or the lighting controls guy, or the architect, or the General Contractor. We were going to let them all decide who was going to do it.

MR. SPLITT: They're going to decide it's the other guy.

MR. FLAMM: Right, and I agree that's a challenge and I don't know how we walk that fence between being flexible and being overly Prescriptive.

MR. SPLITT: And the other thing you have to somehow, for all this daylighting stuff, somewhere in one document, in one place, so from beginning to end you can just read through and figure out what the requirements

are, you don't have to hop. You know, right now, to --

MR. FLAMM: I agree with you.

MR. SPLITT: To do -- if I actually wanted, in doing a performance program, to actually model that large daylit area, even though I was theoretically just doing electrical, not only do I have to go beyond the electrical inputs to envelope, but to specify in EnergyPro that that area requires daylighting, I have to put it in the System section, the Mechanical section, which makes absolutely no sense. Nobody would ever look there and nobody ever does look there, so it just never gets done.

MR. FLAMM: Okay, we'll work on that when we're working on the manuals and the forms, etc.

MR. SPLITT: And then a similar light on the outdoor lighting, we also should require a plan for outdoor lighting, too, for the outdoor lighting areas because, without that, you have a form with a bunch of numbers that there's no way a plan checker can look at those numbers and know what they're referred to. There's no way to check it, it's just numbers and it just gets approved because there's no way of knowing whether it's right or wrong. So outdoor lighting also needs a requirement for a plan.

Well, I've got to talk about BUG for a second.

I was sort of instrumental in getting the Building Code Green Code change to put in some requirements for light pollution reduction requirements, which basically refer to this BUG system, and those are going to become mandatory for all nonresidential buildings in July of next year. So I'd like to see that we try to integrate more the Energy Code with those requirements because, right now, the Energy Code has similar reference to BUG, but it's asking someone to look up Zonal Lumens, which I think is a little more difficult to find and I might -- well, we can work on it later, but I think maybe if you can just refer to the other Code, or move that language into this Code so that it's the same language and we don't have two different metrics trying to get to the same place, would be better.

And then, lastly, just back to skylight daylit areas, I think we need more work on how to define what that area is and the shape because what's in there now isn't clear. There's a lot of things that won't meet the requirements right now, it's not .7, we take a rectangular skylight and we say we're going to make a rectangular shape, so where there would be curves, we're filling in and saying, well, we can go a little bit further, but then why not do the same for a circular skylight, make that a square shape on the floor instead

of a round because that would be a lot airier than for the lighting designer to figure out what the area is and how to know when he has something in the daylit area and when he doesn't.

MR. FLAMM: We can discuss all this. Okay? I thought I saw John McHugh stand up. He must have left. Gene.

MR. THOMAS: Gene Thomas, Ecology Action. I just wanted to get a clarification on 130.0 and the permit adapters and changing lamp type doesn't change the luminaire classification type. You're not intending to say in a situation, well, here's a newly constructed building, and there's an incandescent fixture, that you won't be allowed to screw a CFL in there, or the Phillips LED A Lamp that won the L prize or something? That's not your intent, is it?

MR. FLAMM: That's not the intent. Title 24 is a luminaire standard, it's not a lamp standard. And occupants can put any lamp they want into a luminaire if it fits and if it's within the ANSI Standards, tolerances. But what this says is an incandescent light is an incandescent light for compliance with Title 24, Part 6. If the occupant wants to do beyond that, they can, but when the designer or contractor is filling out the paperwork, they have to claim that as an incandescent

luminaire because it's an incandescent luminaire, because it can always revert back to an incandescent luminaire. It's only something else as long as that lamp lasts. So it's current that way, it's been that way all along. So for the majority of the state, you know, keep in mind that the Title 24 only affects a few percentages of the new construction and additions. The majority of the state, the changing of a light bulb is not even addressed by Title 24, Part 6, it's something the consumers do. So there's nothing in Title 24, Part 6 that is going to prevent a consumer from screwing anything in that, you know, they could screw a zip cord into it if they would like, but according to the calculations, that's an incandescent fixture.

MR. THOMAS: But in a retrofit situation, that wouldn't then mean that the contractor that's putting that LED screw in wouldn't be able to claim the energy savings for that?

MR. FLAMM: Well, I don't know what you mean by claim the energy savings. If it's non-Title 24 -- let's say it's a utility program -- and the utilities are paying to put in high efficacy lamps, no alteration to the luminaire, that's under the radar of Title 24, Part 6. Utilities can still pay a rebate on it. You know, they already buy down ahead stream CFLs so, when the

consumer puts that CFL, the utility claim credit for that savings, but Title 24 still sees that as an incandescent fixture. But if it's not a Title 24 project, it's irrelevant, it's mute because you just screw a light bulb into it.

MR. THOMAS: But aren't the -- the retrofit, the changes to the alterations language, doesn't that make it a Title 24 job at that point?

MR. FLAMM: Not if you're not changing the socket, ballast, etc. If you're just putting in a light bulb, that's still not a Title 24 project.

MR. THOMAS: So one other follow-up question because it was one of the examples I saw in there, are linear LEDs, okay? And we know they're far from ready for prime time right now, but they might be a lot closer to ready, or even ready by the time the Code hits. And so, is the intent there to say that you can't take that Linear Fluorescent Troffer and utilize that for linear LEDs, that that would be contradicting or disallowed under the Code. That's what I was seeming to get from that.

MR. FLAMM: And I think we need to work on that language. I agree a little bit --

MR. THOMAS: Because if you were, what that would mean is, to contemplate that, they'd have to take

out that perfectly good box and everything that's there, and put another one up, and that's going to add to the cost of what's already an expensive upgrade. And once again, I'm not recommending these linear LEDs at this point, but it just points out we want to get more of that cutting edge technology in there, they're always more expensive, and if you can't utilize some of what's in place -- another one was a socket adapter for LEDs and it said, even if it is specified for that by the manufacturer, it seems like you're saying you can't use that.

MR. FLAMM: That is true and that's current -- there's no such thing as permanent, there's no ANSI Standard of permanent, permanent is whatever the manufacturer claims it is. And we don't recognize that in Title 24 because, otherwise, you know, contractors could put in an eight-dollar fixture and put in a dollar adaptor and say, "Okay, let's call it a day." And it's not permanent. You know, I go back from my experience when I was at SMUD and some of these first permanent adapters came out, the first generation were pretty good, but within months the knock-offs were anything but permanent. Because there is no standard of permanent, we can't recognize anything as being a permanent adapter. So, the manufacturer -- back to your linear fluorescent

-- the manufacturer of the luminaire can rate their luminaire for LED lamps; at that point, it's an LED Luminaire. It's the rating -- what was the manufacturer, what was the luminaire manufactured for? What is the UL label? What was it designed for? And that's what we recognize, not light bulb changes. What was the fixture designed for? And that's the way the Standards have always been. And I edited that language about the linear LEDs for clarity and I edited the language about there's no such thing as a screw-based adapter because of misinformation. Just because a manufacturer says his product is permanent, there's no permanent standard, that's in the eyes of the beholder.

MR. THOMAS: Is that something that could be looked at for the next iteration --

MR. FLAMM: If there was a national standard of permanent, then I think it was something we could look at.

MR. THOMAS: Okay. All right, thanks.

MR. BENYA: Gary, can I add something?

MR. FLAMM: You may.

MR. BENYA: I just wanted to remind Gene that what we're contemplating right now is a permanent conversion --

MR. SHIRAKH: Jim, can you identify yourself,

please?

MR. BENYA: Oh, sorry, this is Jim Benya, Benya Lighting Design, consultant through Architectural Energy Corporation to the Commission. One of the things that we talked about in this context was, of course, that when someone changes a luminaire from one technology to the other, it can be done with a complete conversion kit that is UL listed to that purpose. And that kit could just as easily be for linear fluorescent conversions from fluorescent to solid state lighting, or anything else. As a matter of fact, I think some of these products are already on the market. But what differentiates them is that it is a UL listed conversion for this explicit purpose, and those would be acceptable.

MR. FLAMM: So, Jim, I want to clarify -- this is Gary -- I want to clarify something. There's a difference between alterations and new construction. And new construction, the Section 130, does not recognize kits, it's intended that in new construction you shall use the rating, the manufacturer rating, of that luminaire. However, when a retrofitter goes in and guts a luminaire, that's a different issue. In those cases, I think it is appropriate to look at some of these kits, but not for new construction.

MR. BENYA: Well, I'm going to suggest that

there's a third condition in which someone is remodeling a space and they have fluorescent luminaires that they would want to convert to solid state lighting, for example. And I think the way this is written, that if it is a UL listed permanent conversion in the sense of you have to do more than just take the bulbs out and put bulbs in, it's going to have to be a UL listed conversion and a luminaire, from one to the other. I think that category sort of exists, Gary, and I think we definitely should take a look at it, as Gene has pointed out because I really do think that there is something there already, but it's certainly not something as simple as putting an LED tube in a fluorescent socket. That doesn't count and that's, I think, what we're trying to get at.

MR. FLAMM: Okay, so then let's, Gene, Jim, and whoever else, let's see what we need to do to the language to make sure that it doesn't prohibit that.

MR. YASNY: Mudit has a comment.

MR. SAXENA: Yes, hi. Can you hear me?

MR. FLAMM: Yes.

MR. SAXENA: Yes. This is Mudit Saxena with Heschong Mahone Group and the CASE Author for the Daylighting Code from the IOU team. I just wanted to note for the record that I wanted to provide a clarification to the daylighting code as explained by

Gary. Gary explained that photo controls are now required for 250 square feet of daylit area; instead, what we are proposing is photo controls are required when 120 watts of installed lighting is within the primary daylit zone or skylit zone. In fact, we are proposing getting rid of the day lit area concept completely, which addresses some of the concerns that Pat Splitt brought up and, Pat, your comments that you brought up in the daylighting meetings earlier have been incorporated in what we are proposing here, so once you get a chance to talk offline, I'll be able to explain to you how we have addressed them. The concept of daylit zones gets rid of the onerous part of calculating areas for daylit areas, and so it makes the process of complying with the daylighting code easier.

MR. SHIRAKH: Mudit, this is Mazi. I don't understand. You say you want to get rid of the primary and secondary daylit areas, but then you say it's 120 watts of lighting within the daylit zone.

MR. SAXENA: Uh huh.

MR. SHIRAKH: It seems like you have to define that daylit zone again.

MR. SAXENA: Correct.

MR. SHIRAKH: Where is it 120 watts?

MR. SAXENA: The daylit zone, the only

difference between the daylit zone and a daylit area is it's defined in a very similar manner, you don't have to calculate the area for daylit zone, you draw it on plan and you basically sum up the wattage of the installed lighting that falls within the daylit zone, and you check whether it's 120 watts or more, and if it is, then you're required to have photo controls in the primary daylit zone and skylight -- skylit zone.

MR. FLAMM: So, Mudit, this is Gary, I'm reluctant to deconstruct and reconstruct, there's been a lot of water under the bridge already this cycle, and here we are at the 11th hour and you're proposing that we completely change the metric, and I actually think it's kind of late to do that.

MR. SAXENA: This is the same thing that we have, this is what you have in your Code language, and I'm not proposing anything new here. I'm just clarifying it, I think you did not explain the Code correctly in your explanation, you talked about 150 square feet of daylit area; the code that you have in the document that you put up, this is -- I'm not proposing anything new here, this is all consistent with what we have discussed -- 120 watts of installed lighting triggers the requirement for photo controls.

MR. FLAMM: Okay, I stand corrected.

MR. SAXENA: Okay, thank you.

MS. BROOK: Okay, great. Thank you. I need that little guide back again. Next, we're going to talk about Section 140. And we'll be splitting this across the lunch hour. We'll begin now, we'll get through the mandatory -- the Prescriptive Requirements for Envelopes, and then we'll break for lunch.

So first up is §140.1. And we've done substantive edits to this section to clarify how the performance compliance approach is implemented with Compliance Software. And we also clarify that the detailed methods assumptions and required inputs for the Compliance Software is approved by the Commission and documented in the Nonresidential ACM Reference Manual. This is different than in past Code cycles where the ACM Manual included both the process piece, which we're now calling the ACM Approval Manual for how software gets certified by the Commission, along with the very technical detailed individual rules for how equipment and systems get modeled in the Compliance Software. So now we have separated those. The ACM Approval Manual will be part of the rulemaking package and will be adopted by the Commission. And then the ACM Reference Manual will be developed once the Code is adopted, it's actually in the process of development now, but it will be vetted

publicly after the adoption of the Standard update in the spring of 2012. That's all I have to say about that -- oh, we do have the schedules posted for both the residential and the nonresidential Compliance Software certification process and the ACM Reference Manual is posted online now, so you can go there to understand what our process will be to complete those performance standards compliance products. I think that Mazi is up, but he's not here anymore, so…. He probably thought I was going to talk for hours and hours about performance standards and I probably could if you want me to. Maybe we could -- if there is anybody that has a question on this topic, come on up and then we won't have to do it later.

MR. GABEL: Mike Gabel, Gabel Associates. In the section there in the introduction to the Performance Method, you don't really refer back to the ACM Manual. Is there a reason for that? I just thought it would be good to tie the loop to --

MS. BROOK: It actually does include the ACM Reference Manual. In the description of how the Energy budget is calculated, it does bring up the ACM Reference Manual.

MR. GABEL: Okay, so it's a definitional thing between Energy Budget to ACM Manual to the methodology

used, that's how those things are connected?

MS. BROOK: Yeah, no, I suppose you're right, though, there's no reason why we couldn't in the introduction section, would you say, the approval manual.

MR. GABEL: Yeah, I think it would be helpful to emphasize that the basis for the software that performs these calculations is contained in these other sections.

MS. BROOK: Okay, so that, I think we have clearly introduced the Reference Manual, but I think it would be a good idea to also introduce the approval manual. Thank you.

MR. SPLITT: Pat Splitt from ApTech. Just a couple of items on performance for nonres is that you're proposing to start up a registry, at least some time, that could take these inputs. Right now, the software, there is a lot of inputs that the software doesn't fill in, there are forms that it just generates with blank pages that the only way, well, normally nobody ever fills it in because this is just a certified program, if that came out, is blank, then that's the official version of that form is blank, so nobody does anything with it, but they should have been filled out with many things like controls that have to be tested. But right now, the program doesn't do it, so even if somebody were to fill

those in on the plans that were submitted to the Building Department, in your registry you'll never get any of that information because that never got inputted into the software. So I think you have to be sure that the new software performance programs, wherever there's a place where there should be an input, that either the program automatically fills it in, or, if it's something that the person doing the modeling has to input manually, he can right there at that time input the data into the form so it's now in the program, it's not something that you add afterwards, and then, if you send something off to the registry, all that data will be there. Or, if a year from now somebody comes back and wants to make a change and I call that program up again, that information is there and it isn't lost because whatever page I scribbled something on is long gone.

MS. BROOK: So are these forms within the scope of the Performance Standard? Or are they more things like Acceptance Test forms or installations --

MR. SPLITT: A lot of them, they're actually on the Certificate of Compliance where you have to spell out control requirements, that sort of stuff. They're just blank right now.

MS. BROOK: Well, and so since I know you do Code compliance perfectly, you fill it out, you fill

those pieces of paper out?

MR. SPLITT: No, I don't -- well, it depends on what it is, if it's important, I do, but if it's not, I don't because there's no way of tying that to the calculations and to the performance. It doesn't affect the performance at all any way, there's no check that anybody ever put that in there.

MS. BROOK: Right, I understand that -- so the misunderstanding between how we've implemented the standards and how they're getting carried out in the field is that there seems to be an understanding in the field that every single form is going to be generated through the performance software, the Compliance Software, and our understanding is only the performance standard related forms are generated in the Compliance Software and the other required forms are done through a manual process.

MR. SPLITT: Yeah, well, as an example I used earlier, where you have this large area that has a skylit daylit area over 8,000 square feet, now the program, if it was set up to input the data properly, the software could figure out how big the room is, what the size of the skylights are, and what the ceiling height is, and it would know whether or not you needed daylighting controls, but the way it is now, it doesn't figure that

out, it's just a checkbox that somebody has to know to check off on some obscure page, so if they don't check that off, it doesn't happen. So this stuff doesn't show up in the plans anywhere. Or if there are inputs in the software now, for nonres, if I have a building that doesn't comply, and I was somebody who didn't care about whether I did it right or not, just that I can get the building to comply because that's what I'm getting paid for, I could model solar water heating, put in a net solar fraction for that, space heating, and get credit for it, the space heating, I meant, and it will never show up in the forms because you're not supposed to take credit for that.

MS. BROOK: Okay.

MR. SPLITT: So you can look at all the output forms and you won't see that because it's an input that shouldn't have been done. So, 1) everything should be printed out that you input, or maybe beyond that you might have to have a requirement in there that, if a plan checker requires it, that it's mandatory that the person who did the compliance documentation has to submit their input file.

MS. BROOK: Uh huh, yeah, no, absolutely.

MR. SPLITT: Because that's the only way to check it. These things don't all show up on the forms

right now.

MS. BROOK: Okay. Well, we are in our compliance software development efforts, we are now beginning to talk about the required reporting out of the compliance software, so we'd like to talk with you and Mike, if you're interested, to try to figure all of this out.

MR. SPLITT: Okay and just one final thing, as far as acceptance and approving these forms, or the performance programs, there's never been public review, there's never been a place where the program was submitted to -- presented to people and we could ask questions, and bang the wheels, and what about this, what about that. So there should be -- well, not only should there be, it's required by the Warren-Alquist Act, but what does that mean?

MS. BROOK: It means everything.

MR. SPLITT: Okay, well, it's required. So it would be nice for a change if we actually had the public review so we could sort of, before it's too late, because another thing we're always promised when we're at the tight schedule is, "Well, we don't have time right now, but after the dust settles and we get this thing approved, we'll have a meeting and we'll review all this stuff," and it never happens.

MS. BROOK: Okay --

MR. SPLITT: So we have to --

MS. BROOK: So what you're recommending is that we have public review of the Compliance Software before it gets certified by the Commission.

MR. SPLITT: Right.

MS. BROOK: Okay.

MR. GABEL: Mike Gabel. I want to distinguish two things that Pat said that are really important, as different. One is that the software have, the ACMs have a certain amount of artificial intelligence looking at the inputs that have been placed into the program for that project, be able to deduce certain things that get printed on the forms. The other issue, though, is there are fields in the forms which the Energy Consultant, or the person using the software really cannot sometimes fill out at that time, but that in the Certificate of Compliance requires somebody else to input later.

MS. BROOK: Uh huh.

MR. GABEL: The trouble with the registry is, once you register the project, as Pat said, it's locked up, no one can really access those fields and put them in.

MS. BROOK: Oh, okay, so the solution potentially is not in the Compliance Software, it's in

the access to the registry documents?

MR. GABEL: Well, I think the idea is to construct forms bearing in mind carefully the process of how this works because, if you don't do that, then there are things that just won't work at all, so to be discussed.

MS. BROOK: Okay. All right, since Mazi came back, we can move on to Nonresidential Prescriptive Envelope Requirements.

MR. SHIRAKH: Okay, so we're going to have two lively subjects back to back here, the cool roofs and nonresidential. This used to be Section 143, now it is 143.3.

So this Section 140.3(a)1 deals with Cool Roof Requirements for the 2013 and there's two types of roofs for non-residential and steep slope and low slope. The requirement for the steep slope is really not that much different than before. It used to be climate zones 2 through 16, now we're going through 1 through 16. The only other change is the thermal emittance is being changed from 0.75 to .85. There are Performance Software that have always used the ACM Manual to specify .85 as the emittance, I'm not sure why; prescriptive was different, but we're making the two consistent this time.

The nonresidential Low-slope, that is where is

seems some of the discussion is going to revolve around, and we're changing the climate zones from where it used to be 2 through 15, we're going 1 through 16, capturing the cooler climate zones in the state, that would be like High Sierras and up in Humboldt County, North Coast, Climate Zone 1. And the bigger difference is the reflectance and we are proposing to go up from .55 to .67 for new construction or, pardon me, newly constructed buildings. And, again, the emittance, we're making it consistent with the ACM requirements, .85. And the alternative compliance approach is using the SRI approach, which does trade-offs with being reflectance and emittance, as long as the SRI is .80, then the product will comply.

High-rise Residential, pretty much the same requirements, little difference in the climate zones, same requirement for the Low-sloped, .67 reflectance instead of .55, making thermal emittance consistent across the board between different approaches. SRI is still .80 for the steep slope, same as before. Climate zone here is 2 through 15 and that, again, includes the coldest climate zones, it wasn't cost-effective there. And thermal emittance, the reflectance is .20 which is the existing requirement, it hasn't changed, emittance at .85 and SRI of 16. So basically that captures the major

Code changes for the cool roofs.

The other major difference or update to the Code is the Side Fenestration windows for Nonresidential Buildings. In the past, there was basically, you know, we only had an SHGC and a U-Factor requirement, we never had a VT or Visual Transmittance requirement. And then we also had, as a compliance option, or a credit, we had a methodology called the Effective Aperture.

So the proposal for this round of Standards is actually to tighten down on the SHGC and the U-Factor, but also introduce VT as a third criteria for prescriptive requirements. And there is the difference glass combinations, a fixed operable, and there are different sort of casing and stuff, there's a lot of listings, so I only actually highlighted here the most common type of glass that's being used. For the full list, you need to go to that section which is posted, but the concept is the same.

So for nonresidential buildings, Area-Weighted average U-factor for fixed windows is proposed to be .36, and the relative solar heat gain coefficient, again, for fixed windows, is 0.25.

And the VT, the Visual Transmittance, this is the total fenestration value of 0.42 for fixed glass.

And the same type of approach for Skylights for

Nonresidential Buildings. Again, these are all Area-Weighted average, and what we mean by the Area-Weighted is that you can actually deviate from these values so long as the overall weighted value of the U-Factor is .5, in this case, or lower, you comply, which means in the case of VT, you can have darker glass near the bottom and lighter glass closer to the ceiling as long as the weighted area U-factor is better than what we're specifying here, your design will comply which is an important consideration.

For nonresidential buildings, again, the U-Factor for skylights that are mounted on curbs is .58. The relative solar heat gain coefficient is .25. And the VT is .49. And this is not as controversial as the side lighting requirements.

Other new requirements for this round of requirements is the Air Barrier for Nonresidential Buildings, so a continuous air barrier shall be installed in the building envelope in Climate Zones 10-16, except in relocatable classrooms.

And the infamous Overall Envelope Approach, which has been debated at length in every cycle of standards, and we never seem to be able to come up to the same conclusion on it, you know, we are actually proposing to get rid of it this time and use a simplified

performance approach to replace it. We've gone back and forth on this in 2005, there were problems with the equations that didn't quite work out, then, in 2008, we came up with this fancy spreadsheet with about 900 coefficients in it, and nobody knew how to use it, and we spent months this time to try to come up with another approach that works, you know, it was like trying to put a round peg in a square hole.

So we've always talked about coming up with an interface for the compliance software which will allow both in Res and Nonres buildings, we've enabled the user to basically check off what features they want to use in the performance software, and if they're just doing envelope trade-offs, then that's what they'll specify, and they use the compliance software to do it. I think I've finally convinced Martha that this is a good idea and she's going to pursue it. So that's our proposal for now, is get rid of the overall TDV, hasta la vista, and use this simplified method instead, and hopefully that will solve some of these problems.

The compliance software, the simplified software, will actually allow like, you know, trade-offs between cool roofs, insulation levels, side fenestration, you know, whatever the overall TDV used to do, you can do it here -- much easier.

This is §140.3(c). These are some of the changes to the skylight requirement, you know, the Area Threshold used to be 8,000 square feet, we're proposing to drop it to 5,000. The skylit area required used to be 50 percent, now we're increasing that to 75% of the space, it should be within the skylit area as is defined in this bullet. And the minimum skylight area Effective Aperture is no longer needed and we're not proposing to keep that.

So here comes the good part.

MR. GABEL: Mike Gabel. So I have several comments on Table 143.3(a). You don't have that up on the screen, you just summarized those results, I think?

MR. SHIRAKH: Right.

MR. GABEL: So I'll give some of this offline, but basically there's a fixed inoperable category and, if you go to NFRC website, you look at fixed or operable windows, especially operable, there's operable operable and operable fixed. So the problem is I think you need to define these with a footnote that correlates them with NFRC descriptors. Personally, I think if something is operable and fixed, it's more like an operable window and it should follow these requirements. But this is the first time the Standards will use these differentiations as defining what the standard is for a window, so you

have to be really careful with those definitions and get them right.

Also, under that same table, you list windows. You probably want to say vertical fenestration or fenestration in walls, or something like that, because you're including, obviously, other things, so just a stylistic thing.

Substantively, I did a search of windows that would meet these requirements for nonres and high-rise residential buildings, kind of interesting, I looked at major manufacturers who have thermally broken aluminum windows and, just as an example, for example, *Milgard* listed out 1,600 products in that category of which seven percent meet the nonres requirements, less than three percent meet the high-rise residential requirements. I couldn't find any to meet the fixed, and I couldn't find sliding glass doors at all to meet sliding glass door requirements. Plenty of French doors did, a huge percentage of French doors did, don't ask me why. There is also the issue of using CMAST because, well, first of all, let me say that you're taking away the center of glass calculation algorithm, COG algorithm, and I think you might want to keep that in there as a fail-safe; instead of 10,000 square feet, you might want to keep it in there as less than 1,000 square feet. We don't know

the impact of having people use CMAST calculations, how that's going to really work.

If you go on the NFRC website, you can't have access to a CMAST database of curtain wall storefront windows. I called Mudit yesterday and it turns out NFRC charges you $400 a year to even view the library of CMAST values that people have entered. I'm thinking you need to contact NFRC and tell them they need to release a viewing-only version of their program that's free, that lets you look at the shared database so that people who want to specify general values for a project can say, "Oh, okay, well tell your client…," if I have an architectural client, "…here, look at all these products that need prescriptive values, you should be able to find something that works." So I think you guys need to lean on NFRC and I guess Nelson is on the Board of Directors, I think I might talk to him about that.

Let's see, and so in summary I think we need to look at sort of all these issues around CMAST, center glass values, implementation, amount of product, and we need the next couple of months before this thing gets locked and fixed in concrete, to make sure that these values work.

One other final suggestion is the U-Factors between Table 1, excuse me, 3(a) and 3(b), are so close I

think you might as well make the high-rise residential -- they're only .01 and .02 different -- make them the same as the non-res, .47 and .41, etc., just to keep it simpler and make it sort of clear to the industry what these rules are for those kinds of glass. Thanks.

MR. SHIRAKH: Thank you, Mike. Are you going to give us written comments on these or -- okay, thanks. Tom.

MR. CULP: Tom Culp, Birch Point Consulting. We've already, for Ms. Douglas' benefit, we've already had a lot of discussion about the daylighting and that's been very useful. But for your benefit, just so you know who I am, I've worked in the glazing industry for 13 years. I've worked with the Glass Association of North America who has all the major glass manufacturers, fabricators, glazing contractors, as well as the Lumen Exteriors Council that does the framing that goes on these products. I'm also on the Board of Directors for NFRC along with your own Nelson Peña, so I'll take back some of those comments, but good comments. I'm not representing any of those organizations here today. I've been involved here because I have some of the concerns about how we do the daylighting and so we've had some of these discussions, but I wanted to highlight again some of these things plus some new information that we found.

Before we get into that, first I want to reiterate that we tend to focus on the differences, but there are a number of issues where we agree and there's a lot of good stuff in this standard, it's just this one area of side lighting, daylighting that we still have some very serious concerns. And there have been some changes, but we have real concerns about how daylighting is being implemented, and are we going to achieve the claimed energy savings in real life. I'll be submitting written comments, but I wanted to highlight some of the concepts and concerns.

As we've discussed, daylighting is complex. It depends on the space, the orientation, the use of the space, the geometry, the glazing, the controls, everything. But if you try and boil it down to what are the important factors, 1) controls, 2) distribution, spreading the glass, making it up high to get the light into the space, and then third are the window properties for that specific application. So looking at what the standard is being proposed here, controls, check, you've got that, and very good. That's something I really applaud, that we have a strong controls section. But when you look at the other two aspects, we're missing the mark by focusing on VT alone, while ignoring distribution and doing nothing to encourage good daylit zones and the

spread of light. We've modeled -- the CASE reports model the one-story building with equally distributed glazing and then we're assuming that those energy savings can be extrapolated to all buildings in California -- 20-story offices, schools, banks, restaurants, hotels. But without the language about the glazing distribution in the Standard, we're not going to get that good daylighting or realize those energy savings in real life. And the Green Codes, the International Green Construction Code, ASHRAE 189, address these. The other places, you've done a very good job in top lighting; top lighting addresses this where you look at distributions of the skylights. But for some reason here on the sidelit, we're focusing on the wrong thing, the VT only. I was speaking with Jack Bailey, who is with One Lux Studio in New York, he plays a key role on the Sustainability Committee for the International Association of Lighting Designers, and his comment was that, looking at VT alone is not a good substitute for daylighting. The point is that there is not a correct VT number. It depends balancing the light for the specific application. And the optimum VT depends on that specific application -- sometimes higher, sometimes lower. But there's not one number. And we've discussed a lot of this and I think we're making progress.

Yesterday, I did try and sit down, now that we have language to respond to, I did sit down and try and come up with some revisions on my own. I just did this yesterday, so it's still kind of rough and I'll include it in our written comments, but I do have some copies here now if you want at least a first glance. There might be, in my view, a better way to address daylighting and achieve the energy savings that we really want, but also make corrections for whether there are problems. And there are a couple of aspects and I'm not going to go through the detailed language, but I want to try and highlight what I feel is important to do. Number one is we have to account for glazing distribution, getting the light in the right place. And I've suggested some language adapted from the International Green Construction Code that was promoted by the International Association of Lighting Designers and the New Buildings Institute and AIA, and I've adapted that to Title 24 type language, and that is suggested here basically saying that a certain amount of your floor area needs to be in daylit zones; that does two things, it spreads out the glazing, it also encourages people to raise their glazing so that you get more penetration and you're covering more floor area. And there's a couple of other suggestions, we can talk about the specific language and exceptions.

I took some of the exceptions from the skylighting section that I think makes sense on how you spread the light. The second part is really having to do with the VT. Now, where do we want VT? We want VT -- high VT makes sense when it's up high. And I know there was some language in there about sill heights and so forth, but really when you read it, all it said was, if you have two VTs, don't put the dark glass above the light glass, but that really does nothing, that's common sense. And it's really not getting to the point, so I had some other suggested language about windows located above six-feet high, trying to address the idea of clerestory windows; that’s where you want high VT.

I've also put in an option, not replacing the VT, but an option for Effective Aperture, Primary Sidelit Effective Aperture. And I know we've discussed this and there have been some claims that Effective Aperture has an energy penalty to it. And I wanted to address that because it's not true. The arguments were claiming that, well, a designer will want to use a lower VT, so they're going to put in more glass area, or put it down on the floor to do so. But that's completely backwards, that's not how the design process works. A designer does not pick a VT and then fit the window around it, they design the window space for the building, the function of the

space, and so forth, and then, once they do that, then you use the Effective Aperture to determine how much VT, how much light is appropriate for that space, so it was backwards. The other thing is that this is a prescriptive path, less than 40 percent window to wall ratio. So people are not going to be using the prescriptive path to put glass on the floor, otherwise you've got glass bounded from the top of the windows to about at your chin, so it's really -- there's not a penalty there. And, as we've mentioned before, Effective Aperture is the metric used by the International Green Construction Code in ASHRAE 189.

Finally, I made some suggested corrections to the default VT calculation and we can talk about that offline, but it's more of a technical correction.

But I think the other important point is that, similar to what Mike was saying about the Table B and Table A, maybe just match up the U-Factors, we need to do that on the VTs, as well. I just didn't realize until I read through it that we had different VTs for the high-rise apartment hotel and motel, that some of the changes that were made for nonresidential were not made there, even though there's many of the same issues that we've already discussed, plus in those spaces, because whether the Commission sticks with the 250 square foot limit, or

the 120 watt limit, not all those spaces are going to have controls and, when you look at apartments and hotels, for example, if we go to 120 watts, you know, that's the equivalent of nine 60 watt equivalency FLs. Not every room is going to have that much in there, so the energy savings are not from daylighting, unfortunately are not as much in some of those spaces. So there's less justification for having a different VT there, so I think those need to be matched up. So, again, I'll be submitting written comments on this proposal and addressing some of the other issues, a few other things I found in the analysis that may require some tweaking of the numbers, and again, I agree -- I want to stress that we've been debating this VT issue, but I agree on many other issues, I think the staff and the consultants have done a great job on controls and on top lighting, the top lighting does account for distribution and controls, and it's doing a good job, and just from a broader perspective, because I work nationally, I don't work just in California, but California set the path for those two examples -- controls and top lighting. You guys did it first, then look who picked it up -- ASHRAE 90.1, ASHRAE 189.1, IECC, IGCC. California has really led the way with those. It's here that we differ and for some reason I feel that

the IGCC and ASHRAE 189 are leading the way instead of California in terms of daylighting when you look at what the lighting designers and AIA and so forth, what are being proposed there. So I think we just need to keep working on this and continue the dialogue.

MR. SHIRAKH: Thank you, Tom. So I've actually been kind of thinking about this idea that you brought up about having the Effective Aperture as a prescriptive alternative. I'd like to talk to you about that. We can put some limitations on some of the parameters that go into the equation, I could talk to you about that. But essentially, the issue boils down to this, whether the VT that the CASE team is recommending, .42, if that causes glare in the space, that's one of the issues, but I think it's the main issue. Would you agree to that, Tom?

MR. CULP: That's one issue, but I think where you haven't addressed --

MR. SHIRAKH: You can sit at the table there if you wish.

MR. CULP: Glare is certainly one issue that we've raised, one concern. Are people going to close the blinds, turn on the lights, and then, equally, when the glare condition is over, are they going to re-open the blinds so that the lights turn back off? That's one issue. But I think there are other issues like this

distribution where we're not, you know, we're missing a big important part of daylighting design, which is the glazing distribution.

MR. SHIRAKH: So why wouldn't the Weighted Area average address -- you know, you just mentioned that one of the approaches you are promoting is having darker glass at probably head height and clear glass up near the top. I mean, that's what the weighted area average VT would --

MR. CULP: Yeah, and I think we all absolutely agree that that's really one of the best daylighting designs for side lighting because then you could have a moderate VT to help manage glare next to the work space, but you have your high clearer glass up top to bring that light into the space without causing that glare.

MR. SHIRAKH: In fact, that's the kind of system we have here at the Commission, so again, we provide --

MR. CULP: No, the problem is that that's not what the language says to do. By adding the words "area weighted average," it allows that, but it's not promoting that, it's not requiring that. And to be honest, are people going to do it? Probably not. They should, but they're not. So we need stronger language about --

MR. SHIRAKH: The Code language doesn't really

promote anything, it's the Code language, you know, we have our compliance manuals where we can have examples, pictures, actual design, you know, that's where we address the promotion issue, but the Code language basically says you have two choices, you can either prescriptively have VT of .42, you're good, or you can do the weighted area average, and if it's .42, you're good again, you know, we don't really promote anything within the Code language. So, again, my question is, if that's available and you can do it, you know, I hear that you're saying it's a good practice, you know --

MR. CULP: But then we need to say to do that because most people won't do it and the reason it's a little different from other Code requirements, because by not doing it, they may be causing another problem which is, by having this incorrect VT --

MR. SHIRAKH: Well, are you suggesting that the daylighting designers, architects, will not understand our Code and just --

MR. CULP: Daylighting designers and architects will, but not everyone users a daylight designer, unfortunately.

MR. SHIRAKH: And the other thing that we brought up here was this idea of the simplified performance approach, which makes it hopefully very

convenient, and that's the other option, we can actually have more trade-offs available to you if you wish. And, again, is that something that would be helpful?

MR. CULP: Absolutely. And Jon McHugh and I discussed that some and I was pleased to hear that the performance path is used a lot more here in California than in other states. I wish other states would go that way because it leads to better integrated design. But, on the other hand, that doesn't excuse us from getting the prescriptive path correct for those people that do use prescriptive path for replacement products and establishing the correct baseline for the performance path, so I don't think -- that certainly helps, but I don't think we can use the performance path as an excuse for issues and prescription.

MR. SHIRAKH: It's not actually just an option. Again, I think within the prescriptive, there is flexibility. You know, you're concerned that people just use the VT and they'll just go that route and they don't use the weighted area average, I mean, that's probably something we can address through our training efforts, through the compliance manuals. And then the question of glare is, you know, that's what I am actually trying to get a handle on, like whether this is a problem or not. A couple of buildings were mentioned, the New York Times

Building, the Cal EPA, and when I look at -- I actually don't have much data about the Cal EPA Building, but I thank you for sending me those reports, it kept me busy for a while, not very long, but you know, the type of windows, the VT, the window ratio, the SHGC are really quite different than much higher, almost like 140 percent more light goes into the New York Times Building, yet they seem to manage the glare. You know, is glare still a problem in the New York Times Building?

MR. CULP: That was the key aspect of this study with Lawrence Berkeley National Lab was how to manage that and, in trying these automated exterior shading devices, and so forth, and so they do manage it that way; unfortunately, it's expensive and nothing that we can require in the Standard, but the point there is that, to look at how they took this daylighting issue and handled it, and the example I gave is do the keyword search on this 240-page report from Lawrence Berkeley National Lab, VT was mentioned twice, glare and discomfort was mentioned 395 times, or something like that. And it shows the relative factors, you know, daylighting and VT are not the same. VT is one factor, but it's how you integrate it in the design, the distribution, accounting for glare, and so forth. So, I mean, yeah, in that particular building, the window to

wall ratio was over 40 percent --

MR. SHIRAKH: I think that was about almost 80 percent --

MR. CULP: Yeah, but it's more to look at the concept, and you know, in my previous comments a couple of photos we submitted were for buildings that would be the 40 percent window to wall ratio, at least one of them was, and I can submit some more, too. But it's the same issue where you see the blinds being pulled because of the glare issue. But, again, glare is one aspect I think that is of concern. As I looked into this, I realized we're assuming equally distributed glazing when we're calculating the energy savings, but that's not going to happen unless we address it in the Standards. So we also need to address the distribution.

MR. SHIRAKH: Okay, again, I would like to work with you maybe on the Effective Aperture. If the approach results in the same energy savings, I think we're okay with it, we just need to talk to you and make sure we agree on the basic assumptions that go in it.

MR. CULP: Okay, thank you.

MR. SHIRAKH: Thank you.

MR. MCHUGH: Mazi, can I add something?

MR. SHIRAKH: Sure. Is that Jim?

MR. BENYA: Jim Benya of Benya Lighting Design,

consultants for AEC to the Commission. I just wanted to point out that there's been -- there was quite a bit of work done by several teams during the development of the Standard. I'd just like to slightly step back for a second though and point out the leap. One of the things I recommend that we try and do is recognize that there is utilizing the 80:20 principles. Eighty percent of the projects are pretty ordinary and 80 percent of the projects can be, in my opinion, benefit from a simple set of codes and standards that every day contractors, every day architects doing every day buildings will use effectively. I think you're absolutely right talking about the complexity of daylight, even some of your -- I don't disagree with any of the specific technical points that you've made, as a matter of fact, they were made very very well. The problem is that we've tried in the past, I think, in the Standard to be that explicit and to be that careful, to preserve all of the options. And historically we have created Codes that have been hard to follow, hard to manage, and therefore hard to enforce. And we didn't get as good of results as we'd like to. So the idea is to take the designers, the design teams that wanted to do simple every day buildings and give them simple every day rules. So the reason for making the prescriptive measures simpler is exactly that. If you

have a building that is doing frankly better at daylighting which most buildings need, then you should leap into the performance section and make your case in a more complete manner.

So the points you're making are positively totally agreed upon, but put it in the context of what you are ordinarily going to run into; as a building official who has got to approve every day buildings coming across his desk every day, and you'll see why there was a real effort on the part of the Commission and all their advisors to try and find simpler ways to write it.

MR. SHIRAKH: So, then, what is your conclusion. Are you, Jim, supportive of the prescriptive proposal by the CASE team? And you're saying that can be used in the majority of cases and, where there's problems, people should use performance? Is that what you're --

MR. BENYA: Yes, in general that's what I believe, that the CASE teams really worked on this a lot to try and -- you know, there were some knock down drag out disagreements, let me tell you, because everybody knows daylighting is harder than a few simple numbers. ASHRAE has been through this problem from Standard 189, Standard 90, IDCC, IGCC have been through this very same

problem, LEAD goes through this problem all the time because good daylighting is not that simple, but simple buildings can follow some simple rules. So I think it's perfectly great, Mazi, if we undertake to review this one more time, but I want everybody to know that it wasn't like, you know, these things weren't thought of before.

MR. SHIRAKH: Thank you, Jim. Hopefully you can help us resolve some of these issues. Any other -- Mr. McHugh?

MR. MCHUGH: Hi, Jon McHugh with McHugh Energy. What Jim was just talking about, the 80/20 rule, what's kind of interesting is that it almost turns out that it's actually the 20/80 rule that we're talking about because I was actually kind of interested in this whole issue, you know, what fraction of buildings are using the performance approach vs. the prescriptive approach, and I contacted Martin Dodd and he does regular trainings on Title 24, and one of the trainings was to a number of building officials. And of course, this is sort of a convenience sample, but he asked the building officials what fraction of new commercial buildings used the prescriptive approach vs. the performance approach. And the response that he got back from the building officials was it's on the order of 70 percent of new buildings are using the performance approach. So, to some extent, you

know, some of this may be a *Tempest in the Teapot*.

Now, Tom has mentioned that he's been in the glazing industry for 20 years, I started my daylighting career 20 years ago, have my Masters Degree specifically on this particular subject, wrote ASHRAE, a Journal article back in 1996 on the energy impact of daylighting and, in addition, worked on the California Title 24 Daylighting Proposals and led the charge for ASHRAE 90.1, the ASHRAE 90.1 Daylighting Proposals, as well as I'm on the ASHRAE 189.1 Committee and led the development of Addendum A which updated the Daylighting in ASHRAE 189. And it's absolutely true that there's been a lot of activity over the last, well, decade, really on daylighting, starting with Title 24 and, actually, Title 24 and ASHRAE 90.1 have been essentially leapfrogging each other recently, the standards in the 2010 Standard for ASHRAE are more stringent than the current standards that we have in Title 24. And with the adoption of the proposals, again, Title 24, I think, will pretty much, pretty dramatically leap past where ASHRAE 90.1 2010 is.

Now, what's different between ASHRAE 90.1 and ASHRAE 189, is that the focus on daylighting has been on the various easiest places to daylight, and so the current requirements are focused around the primary daylit zone, which is one window head height from the

window. The proposal for this round of Title 24 standards includes mandatory requirements for that primary zone because it is the area where the largest savings is, but in addition, we're prescriptively expanding the requirements for the secondary zone. So the need is for more light to actually realize the savings in that secondary zone.

Some of the earlier discussions have been around trying to just make sure that you illuminate the primary zone. Now, in ASHRAE 90.1, there's only requirements for the primary zone and you can get a control credit for the secondary zone. To get the controls credit for that secondary zone, you have to have an effective aperture of 30 percent and it's almost impossible to get an effective aperture of 30 percent with anything less than 40 percent visible transmittance to the glass. So I think that what's actually proposed is actually reasonable; we're looking for more light because we're looking for illuminating that secondary zone. It is simple and, as I think was brought up earlier, people can put a higher transmittance glass like 60 percent transmittance glass up in the clear story window and then put lower transmittance glass in the view window, and that's perfectly reasonable.

In terms of glare, the fact of the matter is

that reducing the transmittance of the glass in general is not going to provide sufficient glare control for those situations where there is direct beam sunlight. You're still going to need some kind of control, whether it's blinds, or shades, or something like that.

So I think that the current proposal is well thought out, you know, we are taking advantage of, I think, some fantastic new technology that has been provided by the fenestration industry. So we're looking at effectively decoupling the solar heat gain and visible light transmittance and we're making use of that new technology which, you know, multiple manufacturers have patents on and, so, I would actually suggest that we're actually in the right place. I would be happy to answer any other questions that might --

MR. SHIRAKH: Yeah, I have two questions. Mike Gabel, who has just been addressed just said the product availability is an issue and I want to get a reaction from you or the CASE team about whether that is actually a problem, because if it is, then it is a problem.

MR. MCHUGH: My understanding is that the glass that we're looking at is a relatively new product and, so, if the issue is around those particular issues, that's one thing, but I think the bigger issue for Mike, and you can correct me if I'm wrong, is potentially the

issue of U-Factor and frame issues for glass and that's completely different -- I mean, that's a U-Factor issue, what I'm talking about right now is just the BT and SHGC issues. But you certainly want to make sure that, especially for retrofits, that there is the appropriate relaxation potential of U-Factor so that, you know, glass is available to be used in retrofits.

MR. SHIRAKH: And the second issue that he brought up and you actually mentioned it is, yeah, we want -- because, you know, we're including the secondary daylit zone as part of the requirements for controls, then we need to have more daylight to penetrate that. What they're arguing is this is going to basically cause glare for the guy who is sitting next to the window and it could be just too much light coming in, and they're arguing that, to get around it, they're going to defeat it by putting in blinds that will stay closed, and especially you are defeating the entire purpose because those blinds will stay closed and you never get the savings that you wanted from those fancy controls that we put up there in the first place. So what is the response to that?

MR. MCHUGH: So if you, just as an example, I was recently at the New York Times Building and the situation there, as you found out, is that it has lots of

glazing area, actually very high transmittance glazing area. That system actually has automated blinds, but the main thing for that building is that, if there is no direct beam sunlight on the windows, the blinds are up. And you know, the issue is that, in general, especially for California with our clear skies, we really don't have a glare issue when we don't have direct beam illumination. So the illumination that's from clear sky tends not to be a glare problem. You know, there could be some examples where you have a bright white building and it's a sunny day, and it's getting a glary -- but you'd still have a glare issue whether or not you had very high transmittance windows or you had lower transmittance windows. So, I mean, you're still going to -- when there is direct beam sunlight, you're still going to need to use blinds; when there's no direct beam sunlight, essentially --

MR. SHIRAKH: In the New York Times Building, you said they use automatic blinds? Or is it manuals?

MR. MCHUGH: So the New York Times Building has automatic blinds, but certainly the vast majority of daylit buildings do not have -- you know, that was sort of a one-off type project. The vast majority of buildings have manual blinds. And --

MR. BENYA: Jon, I'd just like to -- this is

Jim Benya again -- I'd like to add that many of the floors have had to move the workers' work stations 10 feet back from the windows, that even with the blinds -- even on a cloudy day with the blinds up, there's too much brightness to work on your computer very near the windows. This is not a good building and it's not a good example, but it does bring up the fact that, in leading edge designs and well financed designs, that the blinds can be used as the means of controlling cool air and, to a certain extent, solar gain. In this particular building CASE, those blinds are two percent transmitted because the glare on the east and west sides of the building is so severe so much of the year. And as a result, when the blinds are pulled, the light has got to be on. I mean, there's no kind of in between on that building. I think there could be better models for us to talk about, but you know, Jon's overall point is really good, there are solutions in more advanced buildings and with as many people trying to design more advanced buildings as there are today, I think that we will see automated blinds and other controls stepping in and making these buildings work, you know, somewhat regardless. But let's just say that a building with 80-90 percent window wall ratio, on four sides, in most North American apartments, isn't a real good idea to

begin with, and I don't think this building would pass Title 24 simply because the envelope is so crummy.

MR. MCHUGH: So I just want to make one last comment about glare, which is the computer models that were used to develop the CASE standard made use of the daylighting glare index calculation that is inside of -- I think they're using Energy Plus, but both DOE2 and Energy Plus both have a daylighting glare index calculation procedure, and so what that does is it does look at glare, and when it calculates the glares above a certain level, it does pull the blinds. So the energy analysis included glare. So, I think we're covering our bases there.

MR. SHIRAKH: One other comment. Does this idea of having darker glass at head height and clear stories up high, you know, it's allowed under our prescriptive proposal. Is there some way we can, as Tom was suggesting, we can highlight that? I mean, I mentioned the compliance manuals, but is it something we can do that people become more aware that that option is available?

MR. MCHUGH: I think the manual is the appropriate place to describe those features. We have a whole slew of things, not just around fenestration, but around mechanical systems, etc., which are exceeding the

standard and good design, whereas the codes are the definition of, well, I would say outstanding design vs. the Code is now becoming good design in terms of its requirements. You know, there's always a trade-off between simplicity and trying to write a design manual, and I think that right now what is proposed is, I think, fairly short and sweet in terms of capturing the big issues. And you know, being involved in the sky lighting proposal, you know, the original one back in 2005, the difference between side lighting and top lighting is that, in general, people put windows in their buildings, so it's an amenity that people already ask for. Typically, windows are fairly, I mean, you can go around -- windows are typically fairly evenly distributed around the building, so you know, trying to do some of these other things might be just sort of over-specifying the problem whereas, with top lighting, there were people definitely doing it, you know, a number of companies had been doing this for a while, but it was not a typical design approach and was not an amenity that people were demanding originally whereas windows certainly have been.

MR. SAXENA: Mazi, this is Mudit Saxena. Can I get a chance to comment here at this point?

MR. SHIRAKH: Just one second. I know there are people here that want to talk about cool roofs. Reed

is waiting patiently. We'll get to you, Reed, I promise. Go ahead, Mudit.

MR. SAXENA: Thank you, Mazi. So I'm Mudit Saxena with Heschong Mahone Group. We have a long and wide experience with working with daylit buildings. I agree with comments from both John McHugh, as well as Jim Benya, and especially Jim's comment about the New York Times Building as being a pretty one-off building, which isn't very comparable, and he mentioned that if we had examples of other buildings, that would be good. We've studied a lot of side lit buildings, we did a study about five years ago on 123 daylit spaces in the Pacific Northwest, including California. And more recently, we studied 61 spaces across the United States for the Daylight Metrics Project. One of the things that I wanted to add about the glare discussion here, glare is a dynamic problem. It's a problem that comes and goes because the sun moves around and glints from other spaces, other windows that may be in your view, or it may be just a car that is parked right outside and it's causing a glint and it causes glare to you. It's unpredictable to a large extent and it needs to have the occupant in control to be able to take care of. If we try to solve the glare problem using a static metric, that of VT, I think we'll end up with a very wrong

answer, and the answer will always be "extremely dark windows" because the right answer would be extremely dark windows, that way you solve the glare problem.

I think we will do ourselves a big disservice if we start thinking of solving a dynamic problem of glare through static solutions. The solution for glare has existed for a very long time and is ubiquitous, and that is blinds and shades, manual blinds and shades. In our study of the daylit spaces that I talked about, these are average every day spaces, these are not high end spaces. Ninety-three percent of the spaces we studied had either blinds or shades. So people have figured out how to solve the glare problem through the use of manual blinds and shades. I think the solution for glare exists, we need to understand it. We need better studies to understand how people are using blinds and shades, but that shouldn't stop us from proposing Code that encourages better daylighting design. And having VT -- and I completely support Jon's argument about Effective Aperture of at least 30 percent to get daylighting into the secondary daylit zone, which gives you about a .4 VT. So we've done a lot of thinking about this with Eric Shadd, he's the CASE author for the fenestration portion, and we have talked about glare issues, we've come a full circle on this, and we've all put our heads together and

I think we're in a very good place. I'll take myself off, then. Thanks.

MR. SHIRAKH: Thank you, Mudit.

MR. DEVITO: Thank you. My name is Eric Devito, I'm here for Cardinal Glass Industries, it's a large glass manufacturer, all aspects, coatings, insulating glass units, float glass, you name it, across the country. We have two facilities right here in California, as well, that make the product. First, thank you to the gentleman from the roofing industry who agreed to sort of let us finish this topic a little bit before they launch into some of their issues, so I guess a thank you and apologies to the rest of you that have to hear more about windows. But thank you, Commissioner, for hearing all of our public comments today and taking time to delve into these issues. Thank you to Martha and Mazi and Eric, we've had loads of discussions, particularly on the VT issue offline, you know, both in the workshops and outside of them, trying to get it right.

Before I get into that, though, I want to first put on record, we definitely support the path that you're heading, the new prescriptive values that are being proposed, both for U-Factor, SHGC, and VT. It's the right move, it puts California where it's supposed to be, the numbers are achievable, the numbers will keep pushing

the market transformation that you've already experienced here in the state, it will push it to that next level where it's a reasonable place to go and where I think you need to go, and I know a lot of folks that do. It's a simplification, even more than you already -- you know, you had your prescriptive path was always pretty decent at simplification as it was, it's even better now, you know, it's material neutral, it's eliminating all the different climate zones, it's focusing those targets to get you to that market transformation, which helps with the enforcement issue that someone raised. You know, if you can get your enforcement because the products leaving the factory already meet your Code, it solves a lot of your enforcement issues, so we think your values and the way you're headed is going down that right path. We think Area-Weighted Averaging makes sense, that was a relatively new addition and it adds flexibility, it adds for some design flexibility, and some product flexibility for certain types and certain aspects of the buildings, so we agree with that.

We do -- one sort of item of question which we have raised, but we're not going to push it at this stage, we know that's probably for future Standards updates, is this RSHG, Relative Solar Heat Gain. We think just specifying an NFRC rated SHGC makes the most

sense, it's easiest, there are other aspects into the RSHGC calculation which go away from simplification, but we understand that's where you are now and that would be more of a step than you're willing to take at this point, so I just reserve sort of the opportunity to come back in future standards updates well down the road to maybe revisit that RSHGC issue.

As far as the VT, you know, I do have a lot of comments on the VT, I don't think this is the best forum to get into all of the technical details, so I'll let that go. Like I said, we've addressed a lot of them offline, but it is cost-effective; one of the most important things I think we can leave here with is this is a simplified prescriptive path to set your energy budget. All of the various issues we're talking about on shading and other controls, that can be done in the performance pastel, the area weighted averaging provides lots of options. There is plenty of flexibility that was there before, but even more so now as a result of all these stakeholder discussions, more flexibility has been added. Personally, I supported the higher VT numbers that were out in the original proposal. They've actually come down considerably from what we were originally -- but I understand the need for that, I understand the need for compromise, I understand the need for flexibility, so

I think that this blazes an excellent trail on the VT issue that other Codes have not done yet.

I heard Mr. Culp mention that, you know, ASHRAE is the leader and other Codes are the leader, I disagree; they may have led in introducing the VT topic for daylighting, they do it differently, they do it through ratios and effective aperture. You're getting to the same place much simpler here by setting a point for a VT. I mean, the 1.0 SHGC, the VT ratio that's being used in other Codes is, you know, when you take your .25 SHGC value that you have, I mean, that's a .25 VT. Twenty percent of the visible light, that really isn't a very strong visible light standard. What California is proposing is a much stronger and a much better standard, and obviously justified and cost-effective.

I also have a comment to make about Mr. Culp said, "Well, the controls are the most important thing," well, if you don't let the light in in the first place, you have nothing to control. So building it right, getting appropriate daylighting from the start, and setting the budget, more importantly, through that prescriptive path, is saying these are the type of energy usage and savings and what we'd like to achieve through daylighting, you set that through the prescriptive path, then if you want to vary it and go do your trade-offs

through the performance approach, that's the right way to do it, but that's the way you're doing it.

There were some comments about product availability and I understand what Mr. Gabel was saying, I don't disagree, I've done the same type of analysis myself, I've pulled up the various manufacturers. 1) On the glass manufacturing side, the glass can beat it. You put in almost any frame, you take the right extra low solar gain low e glass, you put it in almost any frame, it's going to meet your standard. The issue I think he is encountering is a lot of the products that may be out there right now are still under the moderate low solar gain type of product and all this really is is a different type of coating, it's built the same, it's made the same from the window manufacturer's side, it's just using a different coating, which they do use now, but there's been no real impetus to spec that product. I think there is -- I think you're going to see a lot more of it -- the Federal Tax Credit on the residential side really pushed a lot of this glass, so you saw a lot more penetration. I think if you look today vs. 2009, you'll see much more penetration of this type of product from the window side. That's one aspect. Two, you know, the seven percent only available, I think if you look at a manufacturer's product distribution, I can see how that

would happen, but that doesn't necessarily mean how many they make, that's of all the various products that they make across their whole line. The most important thing is that they offer a product that meets it, they can always ramp up, ramp down, to meet the standard. California is a big enough market, it's happened before, believe me, manufacturers will meet that standard, they're capable of meeting it now, it's just a matter of, again, picking a high solar gain or -- excuse me, a low solar gain, extra low solar gain, low e coating, vs. maybe the moderate one that they're using now. And it's really no additional cost at all, it's just using a different type of coating.

On that note, I do agree with Mr. McHugh's comments. I do agree with the VT Standards and all the other Standards that you promoted here today. I look forward to continuing to work with staff to getting these new proposed Standards off the ground. And I thank you.

MR. SHIRAKH: Thank you, Eric. Any other comments on fenestration?

MR. ZAREMBA: Tom Zaremba and I represent Pilkington North America and AGC Flat Glass North America, Inc. And I appreciate the opportunity to talk. I'm going to really try to make it as brief as absolutely possible given the length of time and the number of

people who are interested in these subjects. I want to thank the staff for working with us so well. We asked for underlying analyses documents and we just got them a day and a half ago. Unfortunately, it took me about 17 hours to download and it was my computer was too small, so I haven't yet had an opportunity to review those. So we'll set all that aside for the moment because that will give me an opportunity to do so between now and the written comment period.

One of the things, though, that I do want to point out, and I have just a document here that may help illustrate this, is this issue of the products that are currently in the marketplace and what the impact of the standard might be. What I've done is I've taken a graph that appears in the CASE Report, it's at the very end, I believe, it's in the Appendix, and basically what it does is to block in the upper left-hand quadrant, of the products that are available in the marketplace, those that would comply. And the CASE Report indicates that basically this is a spread of the major six manufacturers' products, inventories. So everything outside that box, that upper left-hand quadrant, from a prescriptive path requirement side, is not going to comply with what is being proposed here. And I find myself asking, so, okay, how did this happen? I mean,

it's really limited. Well, I look again to the CASE Report and it basically says that all of the proposed changes that are being made here, virtually all of those, are being driven by the availability of triple silver product, triple silver coated low e glass, that's it. So essentially the standard is being written around a specific type of glass and that's why all of the other glass types are being omitted. Now, of course, the standard itself can drive demand, there's no doubt about it. If these are the permissible products in the prescriptive path, it will in fact drive additional demand. The Standard can't really do much about supply, so, as a result, you know, simple law of economics indicates that, if the Standard goes through, you're very likely to experience -- if it goes through all in one shot, right now, "We're going to enforce this right now, going forward" -- you're very likely to experience a very significant rise in price. And, of course, that's going to have a significant impact on the analysis of cost--effectiveness and other things. So I simply point out that this will drive a tremendous segment of the market, I mean, look at the number of products that all of these manufacturers have available in their inventories that will be excluded, and you know that there's going to be some serious repercussions in the marketplace relative to

demand for a specific single product available by three of the manufacturers.

Having said that, the other thing I want to say is that the end all of the game is to save energy. That means you have to reduce the electrical loads through the VT. I understand the drive for simplicity, there's no doubt but that the folks that have testified, Mazier, and all the other people that are involved in this effort, are looking carefully at how do you do this, but make it simple. My experience, as limited as it may be, I've been involved in the ASHRAE development, the 189, and IGCC development, and involved in the daylighting provisions of those, my experience says that daylighting is one of those issues where, if you really want simplicity, then you leave it to the performance path, you leave it out of the prescriptive. And the reason is that, if the end game is to save energy, the real question is "how often are those blinds going to be drawn to avoid too much sunlight coming into the building?"

Now, there are ways through configuration, and you heard Tom Culp, I'm not going to repeat all that stuff, but there are ways to ensure that the daylighting reaches the locations where it is, where it's intended to be, without having glare issues. For example, even the CASE report suggests that, for example, unless you have a

minimum sill height, you're going to be dropping daylight on the floor, it's not going to be effective. So there are all sorts of considerations to go on, and I agree that the performance path is the appropriate path for designers to take on that requirement. Putting it in the prescriptive path, by VT alone, even one of the comments that Mudit said is that people will control it by the use of the blinds. The real question is, will they reopen those blinds in order to allow the lighting controls to activate? And there's no answer to that.

The comparable area that I'm familiar with would be, for example, in the Fire Codes, I have a fire door and it's open to a hallway, open, separating two components or corridors, part of the building. If that fire door is propped open and not attached to an automatic closing device so that when the fire alarm goes off, that door closes, it doesn't count from a fire protection standpoint because, if the door is open, it's going to let the fire go through. So the only things that count in respect to certainty relative to energy savings are, for example, like what happened in the New York Times Building where they tried to control glare with automatic devices that acted as shading. And as Mudit pointed out, about 97 percent of the buildings are going to have those, or at least of those that he

studied, they're going to have shading. But the real question is, if those shades are closed, and left closed, you're not going to enjoy the energy savings that this is intending to accomplish.

So I would encourage you to simply think about this during the time between now and the time that this goes into effect, I simply wanted to raise some of the questions that I have as to what will happen to price and are we really going to enjoy the energy savings as intended, because enjoying that is clearly a great objective, one that I would like to see happen. So, thank you.

MR. SHIRAKH: Just a couple of comments. In relation to this graph, I understand a lot of products don't meet because of the original proposal by the CASE team was based on triple-coated silver -- but my understanding is they have actually modified the CASE proposals, the VTs, SHGCs, that now it encompasses a lot more products, you can actually have double-coated products, you can have -- I mean, there's a whole list in the latest CASE reports. So is it not true that they have changed their VT and SHGC and more and more products can meet the requirements?

MR. ZAREMBA: Not if you keep all three of the factors together and, again, I'm looking at, for example,

page 12 of the September CASE report where it says triple silver-coated glazing forms the basis for most of the updates to the standard. So, if you take one or another, yes, or if you use trade-offs, or if you use Area-Weighted. If you don't, then the answer is no, you're not going to meet it with any other product but that.

MR. SHIRAKH: Is that your understanding? My understanding was that those products that you listed in the CASE report actually met all three requirements at the same time basically with the prescriptive.

MR. SHADD: This is Eric Shadd. I did the analysis for the CASE report. What you're saying is true, Mazi, there are many other products besides triple silver which can meet the standard without overhangs or fins or any other such thing, and they run the range from triple silver to double silver, to single silver, they even include products that Pilkington and AGC make, which are pyrolytic and they even include single silver, they even include products that Pilkington and AGC make, which are pyrolytic and we're talking sort of room side low e coatings, tinted glass, etc. I think it goes on. The list of products that can meet the standard I think lasted about four pages long. The list of products that can meet the standard without any sort of Area-Weighting, or overhangs, etc., was about a page long. I believe

there are 26 different products that can do it that way.

MR. ZAREMBA: The numbers that were picked for the red lines on this graph, there's some slight variation, we're talking first of all center of glass, but we're looking from 2.7 to 2.9 HGC and 4.8 to 5.2 on VT side. So regardless of the number of the types of products, you're looking at a very small segment of the available product in the marketplace.

MR. SHIRAKH: And my other question, you mentioned the performance is actually the way to do proper daylighting, which we have the performance back here, but the way it works in California, our performance budget is based on our prescriptive. You have to have some prescriptive equivalent in order to have it in our performance, otherwise what is the performance based on? So, you know, I agree with you that the performance is the way to go for these more complicated situations in buildings, but we need a prescriptive baseline that can set the standard budget for the performance. That’s why we need to have something in the prescriptive.

MR. ZAREMBA: And I'm not suggesting that you shouldn't. What I'm suggesting, though is, again, in a very non-complicated way, I think some of the other Codes, even the IECC for its 2012 edition, has taken into account some of these factors, like configuration of the

glass in addition to VT. So there's a relationship there, I think, that the current codes outside of Title 24 have recognized, that plugging a VT in a loan isn't the way to go, you have to have some additional factors which address it. And I think, you know, Tom has suggested EA and there are other ways to do that. I'm not suggesting that the prescriptive path just simply ignore this, I think it is inevitable and an appropriate thing that it does address these things. The real question is whether it's done in such a way that it is really too simple, and will it yield the energy savings, and if it doesn't, if we can't expect it to yield those energy savings in those circumstances where the drapes simply get closed and never reopened again, or remain closed for a very long period of time, therefore increasing the electrical loads, then the question is, well, how do we address that and how do we try to remedy it. And that's what we're working with you to try to accomplish.

MR. SHIRAKH: As I suggested earlier, I'm personally open to an EA approach as a prescriptive alternative to VT, having both in there, but the devil is in the details.

MR. ZAREMBA: It is.

MR. SHIRAKH: So we may agree or we may not.

But, you know, I would be willing to --

MR. ZAREMBA: Of course, it's my understanding that current Title 24 has daylighting requirements in the performance path without a prescriptive baseline, so it can be done both ways, I think.

MR. SHIRAKH: Okay. Any other questions or comments on daylighting? Eric, yeah.

MR. SHADD: Well, if there are more stakeholders out there who want to make statements, I'd rather follow-up and listen to what they have to say first before I respond.

MR. SHIRAKH: Is there anyone online that wants to talk about daylighting?

MR. YASNY: I think George Nesbitt has something to say.

MR. NESBITT: Yes, can you hear me?

MR. YASNY: Yes.

MR. NESBITT: Yeah, George Nesbitt. I guess I just wanted to actually go back to what Pat Splitt had said about software and being able to take credit for solar space heating, that does not come up anywhere on the Perf 1. CFR 1 does come up as a --

MR. SHIRAKH: George, we're talking about daylighting requirement.

MR. NESBITT: Yes.

MR. SHIRAKH: Is this related to this?

MR. NESBITT: Well, no, not to daylighting.

MR. SHIRAKH: Can we shelf that for a while? I want to bring this to a conclusion. Is there any other comments related to daylighting, the topic we were just talking? Pat Splitt.

MR. SPLITT: Pat Splitt from ApTech, just real quick. Just one comment, there was a suggestion made to maybe change prescriptive a little bit to try to say that the lower glass would be a higher -- or lower visible light transmittance to high glass clear -- just imagine that wall where, if there was a four-foot band of dark glass and then clear glass above, your eyes are going to go berserk looking at that. Normal daylighting, if this was a normal daylit situation where there was clear glass above and the lower glass is either tinted, or there is shade, so the occupants can handle the glass that they can view through, the light that's coming above from the clear glass normally is somehow redirected either through light shelves or louvers or something, so that light doesn't directly come into the space and doesn't create glare no matter what. You can't simply just say you're going to have clear glass above, it's more complicated than that and it's too complicated to put into prescriptive, so I think we just shouldn't go there.

And then the other comment is, just getting back to what I said --

MR. SHIRAKH: You know, the current proposal says Area-Weighted average; actually, this was a recent addition to the Code language because of comments that Tom made and, you know, I agree, you can't really describe, you know, this kind of stuff in the Code language, that's what the Compliance Manuals are for, so, you know, my suggestion is, if you're going to keep this, then we defer that until we develop questions and answers and examples in the manuals.

MR. SPLITT: Okay. Along that line, then, what I spoke about before about trying to combine the electrical lighting controls section and the envelope sections and skylight, well glass perimeter sections, those have to be brought together and treated as one so everybody can look at everything together because I don't think, without looking at it together, I don't think everybody is thinking about how it affects what the other guy is doing enough and the place for that really to happen is probably a special section in the manual. However, the problem that happens -- been around this many many cycles -- and what happens, you adopt regulations, and after the regulations are adopted, you say, "Well, now let's do the manual and figure out how

we're going to do this." And sometimes you find out, well, you can't do it. So I have this novel suggestion that, at least for this daylighting thing, because it's so complicated, actually try to write up the procedures and have some sort of a workshop before you adopt the stuff so we can figure out whether it's really going to work or not, and if there's a problem, we have a chance to change it.

MR. SHIRAKH: Okay. Thank you, Pat. Always good suggestions. Any other daylighting related -- do you have something to say, or are you good?

MR. SHADD: Yeah, if everyone is through, I can go. So once again, I'm Eric Shadd and I did the analysis for the fenestration update. And I think, first off, I'm actually feeling sort of cautiously optimistic. I think Tom has sort of scooted away from the arguments around glare as much, I know we've talked a lot about it here, but from what I understood from his presentation, he's thinking more about distribution of glazing and that's sort of a new thing for us to think about in the standards, so I don't have too much more to say about that. Maybe in terms of the glare issue, I just want to add that, you know, we're talking about a glare, we're talking about a visible transmittance of 4.2, which means that basically 42 percent of the light that's coming from

outside will make it into the space. I think we have yet to see any evidence that that is a "bright" window. To me, that sort of qualifies as more of darker, moderate window. When you look at daylighting manuals and such, they usually recommend visible transmittance as higher than 50 percent and consider between .35 and .50 to be useful, but not ideal. So I think, in the end, we kind of have to remember that what we have to show is that, you know, what would need to be shown is that .42 is a bright glass, that it would cause sufficient glare that would cause people to close the blinds, and when those blinds were shut, that you would still not get enough light into the space to have effective daylighting, and that people would do that enough of the time to where that would be an energy penalty. Now, there hasn't been any study presented to us that shows that that would be the case, there's been some anecdotal evidence, but you know, we sort of -- there's a long list of arguments in the report, and I believe we've answered all of the specific technical issues to the satisfaction of our CASE team, you know, myself and the fenestration, as well as the daylighting folks, we've satisfied our responses, the IOUs seem satisfied with our responses or rebuttals to their arguments, daylighting experts also outside of the project team have backed us up, and we have some written

letters to the CEC, I believe, to say that industry representatives such as Eric Devito and another industry representative, Serious Energy, formerly Serious Glass, also backs us up. And also, I believe, the CEC staff are satisfied with our arguments against glare and how we've accommodated it in the standard. I won't get into all the technical details, there are a lot there, it's pretty much all in the report. I guess the one last thing I will say is, you know, if you want dark windows, you go with the dark view window with the clear story up top, and so we've allowed for that.

Let's see, the next thing I would talk about is I think Tom talked about improving the clear story definition and possibly encouraging that somehow more in the Code. I think we could look more into that, I'm not exactly sure how we would do that right now, and maybe he has some ideas. I have some ideas, too, but we could come into more discussions about that. And then, to move on to -- I'm just going to pick and choose here. There is, as you can imagine, we've been talking about this for a while, so I'm going to pick and choose --

COMMISSIONER DOUGLAS: Why don't you just hit the high points because we're behind on the agenda and we've got people who have been standing for a good 45 minutes?

MR. SHADD: Definitely, I just had one more I wanted to do.

COMMISSIONER DOUGLAS: Thank you.

MR. SHADD: Which was to talk about the availability and we've already sort of discussed that a little bit and just wanted to reiterate that, in the report, we have pages and pages and pages of products that are not triple silver, we have all of the six major manufacturers are represented in there. In terms of Mr. Gabel's concerns, that seems, you know, I would like to look into that a little more, too, because that is a question of visibility, can people find -- can people just look something up and say, "Okay, this window will qualify." Maybe we need to talk to the NFRC about having that be more transparent and, like you said, having some kind of review, or something like that. So that's it.

MR. SHIRAKH: Thank you, Eric. So what I would suggest is, not long after these workshops, we get together again with Tom and Tom and maybe we can clarify some language, or maybe we can come up with some alternatives. The key is to maintain the energy savings and not sacrifice that, but within that framework, if we can come up with some flexibility, you know, we are open to that. And now I think we need to move on to Cool Roofs. Thank you for being patient.

COMMISSIONER DOUGLAS: Let's do this now, but let me request that you not be repetitive, that people come up, definitely identify yourselves, definitely say something where you have a unique perspective or something hasn't been said yet, please say it, but feel free to say, "And I agree with everything the person before me said" because that will get us through this a lot faster and it always means something when you see a lot of people show up, but they don't actually all have to say the same thing for it to count.

MR. HITCHCOCK: I agree with everything the window guys said. My name is Reed Hitchcock, I'm with the Asphalt Roofing Manufacturers Association, ARMA. I do want to just quickly thank Mazi, Payam, Bill, and the Commission for the opportunity to comment and participate in the process. We have had a good dialogue with the CEC staff so far this time around, but I do want to draw attention to a letter that was sent to the CEC by a Coalition of 14 Associations involved in the roofing and insulation industries, it was sent yesterday morning. The Coalition is made up of manufacturers, contractors, labor unions, and it focused on four key areas related to the proposal. And it was cost justification, jobs and economy, trade-off options, and consistency in the Code language.

The letter was submitted for the record for this workshop, so I won't re-read it here, but what I want to do is call attention to what we consider the underlying -- fundamental underlying issues that we have. Foremost of concern to ARMA and I think the other members of the coalition, is the flawed cost justifications, going back to the 2002 Lawrence Berkeley National Lab Report upon which the 2005 standards were based and, again, the increases that were made in 2008. We've discussed issues with these baseline numbers literally for years and, while I appreciate the CEC's position of not wanting to go backwards on the standards, we've come to the stage now where the arbitrary sort of trial balloon requirements that have been proposed and floated by industry will do a disservice to the California consumes, the building owners, but not only promising cost-effective energy savings that will not likely be realized, but also by effectively removing quality performing, durable and proven roofing materials from the market in the State of California. Many of these materials that are produced in California will have a direct impact not only on manufacturing jobs in California, but on the application side of things, particularly for skilled laborers.

Manufacturers have also invested very heavily

in their facilities in California to enable them to produce materials that qualify for the 2008 requirements. Some of these facilities produce the very products that will be effectively removed from the market on the basis of the proposed increases in reflectance and emittance, increases based on little more at this point than a mandate, real or perceived, to deliver a more stringent requirement, regardless of the direct impact on the economy, jobs and ability of consumers, designers and building owners to select the roofing materials that will best serve their needs beyond the color of the surface.

Just a couple issues that I do just want to put on the record, that need to be really looked into, lifecycle by product type, maintenance and repair costs, real world install costs for materials, and real world premiums for cool products, tradeoffs that go down to the baseline numbers, which are currently proposed at .08 for steep slope roofing and .1 for low slope roofing in the Code, and consistency between the requirements between new roofs and re-roofing.

I do appreciate Mazi's initial response to the Coalition letter regarding undertaking a new analysis, but speaking on behalf of ARMA and not the whole coalition, it's critical from our standpoint that the roofing industry be at the table for development of the

methodology for the analysis due to the many complexities of roofing systems that go well beyond the surface. I'm sorry, I can't read what I wrote. Oh, I would recommend a CEC and industry working group, working together to develop the methodology, but obviously that will take time. In the mean time, it remains ARMA's position that it would be irresponsible and misleading to change the present requirements, the proscriptive requirements, before a complete re-analysis can be done. That's all I have.

MR. SHIRAKH: So one of the points that Reed was making related to the 2005 Standards, that the cost basis was flawed. In an email to you yesterday, I suggested maybe, you know, we should reset our costs and savings and go back to 2002 for both and rerun. We're okay with doing that, I don’t know what your position is?

MR. HITCHCOCK: Well, again, I think if we're going to do that, it can't be sort of going back up on the mountain and coming down with two new -- with new proposals, without that interaction and that participation. I think there's a lot of complexities that we've talked about over the years.

MR. SHIRAKH: And that was my attempt to try to address your concern. Typically, you know, when we do our analysis, you know, we use the existing Standards as

the basis and, so, when we move from 2008 to 2013, that the difference between the costs and the savings will become the basis for the lifecycle costing analysis. But they're saying that what we did in 2005 that brought us to the .55 was flawed. So an alternative would be to actually start over from dark roofs to .67 and looking at the cost and the energy savings. And if you guys are okay with that, we're okay with that, so we need some response from you on that proposal.

The other one is under a question of jobs and economy, we're not really saying you can't have roofs, we're just saying you have a roof of a different coating. So how would that impact jobs and --

MR. HITCHCOCK: Well, and understand, and I know there's some people that will address the specifics related to the products they manufacture, but understand that based on the prescriptive requirements, particularly the .67 that's on the table right now, there are product categories and specific products that are eliminated. As we mentioned at the last public workshop, there are, I think it was -- the number is near 15, asphalt roofing plants in the state. Built up roofing is largely taken off the table as a compliance option for a start.

MR. SHIRAKH: Okay, so if I may respond to that?

MR. HITCHCOCK: Sure.

MR. SHIRAKH: Your Coalition asked us to come up with prescriptive alternatives just to address that issue and we have, and that's why we have the insulation tradeoff in the prescriptive path for both newly constructed buildings and alternations.

So, again, these are prescriptive requirements, you know, it's not performance, we're not banning any product from the State. And even within the prescriptive path, you know, we have alternatives for products that have lower reflectants, you know, in exchange for some additional R value.

MR. HITCHCOCK: And the current --

MR. SHIRAKH: Why is that not --

MR. HITCHCOCK: Well, the current state of the table, as I understand it, is you've taken it down to a .25; right?

MR. SHIRAKH: Taken to .25 through prescriptive. Through performance it can go down to zero if you want.

MR. HITCHCOCK: Right. Again, we're focused on the prescriptive as the baseline and we feel pretty strongly that that compliance option should -- if you're going to have that, it needs to go down to the baseline, number one.

MR. SHIRAKH: Well, these are for low slope, I think all of the discussion is about low slope.

MR. HITCHCOCK: Yeah, so take that table down to .1, but make sure that what the -- that the tradeoffs do make sense. You know, at a certain point you get to a point on insulation where, you know, as you know, there's no need for a certain color roof. You know, a lot of products are not light colored.

MR. SHIRAKH: But you agree that the prescriptive off-ramp that we've provided is useful, you just don't think it goes down far enough?

MR. HITCHCOCK: Right. Yeah, that's where I was going. Yeah, I think conceptually we agree with it.

MR. SHIRAKH: Okay. And, again, on the costs, you know, we'd like to hear from you guys. If you want us to reset the baseline, we'd be happy to do that.

MR. HITCHCOCK: Well, I think that's definitely a conversation we need to have. The Coalition asked for that so I think, you know, getting together and having that conversation --

MR. SHIRAKH: I think that would be a fair approach.

MR. HITCHCOCK: But I think right now what I'm hearing, if that's the approach we're going to take then there's a huge question mark around the numbers that were

put on the screen today.

We have no idea if those are even in the same ball park as where that would take us.

MR. SHIRAKH: So, you know, we'll look at the cost and we'll look at the energy savings and let it run, and wherever the chips may fall.

MR. HITCHCOCK: As long as we're working together.

MR. SHIRAKH: Okay.

MR. HITCHCOCK: All right, anything else for me?

MR. SHIRAKH: I think that's it.

MR. HITCHCOCK: Okay, thank you. Thank you.

MR. SHIRAKH: And, you know, one more thing I may want to mention is that they asked us to -- they disagree with, not strongly, but somewhat concerned about the cost basis that we had in the CASE report, so we were supposed to get some bids for actual costs. It's been a challenge, as you can imagine, you know, we're asking people who are busy and have other businesses, you know, to spend time.

We've only got two bids, we're working on getting more, but the two bids that we've got so far is basically the same ball park as what we're estimating. So, hopefully, we'll have more data and if you can help

us get more --

MR. HITCHCOCK: We're trying. As I mentioned on our call the other day that's a challenge that we ran into as an industry, you know, I'm hopeful that some of the contracting organizations could be of use to you getting those numbers.

MR. SHIRAKH: Would appreciate it, thank you.

MR. HITCHCOCK: Thank you.

MR. HEINJE: My name's Steve Heinje, I am the Technical Service Manager for United Coatings. We've been in the business for about 40 years, I've got my card here.

We probably don't have time or blood sugar for my -- I actually have a presentation around here. I would love to show you my tour of Home Depot and Lowe's, which I would entitle "Be Careful What you Ask For, You May Get It."

In my brief, my brief survey of the retail market and I'm a commercial -- we are a commercial company, our emphasis is in commercial low-slope roofing. But, you know, I see high-reflectivity products that are advertising their coverage rates at 325 square feet per gallon. This is not good roofing practice.

I brought this up at my comments at the last workshop, where the way the Department of Energy's, I

believe they did some of your preliminary analysis, they looked at the Cool Roof Rating Council as a database, and parsed it, came up with a number, and here we're talking now about the .67. It that right, it's .67, yeah.

MR. SHIRAKH: That's if I --

MR. HEINJE: And that's for new construction.

MR. SHIRAKH: That's for new construction.

MR. HEINJE: Yes, I understand. And I understand the insulation tradeoff, by the way, and that's appreciated. My company often goes over polyurethane foam so that is helpful, that's relevant.

Although even though that's true, I think you have to consider that your goal is to retrofit -- I'm wearing a white shirt, okay, I'm a white coatings guy. Our goal, if we're going to use a cool roof, let's say in a market like San Diego, or Orange County, is to get as many of those roofs retrofitted as possible, so even though the insulation tradeoff is helpful, that does put a penalty on the building owner.

So the reality is from a cost perspective he's going to go shopping for a bright white coating, probably that's cheap, he's going to comply. That's the nature of -- unfortunately, the nature of regulations is to flatten the marketplace.

So, I did a little look at our company's data

and I'm going to give it to you here. I probably wouldn't want it to be a matter of public record, but I -- give me a second here, I've got to get the one I marked up. Should I give it to you, sir?

MR. SHIRAKH: Sure. Distribute.

MR. HEINJE: I just have one copy. I have one so I can remember what I'm going to say, okay.

But I took a look at this and I didn't actually know about the .67, I knew about the .63. I was a little surprised at the .67.

So, looking at my company's database and I have access to all the data, I know how long the products last, I know their Code approvals, that's what I do, what I discovered is if I make a line at .67, and this is just with respect to my company's products, although we are the only company in North America that makes polyureas, silicones, SCBS, acrylics, fluoropolymer. We used to make hypol and we've made them all. We even make -- we even make a wood stain for shingles, okay.

So, we are committed to the roof coating industry and we're committed to making quality products. But when I look at my data, looking at my total solar reflective -- oh, boy, total solar reflectivity at three years, at the .67 line I'm marginal on my core product, the product that actually was the first acrylic product

to be tested by UL for fire, and probably could comply with that or adjust it with time, but I'm not certain that we would comply.

But a very important category of product is the silicone category. And silicones have a tendency to hold dirt. That's not a good thing from a global warming, urban heat island, or an air conditioning perspective, but they're very fine coatings. In fact, probably the most long-lived chemistry on the market is the silicone coatings.

We call them ASTMD 6694s. They have age reflectivities of .64, so that product category is gone at least until we solve this problem, but silicones have been in the marketplace for 25 and they're still getting dirty today, so that's a long intractable problem.

On the other side I see I have some low-cost systems that have high reflectivity, that are not Code approved. We can sell them because there's no Code enforcement.

But and the market seems to -- and they work, we call them discretionary products. These aren't bad products, they might meet Table 118(b), but I have no data to --

MR. SHIRAKH: What is the reflection --

MR. HEINJE: Well, I have one here that's .72,

that's a high one. I have a -- the table's there. I'd actually have more luck with this with my lows' tour, because there's plenty of them there.

But I'm just looking at my data, I see a product category that's negatively affected, called silicones, and that's really for the .67, looking at my company's interests and what I think is a technological argument about the .67 creating some unintended consequences, that's the strongest thing I come up with.

There was another comment made at the last workshop that apparently the findings of the researcher was that high reflectivity products tended to cost less.

But looking at my product line, I don't find that to be the case, I see an increasing cost.

Now, I know why this is, we do not take resin out when we add TI02, okay, so that's why that is.

MR. SHIRAKH: Yeah, I don't think we are relying on that information anymore.

MR. HEINJE: Okay, okay. And then I found a similar thing, by the way, in my little tour of the Home Depot stores. Similarly, I do not see -- by the way I don't mind if you spend the money in coatings.

MR. SHIRAKH: Which Home Depot do you go to, I think I --

MR. HEINJE: I went to Home Depot and the

Lowe's. One's actually -- the Lowe's is actually quite close, perhaps two, three miles away.

MR. SHIRAKH: Because that's what I did.

MR. HEINJE: Anyway, so I did -- and I was making a comment to the process and if you're not relying on that anymore, fine, we'll move on.

MR. SHIRAKH: The information that you gave me, that I handed to the Commission, is that cost data, the one that you just handed to me and I gave it to the Commission?

MR. HEINJE: Yeah, well, I blocked out my -- I gave you costs as a percentage of my max, I blinded it. I have a very expensive fluoropolymer product so that becomes a hundred percent and everything else becomes like 25 percent of that, so it kind of was easy for me to do that.

I actually have the hard cost data, of course, but I wasn't going to present that. So that's how I got around revealing my prices and, yet, speaking to the matter, I just scaled the data.

Similarly, but back to this Lowe's and Home Depot tour, I went and I found seven products on the shelves, one of which had Code approval and appeared to be a fairly high-quality product. And another one, curiously -- excuse me, three -- three of which had Code

approval. One of them was an acrylic, the other three acrylics were -- had no Code approvals that I could tell. They were rated by the Cool Roof Rating Council, but they weren't -- so, I guess what I'm trying, and then --

MR. SHIRAKH: What were the reflectants, do you remember?

MR. HEINJE: I've got them right here.

MR. SHIRAKH: And if you can say for the record?

MR. HEINJE: Yeah, I'll say for the record. There's a product called -- this is an interesting -- this is a good case, let's just pick this one up. What I'm trying to say is there's a law of diminishing returns. If you're raising the bar, I can respect your interest in that, but there are tradeoffs.

I mentioned the silicone category tradeoff, I'm about to get to aluminized roof coatings, which I don't even make or care about, but you are going to lose those, too.

But even looking at the acrylic technology, which is my life and blood, so I see a product here called "Roof Guard 700" with an initial reflectivity of 85 and it looks like it's got a three-year of 65, so it looks like that might be cut. I've got -- I wasn't quite sure about some of these ratings.

And that product has got -- it's called, "a seven-year product."

So, looking at initial reflectivity, it looks like I've got this high-quality product, but this is a seven-year product. Now, I don't know about you, I don't want a seven-year roof.

And then I find a -- I find another one with an 88, but it doesn't have an aged, yet.

So, what I'm trying to say is that you can't look at that cool roof database, Cool Roof Rating Council Database and assume that all those products meet the rest of the Code, because they don't.

And you can't pretend that adding white pigment makes better roofs.

And I'm really trying to get to a third point, as you raise reflectivity what the inclination of the user is, is to put less coating on, because you now have a higher coverage rate. Just it's the physics of it. You take your concentration of TI02 from 10 to 15 percent and your reflectivities go up, but now you have more pigmentations. Guess what, it will spread 50 percent further.

So, now you have roofs with less coating on and that becomes a problem of roofing practice. And I am worried about that, I think that I might have troubles

with this, that I might find products put down in the marketplace at 10 or 12 Mills Dry Film thickness.

In fact, back to Lowe's, I calculated that two of these fine products would get on the roof at about 8 dry Mills.

Now, I figure the erosion rate of an acrylic is roughly a half-a-mil a year, perhaps 3. You know, and this product at that application thickness is not going to service well.

So, I think the .67 layer will somewhat favor some of the inferior products, that's my basic gripe.

MR. SHIRAKH: Do you have a recommendation besides putting it at --

MR. HEINJE: You know, it's not what you want to hear, but I look at the database and I see .3 or .64 -- .63 or .64. I like your .63 number just fine.

And that's what I came up with. I looked at technologies, you know, I looked at silicone, I looked at urethane, I looked at my acrylics and I realize that doesn't put me in that bind where I have a tendency to just make what I'm going to call the white roof paint. That's what I'm trying to avoid.

I did -- I would have mentioned, also, that the category -- even though I don't make, nor particularly care about their fate, the aluminized roof coatings do

have a valid -- and I am an RCMAY Board member, so I'm doing this for the RCMAY brotherhood that makes aluminized coatings, okay.

Their product has merit in your marketplace, though, because you have some fairly wet, nasty climates up in the northern, at least in the northern coast, and then you have the mountains, the Sierras.

And if you're coating a roof in the winter, you know, to be honest with you the white acrylic's problematic, it can be. Certainly, if you have a repair or there's some reason why you're re-roofing because you've got a building, maybe it's a grand opening at Christmas, that's happened before, and you're putting a coating on it, the aluminized coatings have a place. But they have a low emissivity and not a very high reflectivity, so they're out, too.

That's a product category that if left alone I think most people in hot climates, honestly, would not be using the aluminized product, but I think in those wet or cold climates they would and I think they should.

MR. SHIRAKH: And what is their reflectivity, do you have any --

MR. HEINJE: I think Mrs. Helene Pierce is far ahead of me in this matter. Are you going to speak to that, aluminized or not?

MS. PIERCE: I'd love to.

MR. HEINJE: Okay, good. Yeah, that's just not my bag. I just know that they look good in wet climates, I've seen the roofs and I think the technology has merit from a regional perspective. End of comments.

MR. SHIRAKH: Thank you, sir.

MR. OGG: My name's Chris Ogg, I'm the District Manager for [inaudible), we're a thermoplastic member and manufacturer.

Thank you for the opportunity to speak about cool roofs here real quick. I'm going to make it short because my colleagues kind of hit on a number of points ahead of me.

We appreciate the fact that the CEC has modified their original proposal, which feels a step in the right direction.

It is still unclear to us why there's a two-tier approach that is being proposed in regards to reflectivity in the solar reflective index. This will no doubt lead to, we feel, some significant confusion in the marketplace.

MR. SHIRAKH: What do you mean by the two-tiered approach; can you please clarify?

MR. OGG: Well, based on what we've read here you're asking for two different items where before you

had one, and that's why we're trying to understand why the --

MR. SHIRAKH: And that's one for newly constructed, then there's one for existing.

MR. OGG: Okay. With regards to the insulation tradeoff for the roofs not meeting the minimum values, we would proposed that this prescriptive approach be permitted in new construction and alternations, as well.

MR. SHIRAKH: We have actually done that.

MR. OGG: You've done that already, okay. Even with the simploid tradeoff calculators developed by the CEC, the tradeoff approach should be allowed for prescriptive option in new construction. It is simple and transparent that would, without doubt, be a preference to designers, contractors and building owners.

I'm going to keep this short because these guys have already hit on a number of things. But it also should be noted that however these suggestions are implemented, the CEC has not addressed the fundamental concern that we and many others have expressed, that the CEC has not presented the concrete evidence that the proposed changes will have a significant impact on energy savings.

Although these benefits of implementing the proposed changes are clearly debatable, the ramifications

will be significant and including disruption to the market and elimination of certain products from the market, as well, with long-term performance already in the market.

And also we feel that there's some likely job loss in manufacturing, sales and marketing due to the segment of the industry.

Additionally, trying to implement these changes in the 2013 Code will woefully inadequately -- I'm going too fast -- will be woefully inadequate notice for the manufacturer of products in a sufficient time for the proper development and field trials.

You know, honestly, we're trying to -- you know, to come up with a product that fast, what you're looking for to meet what you're trying to do, it's definitely going to take a number of products off of the market as well as increase the prices of others to get into the market.

And again, we feel it's kind of a poor tradeoff, particularly when one considers, you know, there's a proven economic justification for the changes.

And let's see, and finally the proposed changes could not come -- it is our opinion it come not come at a worse time. The overall economic climate nationally and, more importantly, here in the State of California, in the

supply issues with titanium and dioxide, the most important component to reflectivity is in most -- in most roofing technologies a far ideal, such drastic changes to the Energy Code.

We urge the CEC to take a step back and put off the changes to the Energy Code for 2013 to a subsequent Code cycle. The CEC should work with all the stakeholders and map out a comprehensive road map for the future and meet the State's goals in setting reasonable, aggressive targets defining time frames and would allow appropriate product development cycle to ensure that the end-all user's needs and expectations for their roofing systems, most notably durability, are met.

So, basically what we're trying to say is, you know, we need a little more time to come up with the proper products, otherwise you're going to come out with products that don't have the same lifecycle that we're expecting now because, again, it's too fast, and it's one of those type of things, if that makes sense.

MR. SHIRAKH: Just one comment I have is you mentioned we don't have -- demonstrated, we haven't demonstrated the savings. You know, I admit sometimes we have problems nailing down costs, but I think we're actually pretty good at nailing down savings. By we, I mean our consultants.

MR. OGG: Well, based upon the last -- the workshop, I mean based upon the calculations from Dr. Hoff's calculations on his written submissions, it had shown that it's just a fraction of a penny per square foot is possible with the current proposal, when compared to the original baseline, so that's kind of what we're looking at.

MR. SHIRAKH: So, I know, and again we've proposed to look at the cost basis for the standards.

MR. OGG: All right. Well, that's all I have, thank you.

COMMISSIONER DOUGLAS: Thank you.

MR. SHIRAKH: And I think what we've agreed, actually, to do with ARMA is take a look the recurring cost, the maintenance cost of the roofing system, that's another thing we're incorporating into our lifecycle cost analysis.

Go ahead, please.

MR. CALLAHAN: Okay, thank you. My name is Bill Callahan, I'm Executive Director of Associated Roofing Contractors of the Bay Area. We are an association of unionized roofing contractors. We do big, difficult work that often involves satisfying a customer and a Code at the same time. And it's important for us to have options, which I mentioned last time I was here.

And that's why I'm really concerned, on a couple of levels, about this proposed deletion of 140.3(b). And this is referenced in existing Section 141, and it's really important to us.

I can understanding intuitively what you said about --

MR. SHIRAKH: And can you explain what that is, the audience knows what that is.

MR. CALLAHAN: It allows a roofing contractor to use a non-compliant product and do a manual calculation based on the total energy, okay. So, we can do an insulation tradeoff, importantly, that goes below the deck, not just above the deck.

And part of the problem I have with consultants and staff people, who never talk to contractors, is simple solutions are simple for you, but not necessarily easy in the field and an option you think is available --

MR. SHIRAKH: Can you recite that section again? What was that, 141?

MR. CALLAHAN: 141, it's Exception 2, Section 141(b((1)(b) and it allows -- it references the overall envelope energy approach of Section 140.3(b) may be used and the standard building shall be based on the higher roof/ceiling insulation of blah, blah, blah. And it then allows you to go into the reference appendices and look

at what type of framing you're looking at in the ceiling and you have an opportunity to put insulation below the deck in situations where you don't have an opportunity to put it above the deck and that can help you satisfy a customer.

So, I'm worried about seeing this disappear and I'm worried about it becoming simplified because you simplified something else in another section of the Code, that I'll talk about in the afternoon when you deal with that where, well, we'll add continuous insulation.

But again, continuous insulation is above the deck and I'm worried that this is going to eliminate other options.

MR. SHIRAKH: Well, if I can respond to that, you're talking about the overall envelope that when I earlier said, you know, we're eliminating, we're replacing it with the simplified performance compliance.

MR. CALLAHAN: Right.

MR. SHIRAKH: But in the place of -- that's the overall envelope is in 143(b). We are actually going to keep an option there. What we're getting rid of is the formula for now, that we could never get it to work. But we are going to have some form of tradeoff.

MR. CALLAHAN: Well, if I may make one comment, I do think it's kind of funny, Mazi, that the CEC changes

the reflectivity and the emissivity requirements of the products and so the market will adjust and manufacturers can change their plans. And you've had this formula sitting here for years and none of these bright computer scientists, guys out there in the market have come up with a program that would do this, and that ought to be instructive about how it's not always as easy for the market to follow the regulations as sometimes thought.

MR. SHIRAKH: Well, actually, we got it right in 2008, but I think the 2008 approach just is too complicated, people can't use it because of all the coefficients and embedded assumptions, so nobody could use it.

And our choice was to keep that or go back to 2005 and neither one was very palatable.

MR. CALLAHAN: As long as we get something we can use. And, you know, Reed mentioned it in terms of the cost analysis and Pat mentioned it earlier with the computer software that you were concerned about seeing before it became part of a regulation.

I'm concerned about that, too. There seems to be a history here of something gets proposed without really soliciting advance input from the industry. We respond to it in some kind of way and then you go back home and you put all this stuff in a black box and you

give us something else, but we don't get to see what's in the black box.

Now, Reed wants to see, you know, what's the formula? What is the calculation that is made to determine the cost and related to the energy savings because we suspect, I think, that some of the assumptions may be wrong or they may be over-simplified.

The same thing here and my only concern in this is that if you're going to come up with something simple involve us in doing that, so that the end-user, the poor guy who has to go out there in the field and try and satisfy a customer, you know, had a part in putting it together and understands it.

Again, what you may think is simple isn't simple for the end-user, you know, or for the Building Department for that matter.

And I'll talk about some other problems with Section 141 later, when we get to it, but you've made a simplified -- you added something to make it simpler that I think is going to make it a lot more complicated, but that's another section.

MR. SHIRAKH: Okay.

MR. CALLAHAN: So, again, it would be nice if you let us into the black box and I think you'd find a lot more cooperation and support if people were engaged

in the actual process, not simply always presented with the result, well, here's what our calculations show. Well, what's the formula. Trust me.

MR. SHIRAKH: No, he's not done.

MR. CALLAHAN: I'm done.

MR. SHIRAKH: Oh, you wanted to respond to one of his points?

MR. ARENTZ: Yeah, this is John Arentz, AEC, I worked in part on the cool roof proposal.

MR. CALLAHAN: Yeah, we talked.

MR. ARENTZ: So, with regards to this overall envelope tradeoff I may be partially to blame. I developed a spread sheet tool that implements all the formulas that are in the current 2008 standards that is that overall TDE tradeoff, but it's been considered difficult enough to use and it didn't have -- it was a pretty simplistic Excel interface with macros, and so it wasn't very sophisticated at all, but it implemented the formulas, hopefully, correctly. But I think it was deemed that that was too difficult to use, that very few people were actually using it, and so that was one of the reasons for not wanting to update it.

With regards to the question of the insulation and options for doing this tradeoff, I think one thing we discussed that we may do, as opposed to just having a

requirement for a continuous insulation is maybe having an equivalent U factor for the assembly, so it would give you the choice to do -- basically, put the insulation where it's needed to achieve the same energy performance.

MR. CALLAHAN: Right, which is in part of Section 141 now, but not in the newer section, which creates a problem.

You know, and I understand what you said about your spread sheet being complicated, there are a lot of components to a building.

But when you're doing a reroof there's really only two, the insulation and the membrane.

MR. ARANTZ: That's right.

MR. CALLAHAN: So it's not a very difficult calculation for us and probably a really simple spread sheet to put together, too. I'd just like to see that remain so that we have that option.

MR. ARANTZ: Okay. Well, I mean the --

COMMISSIONER DOUGLAS: Let me ask the discussion about the spread sheet move into offline communications or informal communications.

MR. ARANTZ: Absolutely.

MR. CALLAHAN: Sure, sure.

COMMISSIONER DOUGLAS: We've had a fair amount of discussion about it and I appreciate you bringing it

up.

MR. CALLAHAN: That's fine. We can talk again and you know my number.

COMMISSIONER DOUGLAS: All right, great. Thank you.

Who would like to come up next?

MS. PIERCE: When a few of you stand between a room of people and their lunch, I promise I'll be short.

My name's Helene Hardy Pierce and I'm Vice-President of Technical Services at GIF, we're a roofing materials manufacturer, who my friend from the coating side of the business referred and said that I'd address something about aluminum.

But I attended the June hearing and provided comments at that time and, subsequently, have provided written comments to CEC staff and I will not repeat that.

For your benefit, though, we are a California manufacturer with multiple facilities in the State of California. We've also invested millions of dollars to be able to produce products that are currently Title 24 compliant.

The changes proposed will have adverse effects and most -- not surprising, because we saw it a short time ago, but everybody keeps talking about reflectivity, but for those of you who aren't picking up on this, the

shift from 75% emissivity to 85% emissivity removes 60% of the products that actually even meet the 67% reflectivity. And I actually think that -- and that's on product availability using the CEC database which, as has been pointed out in the past both in writing and in verbal comments, is a leap of faith in what's actually available in the market at best.

There also may be somewhat of a dearth of comments today because the cost analysis remains incomplete. You know, a couple of data points from actual roofing contractors I don't think is enough to base anything upon. There still was showing a 10% cost premium on the cool side.

And one other point I would like to make is to point out a caution to the entire State of California, you are on a collision course with everything else that's being done in green, and sustainable, and roofing. And the collision course is this, highly reflective materials for the roofing market are very likely to be unable to meet indigenous material requirements of other types of Codes that are barreling down a path, and the high probability of the State of California adopting the IGCC at about the same time that you're trying to adopt this Code.

And when you start talking about reroofing and

50 percent of the materials having to be indigenous that really is setting up a problem, I think, for the State.

So, all of that being said it is only right to acknowledge the efforts of Mazi, and Priam, and staff to maintain an open dialogue with the roofing industry. Thank you.

COMMISSIONER DOUGLAS: Thank you for your comments. Where do you do your manufacturing?

MS. PIERCE: What do we manufacture?

COMMISSIONER DOUGLAS: Where do you do your manufacturing, just curious?

MS. PIERCE: We have plants in Fontana, in Stockton. Help me, Ilene. Shafter. So, yes, and we have about 30 plants nationwide but, obviously, several in the State of California.

COMMISSIONER DOUGLAS: All right, thank you.

MR. SHIRAKH: Thank you.

COMMISSIONER DOUGLAS: All right, other comments?

MR. DESJARLAIS: Hi, I'm Andre Desjarlais, I'm with the Oak Ridge National Laboratory. I lead building envelope research at ORNL.

First, I want to thank Mazi for putting back the prescriptive table requirement. However, I'd like to suggest two conditions to that table. One, that it be

extended to the black roof baseline, which I think somebody else has also mentioned.

But I think more importantly the emittance requirement is not able to be traded off with that table and I would suggest that you add or replace the reflectance value with an SRI value, so that you can also trade off products like bare metals and the aluminum coatings that we were talking about earlier today. Those products effectively cannot be traded off based on the table that you have today.

And my second --

MR. SHIRAKH: Just so I understand, the current equivalency is based on reflectants, you want us to make it based on SRI.

MR. DESJARLAIS: Or both. Yeah, either.

MR. SHIRAKH: SRI is basically --

MR. DESJARLAIS: But if you have SRI there now I can -- I can trade off either emittance or reflectants and that would include -- that would add these products back into the mix.

MR. SHIRAKH: Okay.

MR. DESJARLAIS: And my second recommendation is, again, I think I commend you for being willing to kind of revisit the cost effectiveness issue.

And while you're doing that I would suggest

that one of the biggest problems I see in your cost effectiveness model is that you assume all building envelopes last the same length of time. You know, and I think no roofs last the length of time that you're using in your analysis, so I think you need to revisit the issue of service life of roofs and address the fact that a roof coating is not going to last as long as a four-ply asphalt roof. And each one of these product categories should have a service life that's more typical of what we actually see in the field and I think that will improve your quality of your calculation appreciably.

MR. SHIRAKH: Yeah, the last discussion we had with ARMA and the other hearing, where we agreed to do that and I think, John, you're doing it, aren't you, looking at the --

MR. ARENTZ: Yeah, well that's in progress. I am looking at maintenance issues and looking at for cool roofs relative to non-cool roof, which is what I was recently asked to look at, what are the additional costs to do recoating. And we're taking update costs that we've gotten from, like was mentioned, the limited set of stakeholders for built-up roofs to look at the lifecycle costs.

Now, as far as the issue of the expected lifespan of roofs, now, for the current analysis we

assume a 15-year lifecycle for the lifecycle costs. And I don't -- to date I haven't had good data on what expected actual costs are for different roofing systems to look at. So, if industry and others have some actual data on that, you know, that's beyond some anecdotal stories, I'd be happy to look at that.

MR. DESJARLAIS: No, I appreciate the difficulty of the task you have, but I think we all agree that roof coatings don't cost a nickel a square foot, which is what the basis of the 2002 report was.

MR. ARENTZ: Okay, well, yeah, just to be clear pretty quickly, I know everybody's getting hungry. So, we're not using the assumptions that were done in the 2002 costs. What I have from right now is about $1.50 per square foot for a recoating cost and that's the cost that I'm going to be using in this updated analysis, yeah.

MR. DESJARLAIS: Yeah, that's -- but, you know, at the last meeting what we were referring to is not doing a cost analysis, we were going to just assume that the 2008 cost analysis was valid and look at the cost difference. And since I think we all feel the 2008 analysis, which is really the 2002 report, was flawed, that your basis was flawed. And I think the fact that you're redoing it and using new prices is the right way

to go.

MR. ARENTZ: Yeah, I mean it's difficult because, obviously, any costs we get now are based on what we're getting for current costs from contractors, as opposed to back when that study was done so --

MR. DESJARLAIS: Well, I don't think even the cheapest paint at Sears cost five cents a square foot installed, back in 2002, either. So, let's go eat.

COMMISSIONER DOUGLAS: Thank you. Other comments?

MR. HUTCHINSON: Good afternoon, Tom Hutchinson and I represent the UPM Roofing Association, Commissioner, Mazi, Martha, thank you for the opportunity to speak to you this afternoon, now.

We are also signatory to the Coalition letter and agree with the points brought in there. I would also emphasize that the difference between new construction and reroofing at .67 to .63, we'd like to see that leveled off at .63 as well.

But one point I'd like to make to you is the exception for ballast. You currently have it in there at 25 pounds per square foot, which is prohibitively difficult when the -- from what I understand, the California Code requires for dead loads for roofs to be 25 pounds.

So, for any type of consideration the structural engineer would have to make substantial modifications.

The EPM Roofing Association undertook an analysis, based on using software programs recommended by the CEC and we've submitted that for review, which would show substantial reductions and that will result in energy savings.

And that's the key here is that years ago SPRY and Oak Ridge performed a study and they came up with the conclusion that ballasted roof systems are actually more energy efficient than cool roof systems. So, this should be a system that should certainly be looked into.

ASHRAE, as well as the City of Chicago have exceptions at substantially lower cover rates than the 25 pounds per square foot.

MR. SHIRAKH: What is ASHRAE's?

MR. HUTCHINSON: Seventeen currently and Chicago's at 15.

One of the benefits, perhaps, of ballast it does maintain its reflectivity over time, but it also adds a level of fire protection that's an added benefit.

The one thing that I hadn't seen or thought given consideration was the F-16 climate zones and perhaps that needs to be created over the various climate

zones as well.

And, additionally, it does give designers an option. Do you really want white roofs everywhere? Is it appropriate everywhere?

I heard some discussion about glare. Boy, no one's talking about the glare off of a white roof coming into this curtain wall systems, that's a whole different issue.

But given that we have some energy savings with ballasted, it's given designers various options, and it offers fire protection. I just ask and request that you take a closer look at that tradeoff for there, for ballast there. So, thank you.

COMMISSIONER DOUGLAS: Thank you for being here.

More comments?

MR. FISCHER: Hi, I'm Mike Fischer with Kellen Company and I'm here representing an unholy alliance of various interests who, through Reed's efforts, are holding hands. I'm here representing John Ferraro today, on behalf of the Extruded Polystyrene Association. I'm here representing Jared Blum, from the Polyiso Manufacturers Association, and I'm also representing the Roof Coating Manufacturers Association President, who's Joe Malad, and you've got some of the members, obviously,

here participating.

But I will speak about glare off of reflective roofs. We have an office in Atlanta it's, I think, a three-story building and outside there's a covered walkway area. And it's the south, and one of the staff accountants for our company, his second-story window faces directly opposite that roof system, and while that roof is reflective not for energy reasons, but for comfort of those standing underneath it, it is disruptive to his work because the light comes in directly off that into his office. So, he's getting sunlight from the sun and he's also getting that bounce off that roof system.

So, what this brings me back to is the law of unintended consequences and I certainly appreciate the difficulty that the staff have to try to come up with a way to demonstrate energy savings increases as we move forward. But we have to look at this from the big picture stand point which means you have to look at durability.

As a trade association representative, we can't talk about warranties, we have to look at costs. As a trade association representative, we can't talk about prices, so you have to find another path through the contractors or through other sources to try to identify those costs.

But what we can do is we can talk and work with you on looking at the methodology. As we speak, the U.S. Department of Energy has issued a call for public comments on their methodology they're using for energy savings analysis, so they've actually formalized the process of developing the methodology.

I'm not suggesting that we want to go to that level at this point in the process on Title 24 updates, but I think it speaks to the idea that industry can bring what we can bring to the table to work with staff on looking at all these things from the big picture.

So as I stand here to represent the insulation interests and the cool roof interests, looking at what's reasonable and what's right, making sure that options are there so the contractors are happy, the building owners and designers are happy.

But in the end, if we're able to consider all these variables, how much energy's being saved, what's the impact on sustainability, what's the impact on cost, durability, I think you'll end up with a better product.

And so I understand we're going to be talking about the methodology as we move forward, but I think we need to be clear that it's more than just that, it's also about what's the energy savings, what's the cost value, limiting the tradeoffs. You know, there are times when

caps on tradeoffs make sense. You don't send a kid to school in Minnesota with just wearing really good boots because -- and then wearing a t-shirt and shorts the rest of the time in the winter because on area weighted average they're warm.

And the same thing would be true in Florida or San Diego about just putting really good SPF 50 on one part of your body and so on.

So, the unintended consequences tell me that in the interest of lunchtime we should bring an end to this. I would, obviously, like to offer to bring our groups in, along with our coalition that Reed's put together, which I think for the first time we've got an entire group working together to support the efforts of the CEC.

So, I wish you sympathies, but good luck at the same time. Thank you.

MR. SHIRAKH: Thanks.

COMMISSIONER DOUGLAS: Thank you, thanks for being here.

Other comments. All right, well it's time for lunch then.

MR. SHIRAKH: No, I think there is one coming up.

COMMISSIONER DOUGLAS: Oh, I'm sorry. One more, come on up.

MR. VARVAIS: Yeah, my name's Dan Varvais with the Spray Foam Alliance and Environmental Materials Science, and my comments are real brief.

One, we support the -- I went blank -- the air ceiling in 140. And there seems to be a misplaced note on Table 140.3 (a)(b) and (c), where you're requiring QII for the application of close-up polyurethane foam in these buildings, and you're excluding all other insulation materials. I'm just pointing it out, so I think maybe that's a misplaced note.

MR. SHIRAKH: I need to look at it.

MR. VARVAIS: Okay.

MR. SHIRAKH: Ron's here, if he can respond, but we'll look at it.

MR. VARVAIS: Thank you.

MR. FLAMM: Could I interject something, please, this is Gary Flamm. I know, I've watched the court reporter's over time that they always get a business card and, Dan Varvais, I would not know how to spell your name if I didn't see it.

So, I would recommend that everybody that has spoken thus far would drop a business card in the lap of our court reporter, so that he can spell your names. Thank you.

COMMISSIONER DOUGLAS: Thank you, Gary. With

that, it's 1:20, we'll give you an hour for lunch because sometimes it isn't easy to find lunch in less than an hour.

If you want to get lunch quickly, you can get it on the second floor here, in the Energy Commission, and they have sandwiches, but they probably don't have enough sandwiches for everyone here.

So, we'll see you at 2:20 and we will start at 2:20, thank you.

(Off the record for the lunch recess at 1:22 p.m.)

(Reconvened at 2:21 p.m.)

MS. BROOK: Good afternoon, this is Martha Brook, we're going to continue the 2013 Nonresidential Standards Workshop.

The next section we're going to cover is Section 140. And I think we might have a couple breaks in here -- oh, what happened here? Did I do that? Okay, good.

All right, so we're going to cover Section 140.4, Prescriptive Requirements for Space Conditioning Systems.

And we'll start through this and the first item that is an update is Item (c), power consumption of fans. We removed a requirement for VAV fans that are greater

than 10 horsepower to be variable speed. So, it looks like a deletion in the Standard, it's actually getting replaced with new text that I'll cover when we get to Item (m).

And then we've also added efficiency requirements for HVAC pump and fan motors, 1/12 horsepower to one horsepower.

And in space conditioning zone controls we've reduced the degree to which primary air is reheated, so trying to reduce reheat in space conditioning systems.

Item (e), in the economizers, direct expansion systems with economizers must cycle compressors off when economizers provide partial cooling. Effective January 2015 direct expansion systems must be able to stage or modulate capacity.

The reason for this staged date of implementation is just to make sure that there is more products now that can meet this requirement. There are products now that can meet it and it's cost effective, but we think if we, you know, notice people by our Code adoption, manufacturers, that this is a requirement that there will be even more products and the cost will come down.

So, we still use current costs for our cost effectiveness, but we just want to give the industry a

little bit more time to respond.

Economizers and return air dampers on individual cooling fan systems have requirements for lots of things, warranties, drive mechanisms, reliability, leakage, adjustable set points, damper control, sensor location specifications, sensor accuracy, sensor calibration data, prevention of sensor false readings and relief air systems are all prescriptively required in the Code now.

There's a Table 140(e)-A, Economizer Tradeoff Tables. They're not currently updated, but they will be. So this is a table that lets you not install an economizer if you have an increased efficiency of your equipment, and we're going to be updating those efficiencies to take advantage of some national -- national code analysis that's been done.

And then we've also updated Table 140(e)-C, which is the Air Economizer High Limit Shutoff Control requirements.

Item (i) in the 140.4 is minimum chiller efficiency and we're -- we're using the chiller efficiency tables from ASHRAE 90.1 in our Section 110, but we're saying in this Code requirement that chillers must meet or exceed Path B efficiencies listed in that table. So, there's Path A and Path B efficiencies listed

in that table, but our requirements for our standard is that chillers meet or exceed Path B, which is more stringent.

Limitation of air-cooled chillers, chilled water plants can provide up to 300 tons with air-cooled chillers, but no more.

This is the new fan control section, Item (m), multiple- and single-zone systems must vary the air flow rate as a function of actual load, either two-speed or variable speed with fan motor demand limitations for single-zone systems that demand limitation that's less than or equal to 50 percent design wattage at 66% of design fan speed and for multi-zone systems that's less than or equal to 30% design wattage at half of the design air volume.

And this replaces existing variable air volume control for single-zone system code and the previous code I mentioned, power consumption of fans for VAV fans greater than 10 horsepower.

Does anybody want to talk about that Section 140.4?

I'll probably just keep going and if you think of anything that you want to talk about, we can bring it up in the next break in the presentation.

And there's nobody online. Ron, is that

correct? I don't know what's going on here.

MR. DESJARLAIS: This is Andre Desjarlais with AHRI.

MS. BROOK: Yes.

MR. DESJARLAIS: Martha, can you hear me?

MS. BROOK: I can.

MR. DESJARLAIS: Okay. Yeah, I think we have submitted comments, you know, on the light commercial HVAC equipment earlier and I think, you know, with respect to some of these Code changes our members do have some concerns.

I just want to let you know that we are putting together some data and that will be submitted in our comments by the 31st. So, you know, just wanted to let CEC know that you can be expecting that data shortly from us.

MS. BROOK: Oh, okay. All right and I'll go back and look at your previous comments and make sure that we respond to those as quickly as possible.

MR. DESJARLAIS: Right, I see we had copied Jeff Stein as well, from Taylor Engineering. We did receive a response, a letter from him as well. So, you know, we haven't really responded to that letter. We're still working on the data and the analysis.

MS. BROOK: Oh, okay. Okay.

MR. DESJARLAIS: As soon as we get that in we'll share that with CEC.

MS. BROOK: Okay, great, thank you.

Yeah, Pat, I knew if I gave you a minute I knew you'd --

MR. SPLITT: I had to think for a second, but I came up with something. Pat Splitt from APTEC. I'm not going to be here tomorrow for the residential so this comment sort of deals with both of them.

MS. BROOK: Okay.

MR. SPLITT: By I do a lot of hydronic system designs and now for homes going to zero net energy, or commercial buildings, you need basically all-electric systems, so I've been trying to use air/water heat pumps.

And I can do that but I've been having problems fitting it into the compliance software because it doesn't really handle it very well and I just want to make sure that there's going to be some way for the new software to handle it. And also, maybe a methodology for getting things listed in the appliance directory where nationally there isn't really a test procedure, yet.

Like for the air/water heat pumps there's a lot of variable flow systems that people keep going back and forth and nobody can make up their mind.

But these are all systems that have been sold

and installed in California for years and years, and it would be nice to be able to do it officially.

It's not as much of a problem on the non-res, commercial side because if you go prescriptive for mechanical it's very simple and you can actually model these things will minimum efficiencies and still pass.

But on the residential side I'm killed if I model an air-to-water heat pump water heater as a .97 energy factor.

MS. BROOK: Oh, okay. Okay.

MR. SPLITT: So, it's the same problem, but it's more of a problem on residential.

MS. BROOK: Okay.

MR. SPLITT: But for both sides there's a lot of equipment that's out there that doesn't quite fit into any bin, and people want to use it and there's going to be a lot more of it as you go to zero net energy, and want to do electric, and make sure that there's some easy way of doing it. Or if somebody comes up with some new piece of equipment that they're just developing and they want to try it out that, you know, there should be some trial method or something like that.

MS. BROOK: Well, what we talked about on the non-res side and we haven't formalized this, but what we've been talking about is for those either exceptional

designs or unique operating schedules, things that are outside of the bounds of the compliance software that we could allow those things to be modeled, but there's a little flag that gets checked that says there needs to be some sort of review --

MR. SPLITT: Uh-hum, yeah.

MS. BROOK: -- by a certified or some authority group that is, you know, deemed acceptable to review compliance.

MR. SPLITT: Yeah, there should be something between doing nothing and what we have to do now is, basically, if you want an exceptional design that you have to create a whole new program. You know, it's just --

MS. BROOK: Right, right, right, okay.

MR. SPLITT: -- it's just prohibitive, you know, and some people just give up.

MS. BROOK: I agree. Uh-hum, I agree. Okay thank you.

All right, we'll keep going. This is not me, this is Gary.

MR. FLAMM: Good afternoon. So, the next three sections I'm going to cover are all nonresidential prescriptive lighting standards. So the first section, .6, is non-res indoor, .7 is outdoor, and .8 is sign

lighting.

So, the non-res indoor has been edited for clarity. The default wattage exclusion for portable lighting, the issue is that portable lighting is usually installed after the building inspector has left, so we have assumed that the typical office puts in at least .2 as a default.

And if the -- at the time of design if it's known that more than .2 is put in, then they're supposed to claim that on the compliance form.

And we're changing that to .3 with a corresponding reduction in the general lighting in the ceiling of .1.

So this is just a default number. Because no people have no way of knowing the portable lighting load at this point, they claim the default number.

There's also an option that in certain spaces, big spaces, where they need a redundant lighting system, where they're only going to use one for one type of application and the other for the other application, that's been edited for clarity but, also, it's going to require acceptance testing in order to be able to claim that you're putting in that redundant lighting system.

There are also a number of power adjustment factors, that's where the actual connected load gets to

be reduced by a percentage depending on special controls that are above the controls that are required. And so that whole section has been edited for clarity and there have been a number of changes. The daylighting power adjustment factors have gone away because now daylighting is mandatory, and so that whole section has been changed.

And there's a new power adjustment factor for occupant sensors in open offices. So if there's an open office for which there will be office furniture, and somebody puts in ceiling-mounted occupant sensors, depending on whether they're controlling 125 feet or two something, there's three different tiers, they get to get additional credit, which means that they get to -- they don't have to claim as many watts as they actually installed in that space.

The lighting wattage excluded, there's a whole list of applications that don't have to comply with Section 140.6 and one of those exceptions was video conferencing studio lighting, which said that you didn't have to put in -- you didn't have to claim two and a half watts, that's what the current standards say, for video conferencing studio.

And the problem with that is it's very clumsy in compliance forms how to do that. We basically do that on the back of a napkin right now, when somebody is

accounting for the connected load.

So that has been removed from the excluded wattage table list and it's been put into the area category table, along with what we call a use-it-or-lose-it adder, so we just moved that to make the compliance forms more elegant.

And there's a new ASHRAE, IES just came up with a new elevator standard and we add it to that list of excluded applications, more for clarity. It's been unclear in the standards whether elevator lighting was or was not part of the building load.

The tailored method, the narrative for how to comply with the tailored method of compliance has been expanded significantly and gone through step by step on how to comply with the tailored method.

The Illuminating Engineering Society comes out with a new handbook every ten years and they just came up with the tenth edition this year. In the previous two cycles we referenced the ninth edition.

And there were some significant changes in the tenth edition. Part of the tailored method of compliance is to identify an illuminance category, which was listed as A through G.

And as a way to map the tailored method to the new tenth edition handbook we changed those A through G

designations to lux values. And so wherever the 2008 standards talked about A through G, we talk about lux values, which is a metric version of foot candles.

These are the tables that are at the end of Section 140.6. 146.(a) are lighting power adjustment factors. These are the credits. This is the table that the narrative refers to.

Table 146.(b) are the complete building method lighting power density values, how many watts you can put in if you're using the complete building method, which means that you're looking at the square footage of the entire building and you're multiplying that times your allowed wattage for lighting.

There were edits -- and there's some of those applications went down, some of the allowed lighting power densities in the complete building method have been reduced and all of that information is online.

Table 156(c), the area category method, that's where you're looking at basically room by room. Some of those lighting power densities went down.

Also, I'm going to talk about the tailored method, Table 146 -- 140.6(d). A lot of the function areas that were in the tailored method have been moved to the area category method table, so the tailored method table has been significantly reduced.

And a lot of the use-it-or-lose-it allowances are as footnotes in the area category table.

Now, the difference in the area category table, as you look at room by room with the tailored method, you not only look at the room, how many watts you get for general lighting, there's also an allowance for wall display if you need it. There's an allowance for floor display lighting if you need it, and for very valuable merchandise and ornamental lighting. And each of those layers are use-it-or-lose-it.

Table (e), mounting height adjustments has been adjusted in accordance with the CASE Report.

There's a new table, 140.6(f), room cavity ratio equations. Those ratios -- those equations have existed mixed within the narrative portion of the standards and they disrupted the flow of the narrative, so I just put them into a table.

And in the narrative I now, instead of -- you know, you have to go a half a page to pick the narrative up again, the narrative continues and the calculations have just been moved to a table.

And Table (g) was categories A through G, illuminous categories, and that has been changed to lux values and a lot more rows in it than there were in the previous table.

From there we're going to go to the outdoor lighting, the changes in the outdoor lighting power section. It has been edited for clarity.

Some of the lighting power densities have been reduced and there were -- the way the outdoor lighting standards work is it's called a layered method, is what we call it, where one layer of wattage is available for the hardscape. You get another layer, it might be for the same area, let's say it's a sales lot, and then you get another layer for sales frontage.

And the total allowed lighting power for the site is made up of all these layers of all the different function areas.

There was one additional function area that was for local ordinances and it has been determined that that is no longer needed, so that allowance has been removed.

And the last section is Section 140.8 and that's for the sign lighting power, and that has only been edited for clarity and there have been no substantive changes to that section.

And any comments on that -- those sections?

MR. SHIRAKH: So, any comments on lighting sections online?

MR. YASNY: Gary, you know, we missed somebody on the last section and he made a comment that I can

probably just read, and then he's going to follow up on in writing.

And this had to do with economizers and two-speed fans. "We have conducted studies that are not yet complete" -- oh, this is Richard Lord.

"We have conducted studies that are not yet complete, but Jeff Stein used an arbitrary D rate of the economizer by 25% to justify his change, which he based on monitoring of one unit in the field. What he's doing is de-rating some conditions where just the economizer is being used, so the savings are significantly over-stated. He also has defined requirements that products are not available for and only likely will not be available in volume at the implementation date. We will file formal comments, along with the technical analysis."

Hold on. "Along with the technical analysis period."

MR. SHIRAKH: Is that it?

MR. YASNY: That's it.

MS. BROOK: Okay. Okay, thank you, Dick, and we will look forward to seeing the data and your comments in writing.

MR. JOHNSON: This is Karl Johnson. I had one question, the elevator requirements what -- could you specify what those are?

MR. FLAMM: I don't know the -- all I know is that ASHRAE came out recently with some elevator requirements and I don't have them memorized. I can get at -- you know, I have them. I think it's just a lighting power density, I don't believe it's by level.

But there is an assumption that elevator lighting is exempt from Title 24 and a lot of -- even though the standards are silent on that, that's always been assumed.

And not only that elevators are really an appliance because they're assembled offsite and they're brought and put into the building.

So just for clarity, because ASHRAE just did something, I just said, well, let the standards say something to go along with what everybody assumes they say anyway, which is that elevators are not covered by Title 24.

MR. JOHNSON: I had a follow-up question. I've been doing audits with the universities on their places, and elevators still seem to have T-12 lamps in them and so does modular furniture underneath. It seems like we don't have a Code to cover those things, so they're still using T-12 magnetic ballast kind of technology in those spaces.

MR. FLAMM: Well, there's two issues there,

Karl. First is I would love somebody to propose an elevator Title 20 standard.

MR. JOHNSON: Yeah.

MR. FLAMM: Because I think it's appropriate. And I believe that the lights can be put to sleep because they already have the digital control on them.

MR. JOHNSON: Yeah.

MR. FLAMM: And the second thing is we -- Title 24 cannot regulate furniture because it's not there when the building inspector inspects the building. So it's really not a Title 24 issue.

MR. JOHNSON: But could Title 20 address that, as well?

MR. FLAMM: I think there's some Federal preemption, but outside of that I -- there is a Title 20 regulation for T-8 lamps, for under-cabinet furniture light that is a T-8 lamp is regulated by Title 20, but there are some Federal preemption issues that we're pushing against.

MR. JOHNSON: Well, with the CEC research that might be morphing towards LEDs as a standard.

MR. FLAMM: Correct.

MR. JOHNSON: So, you should look at those.

MR. FLAMM: Okay.

MR. GABEL: Mike Gabel. This is really not so

much about prescriptive lighting, but the way it sets the baseline for performance. And when it comes to secondary side-lit day-lit zones the concern is when you get to the ACMs that unless you put all kinds of notices all over the forms that someone has not modeled the space, standard design will set a budget without those controls.

So, I'm just sort of giving you the warning when you get to the performance method it's probably going to take people a year or two, for building departments to even realize people have to put that into the performance method. Because if it's mandatory -- excuse me, if it's prescriptive and you don't model it, it will just disappear and the energy budget will be one percent higher or something like that. So, I'm just going to put a little placeholder for that.

MS. BROOK: Are we good, we're ready to move on.

MR. FLAMM: Thank you.

MS. BROOK: Okay, 140.9 is a new section. Was there a -- did there used to be a 140.9 Section?

MR. SHIRAKH: Yes, there was a 149, which was additions and alterations for nonresidential buildings. That is now called 141. So, 140.9 is this covered processes.

MS. BROOK: New, okay.

Okay, so these are prescriptive requirements for covered processes. We have three items under this section, they're all new.

The first is prescriptive requirements for computer rooms or data centers. The first is an integrated economizer requirement for each cooling fan system to meet a hundred percent of the expected load. And the calculation method for estimating that expected load will be approved by the Commission.

Controls that prevent reheating, recooling or simultaneous heating and cooling, non-adiabatic humidification will be prohibited.

Limitation on fan power, two-speed or variable speed control on fans with motor demand limitations and then air barriers for containment to prevent discharge air from recirculating.

The next item is prescriptive requirements for commercial kitchens. The first requirement is to reduce short circuiting of kitchen exhaust hoods, so the replacement air is limited to 10% of the hood exhaust air flow rate.

There are maximum exhaust flow rate requirements in Table 140.4(b). And that's a mistake, it should say 140.9(b).

Limitations on heated or cooled makeup air for

spaces with exhaust hoods, transfer air is more or equal to 50% of the replacement air. The demand ventilation controls need to be on 75% or more of the exhaust air system.

Energy recovery devices with recovery effectiveness greater than 40 percent on half of the total exhaust air flow, 75% or more of the makeup air volume needs to be unheated or uncooled. And there will be kitchen exhaust system acceptance testing requirements delineated in the nonresidential Appendix 7.

The last item under this prescriptive section for covered processes is prescriptive requirements for laboratory exhaust systems. And there's a single item here, zone exhaust and makeup air flow rates shall be capable of reducing to regulated minimum circulation rates or a rate necessary to maintain pressurization, whichever is larger.

And I think that's the end of this section. Does anybody want to make comments on covered processes?

MR. SPLITT: I gave you a bye in the last one. Pat Splitt from APTEC, just one question on -- you had a note there on kitchen exhaust hoods that only 10% of the, what was that, makeup air can be provided or what was that?

MS. BROOK: I'm getting there.

MR. SPLITT: Yeah, replacement air limit to 10% of hood exhaust air flow rate. So, if you have a manufactured exhaust hood that brings in its own makeup air, you say that amount of air can only be 10% of the exhaust and the other 90 percent has to be --

MS. BROOK: Yeah, so basically you can't short -- you can't install short circuit hoods in California anymore, basically, right? I mean the idea is that they -- they waste so much energy because once you start doing that short circuiting then the containment of the fumes you're trying to exhaust drops way down, and so you have to beef up the exhaust rate to get the containment and, you know, the stuff you're trying to exhaust up through the hood. And so that's the reason for that requirement.

MR. SPLITT: But this is just talking about replacement air in the hood, itself, or just replacement air anywhere in the kitchen, you know?

MS. BROOK: Oh, I think it's for the hood because it's really focusing on limiting short circuiting of the hood.

MR. SPLITT: In other words if you didn't provide it in the kitchen, then that air has to be -- it's going to sucked out of, say, the restaurant area. I mean all that area has to be made up and be cool.

MS. BROOK: And that's where these other transfer air requirements come in because the transfer air is where it would come from, the serving room or the eating room, and so that -- so that's basically what they're saying.

MR. STEIN: Martha, this is Jeff, maybe I could provide --

MS. BROOK: That's fine.

MR. STEIN: Yeah, this is Jeff Stein, I was one of the authors of this proposal and I can give a little more clarification on it.

MS. BROOK: That's great. And Jeff, could you just speak up a little bit, please?

MR. STEIN: Sure. So the 10% limitation there is basically, as Martha said, we're pretty much outlining a very specific and very rare type of hood in California, which is a short circuit hood. And the idea with the short circuit hood in theory was that if you provide the makeup air directly inside the hood, then you won't have to condition that makeup air and you'll save on conditioning makeup air to the space.

The problem was there was some research done that showed that they don't work. And as Martha described, what ends up happening is you have to increase the makeup to the room to get adequate capturing

containment.

So, there are no limitations on bringing makeup air into the room, itself. Or, actually, there are separate sections that describe that. But this particular one, the first one here is basically saying you can't inject more than 10% of the makeup air directly into the hood, the rest of the makeup air has to be provided into the room, itself, because that's the only way to actually get the hood to capture and contain.

And there are a number of products -- less than one percent of hoods sold in California are actually short circuit hoods, so this is not going to make very much difference on the marketplace today.

MR. SPLITT: Okay, so this is then we're talking about only where that air is injected directly into the hood. So we could have --

MR. STEIN: Right, you can't inject more than 10% of the air directly into the hood.

MR. SPLITT: So there could be a system that actually is providing makeup air but it's just letting it into the room, as long as it doesn't put it into the hood, itself.

MS. BROOK: That's right. That's right.

MR. STEIN: Yeah, and there are a number of designs that do that, that integrate makeup through the

hood, but the makeup is then delivered to the room before it goes back into the hood, and so that is not being affected by this requirement.

MR. SPLITT: Okay, I understand. You might want to put a picture or two in the manual.

MS. BROOK: Oh, no, there's some really good pictures in the CASE Report, so we'll definitely do that.

MR. STEIN: Martha, if I could, I wanted to clarify a little bit, too, about some of the other bullet points on your slides. Those -- most of those are actually from a menu of options and they're not all required. You don't have to do demand control ventilation, and energy recovery, and the 75% percent unheated/uncooled.

MS. BROOK: Oh, I --

MR. STEIN: Those are all options and you only have to do one of those and it's only for large kitchens, so it's not quite as drastic as it might look on this slide.

MS. BROOK: Okay. Well, appreciate you clarifying that and I apologize for misrepresenting the proposal.

So which of those, again, are choices, demand ventilation, energy recovery or --

MR. STEIN: Well, probably the bullet that says

limitations on heated or cooled makeup air --

MS. BROOK: Uh-hum.

MR. STEIN: -- the four bullets below those should be indented again, so there are four options that are available.

MS. BROOK: Okay.

MR. STEIN: If transfer air is available, then you don't have to do any of the other options.

MS. BROOK: Okay.

MR. STEIN: If transfer air is not available, then you have to choose from one of the three other options, the DCV, energy recovery, or partial conditioning of makeup air.

MS. BROOK: Okay, so we'll make the clarification, we'll fix it on the slide because it will be -- it is posted and we'll repost it. And then, obviously, it's correct in the -- well, I'll make sure it's correct in the standard update as well.

MR. STEIN: And it does -- it does only apply to large commercial kitchens over 5,000 CFM.

MS. BROOK: Okay, great. Thank you.

Any other questions, or comments, or clarifications on covered processes? All right, we're on to --

MR. STEIN: Martha, I think --

MS. BROOK: Go ahead.

MR. STEIN: -- if you don't mind, Mark Heydeman had a comment, he's trying to unmute himself as we speak.

MS. BROOK: Oh, and we're going to talk about data centers now?

MR. HEYDEMAN: Oh, no, no, I wanted to talk about covered processes.

MS. BROOK: Okay.

MR. HEYDEMAN: Sorry about that. I had unmuted myself on the WebEx, but not on my phone.

MS. BROOK: Okay.

MR. HEYDEMAN: So just one item that came up, we had envisioned all of these things living in Section 144 and now you have all of the processes, lab exhaust, and kitchen exhaust, and data centers in a separate section, which I think is fine.

But we want to make sure that we don't lose all of the mandatory and other prescriptive measures. In the case of the data centers, the economizer requirements are in lieu of the 144 Section economizer requirements, but all of the equipment efficiencies and most of the controls we want to have applied to these cover processes as well.

And we can work with you offline to work on the structure of the language. But by putting these things

off in a separate section, we need to make it very clear that all of the other requirements of the standard also apply to these facilities.

MS. BROOK: Okay, yeah, we think we've -- well, we tried to do that and maybe we didn't do it the way that you would recommend and we definitely should be talking about that, and we can do that.

MR. SHIRAKH: And usually what we do within the prescriptive section, we refer back to the mandatory so people can see there are mandatory requirements.

MS. BROOK: Okay, okay.

MR. SHIRAKH: That's what we do like in Section 152 for nonres -- I mean res, we refer back to 150.

MR. HEYDEMAN: Yeah, I just wanted to make sure, Mazi and Martha, that everyone that's listening understands what the intent is and it's clear in the CASE Reports. But because of the way this is structured I think it could be viewed that these are not -- these are in lieu of the other requirements and I just want to make sure that that's not the case.

MS. BROOK: Okay. Yeah, we'll definitely work with you on that. Thank you, it's a very good point.

MR. YASNY: And perhaps Robert Nakamura wants to say something. Robert? Never mind.

MS. BROOK: Okay. I think we're on to Mazi,

now. Oh, no, this is Gary and --

MR. SHIRAKH: Right, this is going to be Gary and Mazi show.

MS. BROOK: Yeah.

MR. FLAMM: Okay, this next section that we're going over is formerly Section 149. We're calling it 140.1. This is one of those results of we were running out of numbers and this is one of the reasons, we have a new Section 140.9.

So, this is 141 and it's nonresidential additions, alterations and repairs. So, of course, it's been edited for clarity. There are added exceptions for solar-ready requirements when there are additions and alterations that do not have a solar zone.

So we didn't go over the solar --

MS. BROOK: We're doing that tomorrow.

MR. FLAMM: We're doing that tomorrow. Okay, so this is an exception that you don't have to do that if you don't have the solar zone in additions and alterations.

When a space conditioned system is altered the unitary system with an economizer shall have control systems that cycle the compressors off when economizers can provide partial cooling.

So my mechanical whiz, you want to say

something about that, Mazi?

MR. SHIRAKH: It is just what it says.

MR. FLAMM: Okay, we shall move on and this is Mazi.

MR. SHIRAKH: So back to our favorite topic, different context, this one is within alterations. So the requirements are slightly different. This section specifies the reflectants requirements for lowest load proofs in alterations is .63.

If you recall from this morning, the recommendation for newly constructed buildings the reflectants was .67. So this is different in recognition of the existing market and alterations are different, and many products that would be available in new construction would not be available in existing homes.

So, this .63 reflectants is required in all 16 climate zones. Again, the maintenance of .85 and if you want to comply with SRI, that would be an SRI of 75.

As in the newly constructed buildings we are providing continuous insulation as a prescriptive alternative to cool roof requirements in lowest load applications. And the reflectants go down to .45. I think we provide prescriptive alternatives and I think the range actually goes down lower than .45, it goes down to .25 right now for continuous insulation tradeoffs.

For the steep slope roofs the requirement is pretty much the same as this morning, reflectants of .20 and a thermal maintenance of .85, and an SRI of 16.

So this is the performance approach, the baseline for additions and alterations. And, essentially, when altered components are -- a specific feature in the building is altered that's considered an altered component, and there are rules for how it's treated within the performance software.

And so we're -- set the rules and this is continuation of previous rules changed slightly, that when you alter components, it's called, considered an altered component, it must meet the mandatory requirements. In general that's the logic. It must meet the mandatory requirements for that altered component.

So, like if you touch a wall or a window, it should meet mandatory requirements for that altered component.

So, if you just meet the mandatory requirements there is no penalty or credit. If you do an alteration and it exceeds the mandatory requirement for that altered component, but does not actually meet the prescriptive requirement for that altered component you get partial credit relative to the actual value and the mandatory requirement for that altered component. So, there's

partial credit.

And, now, if you alter that component and bring it up all the way to the prescriptive requirements, then there's actually a big credit which is relative to the existing condition prior to alteration and the prescriptive requirement.

So, the whole intent here is that if you touch something, you're trying to make an alteration, bring it up to the prescriptive requirement, get the full credit. But at least if you bring it up to more than mandatory requirements, you get a partial credit.

So, I'm going to be working on this with Mike Gabel. And the residential is pretty much the same and you'll see that tomorrow. And Jon McHugh, I know there's some issues still related to this and we can work on it a little bit later.

We're back to Gary Flamm.

MR. FLAMM: This next section is going to be about lighting alterations. The current standards, basically, if you replace more than 50% of the illuminares in a room, you have to bring that room up to the current requirements, power requirements.

And if you touch the wiring, you have to bring the lighting controls up.

And if you subdivide a room, each room has to

have the manual switches to be able to turn it on and off.

That's where we are, now. So, now I can explain where we've gone to. We've defined three different types of alterations, we actually have definitions here. Illuminare alteration, illuminare modifications in place, and lighting wiring alterations.

Illuminare alterations are basically if you add illuminare, if you disconnect illuminare from the service and put it back, or if you do a gut rehab and put in new illuminares, those are all illuminare modifications.

Illuminare modification in place means you basically leave the illuminare housing in place and you gut the inside of it and you put new guts in it. And in doing so you change the technology, you change the number of lamps, the type of controls, some major modification to that illuminare.

Now, the current standards say that replacement of lamps, ballasts, lenses, lamp holders is not an alteration covered by Title 24, but that is changing.

So, ASHRAE 90.1, where we've had 50% threshold, recently went to 10%. So, if you go into a room and you change 10% of the illuminares, you have to bring them up to the current power requirements.

So, we're following ASHRAE 90.1 and so we've

got that same threshold, and it's always per room. The reason we do that is if you change a bunch of illuminares on the floor, you shouldn't have to -- well, let's say you change all the illuminares on one floor, but you don't touch the second, third, fourth and fifth floor, you should only have to bring up to date the floor that you touched or the room that you touched.

So that's why we've always looked at the alteration per room because you could go into a room and do a very minor modification and that could be a repair.

Now, one of the things we're introducing this time in illuminare modifications in place, what was proposed by the CASE team was bringing ballast replacements as a compliance requirement. And this is where we ended up morphing into illuminare modifications in place.

And so the number was bantered around and we ended up at 40 in what is considered a building space. And a building space is defined as a single floor in a multi-floor, a single tenant lease space, and there's a couple definitions of what's a building space.

So, there's two thresholds. We didn't want to have routine ballast change outs, maintenance, repairs to be considered an alteration that's regulated by Title 24, so we came up with this two-level requirement.

So, first of all you have the 10% threshold in a room, which is similar to what we've always had and a minimum of 40 illuminare modifications in place in what's called a building space which is, again, the total lease space, the total single floor.

And so there's two levels and I think it's confusing a little bit to see those two levels. And what we're trying to capture is to not -- to note make routine ballast change outs to be regulated by Title 24.

And so to capture all of this we put this in a table format. Jim Benya had actually promoted this very strongly and it seemed to be well received. So instead of a narrative we have all of this construct, except for wiring alterations, in a table format.

So, what we say for illuminare alterations, each room that has greater than 10%, if you have less than or equal to 40 building luminate alterations of the general lighting, and you put in 85 percent of the allowed lighting power density you don't have to put in as many controls as if you put in 100% of the allowed lighting power density. This is why we had to put this on a table.

So, the stakeholders said, you know, I can save just as much energy with installing less power than I can with multi-level lighting.

So, the requirement we have in Section 131 for the multi-level lighting, which requires basically a four-step ballast, we were trying to address that issue here. So those who are in the alteration business, if they only put in 85% of the power, they don't have to put as many controls in, they only have to put one step in between zero and a hundred.

If they put in a hundred percent of the lighting power density, then they basically have to put the four-step ballast.

So those are the two alterations are very similar, whether you install 85% of your allowance or 100% allowance for either illuminare alteration or illuminare modification in place determines how many controls you have to put in for the multi-level control.

So, sorry for the expanded definition, but I felt like I needed to do that. Comments?

MR. CALLAHAN: Good afternoon, Bill Callahan, Associated Roofing Contractors.

In the earlier session there were a number of comments made about the new Table 141.0(a), which is a tradeoff table for insulation. I like it conceptually, it saves you a step, instead of doing a manual calculation, it's very easy to see.

Should it go down to .00? Perhaps. I would

support that, as other commenters have mentioned.

Does it need more information because of emissivity tradeoffs? Possibly.

My concern, though, is a simpler one. This table's in the wrong place in the regulation. It doesn't belong here, it belongs right in front of Exception 2 to 141.0(b)(1).

You have eliminated the existing Exception 1, which had to do with taking off the gravel in a roof and removing it to a certain level and putting it back. It should really go there.

And the reason is this is an option and it's in between two prescriptive requirements and it's going to confuse people.

What's going to happen is that a contractor or building official is going to look at this and say, okay, you've put in a roof membrane of .5, instead of -- and because of that you get to put in 6-R, to trade off for that because you're putting in R-6 on the roof deck.

Then you get to the next requirement, which is the minimum insulation requirement for reroofing, that 6 should not count against the minimum 8 or 14, but that's exactly how they're going to look at it because one follows the other.

MS. BROOK: Okay.

MR. CALLAHAN: And you should move this after the minimum insulation so everybody knows, first, it's R-8 or R-14, and then after you've done that you have the opportunity to do other tradeoffs for the reflectivity.

MR. SHIRAKH: Thank you.

MR. CALLAHAN: Otherwise, you know, you're going to have compliance problem and a lot of confusion, and that's my comment.

MR. SHIRAKH: Thank you, it's a good point.

MR. CALLAHAN: Thanks.

MR. SHIRAKH: Did you take note?

MR. HITCHCOCK: Reed Hitchcock, Asphalt Roofing Manufacturers Association. It probably goes without saying, but I just wanted to make sure that, you know, when people look at the transcripts that we point them back to the right discussions. And I just want to reiterate earlier concerns raised about cost justification, some of the interaction we've had with CEC and direction forward at least at this time on reevaluating the baseline cost justifications. That's all I had, thank you.

MR. SHIRAKH: Thank you, Reed.

MR. THOMAS: Gene Thomas, College Action. And, Gary, I got a handout for you, an extra one that was going to go to Jim.

I had emailed you previously the wrong version, this is the one that had my comments in it. And first of all I want to say it's been really good working with everybody on the CASE Team, Gary, and Jim, and John, and Mudit (phonetic), and Owen, and everyone else and appreciate the opportunity to give input.

At the last conference call that we had on this issue, on the table, and specifically I'm talking about from the stand point of lighting, alterations and retrofits. I thought we were really close to having a consensus, you know, a fairly decent consensus from the stakeholders that were in on the call. There seemed to be some buy-in on a higher number of ballasts than 40, but we appreciated the table and we kind of liked where things were sitting at that point.

When I saw this posted it -- there were some -- a couple good additions to it, but there's a couple things that seemed like a big step backward from our stand point.

And the first one of it, in both tables, C and D, is the room-by-room requirement, which the way it looks to us is that that would be a real significant cost adder compared to the building space definition that you have here in 149(d). We think that's great, that clarifies things a lot and it makes sense to us to have

that in Table C, as well.

I mean in the context of the retrofit industry you've got, and you've described it briefly, but you've got a situation where now the threshold is 50%, that's being brought down to 10%, that's huge.

Then you have the -- right now the basic exemption for lamp ballast retrofits, which comprises a huge proportion of the energy savings that the retrofit industry and programs, like ours, deliver.

And we had in the last iteration, you know, talked about 40. We weren't terrifically comfortable with that but -- but it was if you have 40 or less, you can meet the existing controls requirements, and switching requirements, and dimming, multi-level requirements, but you don't have to meet a lower LPD threshold.

That's more stringent in this and we don't -- we don't think that makes sense. We think it makes sense to have the 40 fixture cutoff point apply to both the alterations and the alterations in place. For those small, hard-to-reach customers, that we don't think that 40 covers nearly all of them, but it does cover a lot of them. And for us it makes a lot of sense to have that.

And this is also another differentiation that wasn't in the previous versions, separating out the

alterations in place from alterations, because they were both treated the same except that the lamp ballast are completely exempt at this point.

So we think that it's important to have those apply to both of these tables and we think if they -- if that small customer makes that -- you know, has 40 or fewer that a hundred percent of the allowable LPD should be sufficient.

Because the one thing that we all have to keep in mind with this is the customer can say no, and they say no quite a few times now, even the way things are. But if you're imposing these significantly higher costs on a room-by-room basis, that can considerably add to the overall cost of the job, they either won't do it in that room and proceed with the rest, and then you have a lot of differentiation of lamp types, and you're stranding that older technology, or they'll just say no to the entire retrofit and then you don't get any savings at all.

And like the gentleman earlier today referred to, when you -- if you don't -- the controls being at the top of the loading order, if you don't get light into the room there's nothing to control.

It's kind of that same way, if the person doesn't say yes to your retrofit proposal, you get zero

savings. And if he says yes to part of it because of some of this granularity of the space requirements, then you're stranding partial savings and making it harder to go in and get it subsequently.

So, what I've proposed and what I've handed out here basically says that -- gives that 40 number of fixtures, illuminares, or 10% applies to both tables, and in each table it has the space definition because in practical terms that's pretty much how it plays out for retrofits.

I mean we typically, most of the time we'll be doing number three, retrofitting the entire space in a building or a single tenant, under a single lease. And that's a good, common sense way of doing it.

In the previous version, in the last conference call, you had a .7 LPD that would apply to basically that kind of space definition.

And so I -- .7 watts per square foot. And now you've changed it to a more granular approach, where you've got to have a multiplicity of different LPDs based on the area category method.

We can support that, but we think it makes sense to have two tiers, an 85% and a 70%. So in other words, if a retrofit comes in 30% below the allowable LPD, then existing controls should be good. That's darn

good for a retrofit and we think it's going to leave out comparatively few people that would then say no.

If it's -- excuse me, if it's under 40 they can keep 100%. If it's 40 or more they can -- but they come in at 70% of the LPD, then they can have existing controls. If they come in at 85%, then it's exactly the way you had it before, they have the additional switching requirements and they have two-level lighting control.

We think that's a great, the two-level thing has really helped get this traction in the market.

And then if it's more than 85% and I just changed it from 100% to more than 85%, because that's really where the cutoff is, then everything applies in the Code, it's like new construction and we can support that.

And we can support everything else that's in there, but we feel pretty strong about the floor by -- or the room-by-room being kind of a deal killer and we think it makes some good sense to have one other tier that's going to help encourage people, encourage that lease holder in that space, yeah, I'll go ahead and have this lower lighting level because then -- because those are comparatively cost effective, those will pay for themselves within an acceptable pay back for that business owner.

When you layer on all of the other requirements then it's a lot more costly, you're going to get more no's, you're going to strand more savings.

And once again, this has the greatest impact on the smaller, harder-to-reach customers that make up most of the number of jobs, but you're still going to achieve your desire savings with larger customers that are going to have -- that are going to be more accepting of the higher requirements as you get up to those higher LPD levels.

MR. FLAMM: Okay, two things. I think it would be useful to have a conference with you, and Jon McHugh, and Owen, and Jim, and myself, and Mazi and to go over these numbers. I think that would be the next logical step to go through.

The second thing is I'm -- there's some logic I'm not following. I'm wondering if you're thinking the glass is half empty and I'm thinking it's half full.

The whole issue about rooms, if you have a tenant lease space and let's say it's got six rooms, and you only do three of those rooms, you don't touch the other three, even though there's 40 you don't have to touch those other three because you didn't get into them.

Or here's another example, you have a core space with a bunch of perimeter offices and all you're

doing is the core space, even though you do 40, you shouldn't have to do all of the little offices because you didn't touch them.

So, the 10% per room brings that room into play. By not having 10% in that room, that room is not in play. So, I'm not following your logic because I think the intent is to be exclusive, not inclusive.

MR. HITCHCOCK: Well, I hear what you're saying and maybe it's a little counter intuitive. But we're always trying to sell the whole job, so when we go into a customer we're trying to sell their whole space.

And unless they push back that's what we're going to present. If they come up front and say, hey, this second floor here, that's going to have to be a second phase because of cash flow issues, we only have this much we can spend, you know, can we do one floor at a time, we do run into that occasionally.

And that's more frequent with larger customers, actually. But we typically go in and try to do everything in the space that we can and that has to pay back within an acceptable time frame.

We think that the room-by-room requirement is actually going to encourage more cherry picking or more excluding of rooms that are less cost effective because many times a building owner will look at the present,

look at the proposal and they'll try to pick out what's least cost effective and say don't do that.

We're usually really successful at getting them to keep that in the mix, but we think this is actually going to make it easier for them to say, well, here, let's just do this and these other ones we can see it's going to -- the costs on those is a lot higher, let's just leave those here.

So we really, the situation you described where you're only doing a core space and you're not doing the offices, we don't encounter all that often. I'm not saying it never comes up but it's -- you know, I mean we're dealing with, primarily with under 200 kw customers for the Right Lights Program, and bigger ones for Lodging Savers and Casino Green. But it's still our mindset is to try to get the whole space, if we can.

And we think this is going to have one of those law of unintended consequence consequences.

MR. FLAMM: Thank you. And I would encourage that we have further discussion and it looks like Jon McHugh has something to say.

MR. MC HUGH: And I'm just trying to clarify something for Gene, so I think it would be good if you could just stay up here.

MR. THOMAS: Okay.

MR. MC HUGH: So, Gene and I just talked about this over lunch. So, my understanding of what Gene's got in mind is that where what you have in mind for the rooms is an "and" statement, so it's something "and" you have to have more than 10% in a room.

What Gene's talking about is you have a project and if the project is either over 40 ballast or it's more than 10% of the fixtures in this permitted space that he's retrofitting, then that's what triggers the requirement. So in some ways it's probably more restrictive than what you've proposed.

And so I think what's going to have to happen is we're probably going to need to do a bunch of what-ifs, so what about this space. And, you know, it's kind of like that spread sheet I sent you, Gary, which has all the various --

MR. SHIRAKH: We didn't look at the detail.

MR. MC HUGH: -- you know, it's the logic diagram and, you know, each of these things, what are the outcomes from each of these various spaces. And so I think Gene might actually be on to something.

MR. FLAMM: The concern I've had through this whole discussion, we've never regulated ballast change-out before, so this is a brand-new thing that we're doing. And we really need to differentiate between

routine maintenance, which somebody may change 40 ballasts in a building, that may be their job. All they do, all their life is run up and down 27 floors of a building and change ballast. That should not be required to have a building permit because it's repair.

And so this whole construct of, well, let's have a 40 threshold per building space, and in addition to the 10%, basically protects that from having to be routine maintenance and then is not a permitted issue.

And so how do we define -- we were trying to look at how to define routine maintenance from a -- what's called a lighting alteration, how do we differentiate that? And so that's been the whole struggle we've had.

And so what I'm concerned about is we're back there again. I don't think we should go there. We still need to differentiate that, okay, this guy, you know, he changes a hundred ballasts a year, but it's in a high-rise building, that's maintenance and you can't expect him to pull a permit.

So, I think that this is going to require additional discussion amongst the group that I identified and anybody else that wants to participate.

MR. THOMAS: I would agree and it would also be our goal that maintenance is not lumped in where they

would have to require permits.

But in all the discussions up to this point, as well, it was one of the assumptions would be that this -- from this cutoff point, whether it was 30 in the beginning, or 40 now, that those wouldn't be subject to getting a permit. They're not now, none of these jobs, none of the alterations in place, as you're calling it now, are getting permits.

So, we would want to maintain that and we think there are -- I can't give it to you off the top of my head, but we think in a discussion like you're talking about we can accomplish both, both goals. Thank you.

MR. SPLITT: Pat Splitt, from APTEC again. The question of permits seems to be on my mind. It's not clear to me how you decide when, for just changing ballasts, that you have to get -- I mean can you do that, can you require that they have to go and get a building permit and are they going to. If they don't get a permit --

MR. FLAMM: That was the proposal. The CASE proposal was when you change 30 ballasts in a building, you will now be required to get a permit. And from that there were a lot of discussions of, okay, how do we differentiate between a lighting retrofit or a complete ballast lamp change out, and routine maintenance?

And so the requirement is, okay, at some threshold -- the proposal is at some threshold a permit is going to be required for replacing ballasts.

But it's not only replacing ballasts, you know, you're changing a four-lamp illuminare to a two-lamp, or you're changing a HID illuminare to an LED illuminare. You're doing a number of things where you're actually gutting illuminare and so we're calling it an illuminare modification in place, where you're doing something different than for which the illuminare was manufactured.

And we're saying, okay, where's the threshold where we're going to require a permit to be pulled. And to me, that's what this discussion is all about.

MR. SPLITT: So, is CALBO on board with figuring out how to do this and charge a fee, and how they're going to inspect and all this?

MR. FLAMM: Well, Tom hasn't said anything to me, yet, so I'm assuming he's happy.

MR. SPLITT: Okay, just one final thing, though, if there's some threshold where you don't need a building permit and above it you do, it seems like you may have to, for whatever that number is, put some time limit on it. Say, 30 ballast within some period of time, because there are buildings where they have maintenance people and they can just schedule this to we'll only do

so many at a time. And eventually they'll do the whole building, but they'll stay under your threshold and never get a building permit.

MR. FLAMM: So that language has come and gone, and I don't know if it's come or gone now. We've had six months, we've had a year, and it looks like it got lost again, but that's something we can do.

MR. SPLITT: It looks like a loophole.

MR. GABEL: Mike Gabel. I just want to thank staff, applaud the effort you guys have made on the alteration section. It's been many years of discussions of trying to work it out to make it, I think, a more sensible public policy.

And I took a glance at the residential and we'll talk about that tomorrow. I think keeping the nonresidential on the same conceptual track is a good idea. I just want to make sure I get included in the discussions about how do we deal with nonresidential fenestration, you know, whether we're going to shoot for the threshold of the prescriptive, or something slightly less stringent in the prescriptive in that small band between a mandatory requirement and a prescriptive requirement.

But thank you for your efforts on that.

MR. DEVITO: Eric Devito, Cardinal Glass

Industries, again, really, just a point of clarification, sort of on the lines about the fenestration provisions.

Just so I'm understanding it correctly, under the performance approach under alternations there's a fenestration section. The other sections dealing with additions and alterations -- dealing with additions, and the performance, and the prescriptive just blanket refer to the fenestration Section 140.3.

But in particular, with regard to the alternations and the performance approach it just calls out U factor and SHGC requirements. I'm just curious if that was an oversight, why it was specific to them. Are you intending to leave VT out? Obviously, another hot topic to today or whether -- whether you should just be generally referring to all the fenestration sections? Really, just a question more than anything else, we don't have to resolve it now.

MR. SHIRAKH: Yeah, I don't know if Eric remembers, we went back and forth whether we should require this for alterations or not. I don't know where we landed.

MR. SHADD: This is Eric Shadd. We didn't land anywhere, yet. I would like to see a VT requirement in the alterations section, but I think there's more discussion that needs to be had with Mike Gable, and Eric

Devito, and such around that, so we'll talk more.

MR. SHIRAKH: Yeah, we should do so. Eric?

MR. DEVITO: Just to follow that on, then I would also suggest that, you know, the type of glass that you're spec'ing for the U factor and the SHGC, you know, new or alterations it really can be met the same way, so there's really no point not to include the VT for alterations.

MR. SHIRAKH: Okay, thank you, Eric.

So any other comments on alterations?

MR. THOMAS: Gene Thomas, just a follow up regarding the permitting issue. As I mentioned before, all of these alterations, you know, typically have not involved getting a permit. And so, really, regardless of where the cutoff is there's going to be a huge increase in the number of permits that are needed for these jobs that haven't needed them heretofore. And it seems like that would be very, very taxing, potentially, on building officials, and cities, and so forth to deal with those.

So, I was just going to suggest to the Commission that there might be some workshop or some other venue organized to bring together some building officials and people that are doing retrofits, and other stakeholders to try to minimize the downside of what that would be, because I think we'd all want to try to avoid,

you know, major additional expenses, major additional delays that are imposed. Because if you, you know, multiply the number of permits that are required by ten times, there's probably not enough staff, you know, in the building departments to handle it without some kind of plan, and that probably won't involve hiring a whole bunch of new building inspectors to take up the slack. So, it seems like it might be good to discuss that in a stakeholder workshop.

MR. SPLITT: Thank you, Gene. I'd like to believe I did that. I invited, I've called Tom a number of times. I did reach out to CALBO, I've reached out -- we've had several conference calls. Not -- there were some changes since the last conference call, but I really made diligent effort to reach out to all of the parties.

MR. THOMAS: I believe you. Did you get any feedback on it or was it --

MR. SPLITT: There was feedback, yes, and this is the product that evolved from that.

MR. BENYA: Hey Gary?

MR. FLAMM: Yes?

MR. BENYA: Jim Benya, Benya Lighting Design, consultant to the Commission through ADEC.

I just wanted to say that, you know, I think there is definitely an opportunity here to address this

and maybe we do this a little offline. But, you know, inspecting authorities have different ways of accepting permit applications, checking permit applications, and of providing inspections and everything else.

My hunch is that this would lead to a pretty rational discussion about inspecting authorities being able to have a short form, expedited retrofit permitting process that would not totally burden them and would not call for significant inspections and everything else and that would make a lot of sense.

But I think the notion of not having retrofit fall within the standard always bothered me a little bit and I think we've got an opportunity here for a pretty good win-win scenario.

I like many of your suggestions, Gene. You and I have talked privately and many of your comments have been brought up in our internal discussions, and I want to thank you again for all of your work. You've added a lot of sensibility to the process and we'll continue to take a look at these as Gary has suggested.

MR. FLAMM: Right. Thanks, Jim, those are some good suggestions right off the bat there.

MR. GARCIA: This is Tom Garcia, representing CALBO. I was a building official for the City of Fairfield, actually building official for ten years and I

worked for the City of Fairfield in the Building Department for 30 years.

So, in conversation with Gary on this, you know, a lot of the things that I see it's like the train coming down the track and you're not going to stand in front of that train. We're going to do energy savings.

And I think I've been kind of just weighing all of this, listening to this and watching what the industry wants and what the professionals that have put this paperwork together want.

And my feeling is that we, as CALBO, now have to figure out how we're going to solve this and help be a part of saving energy in California.

Part of that is as we start developing forms, we are definitely going to need to have simplified forms for this type of alteration so that we can have a fast permit process.

I think the building departments, they're job is to help build things and it's not to slow down. So, that's kind of my input on this is that we will find ways to do fast plan review, you know, have a simplified form and a simplified process, but we're going to have to get our hands around the sheer numbers, you know, how many building permits will this affect?

And I think, and I'll be happy to say this in a

public form, there are going to be many cases where people are just not going to get the permit and that's what I don't like to see, because we want people to get permits so that we make sure that things are done in a safe and effective manner.

But the biggest thing we can do is educate, simplify the forms, and try to work to save energy when we have the chance.

MR. SHIRAKH: Thank you, Tom.

COMMISSIONER DOUGLAS: Yeah, thanks for your comments, Tom, we'll definitely work with you on that.

MR. THOMPSON: Hi, my name's Mike Thompson, I'm the Director of the CBPCA, California Building Performance Contractors HERS Providership. And this discussion has given me an opportunity to raise an issue that I had hoped to be able to raise in these two days.

Sort of an elephant in the room here that puts into question everything we're doing for these two days, and that's simply that the majority of municipalities in California today are not enforcing the Code.

We have 200 HERS providers plus. We just had a meeting with the Energy Commission last week, where we brought the HERS raters in and they produced a list of over 50 municipalities in California where they didn't collect any forms or didn't enforce -- or only collected

part of the forms.

And I've talked to building officials all the time and my impression is that the reason this is happening is that the building officials just can't possibly keep up. And I'll bow to Tom, he's the expert on this, but they can't keep up with the regulations we have.

I just talked to a fellow today and he was hopelessly over-burdened, he can't even try to keep up.

So, I do want to report that last week we had a meeting with the Commission and we were very well received, they said they were going to start a new initiative to try to cooperate with the HERS providers and try to solve this problem of enforcement at the municipal level.

But unless that's solved, everything we're going here today is relatively purposeless. So, I just want to make that point and I want to encourage the Commission to give whatever support they can to the Commission staff to do better training and more enforcement at the municipal level. Thank you.

MS. BROOK: Okay, if we don't have any other comments, we'll move on to the last item on our agenda, which is Title 24, Part 11 Nonresidential Voluntary "Reach" standards.

So this is a new process for the Energy Commission. We've been participating in the Green Building Standards development since its inception within the State of California and this time we're actually developing the energy efficiency components of the Green Building Standard within our Title 24, Part 6 stakeholder process. We think it's a much more robust and rigorous development process and it's also our authority to develop energy regulations for the State, so it actually belongs here at the Commission.

So what we'll be doing is adopting the Title 24, Part 11 energy efficiency components of the recommended Building Code updates, along with Part 6, and then submitting those adopted Code changes into the Building Standard update that will happen all at the same time in 2013, within a January 2014 implementation date.

So, for the nonresidential Part 11 "Reach" -- we call these "Reach" standards, they're voluntary, they're more aggressive than our base standard in Part 6. They go into the voluntary appendix of the Green Building Standard.

We are trying to keep it lean and mean on the green side by basically setting two performance tiers and then a limited number of prerequisites.

So for Tier 1, the first voluntary level of

advanced energy efficiency we're saying that the energy budget that's calculated in our compliance software must be less than or equal to 90% of the Part 6 energy budget, so that's a 10% better type of an energy efficiency metric.

Tier 2 would be more advanced than that, it would be that the proposed building energy budget is less than or equal to 80% of the Part 6 energy budget calculated in our compliance software.

So these are performance standards. We don't -- we aren't developing a prescriptive alternative to this performance standard.

We do, we are setting some prerequisites so basically we're saying that we think that these measures are so important that if you're serious about energy efficiency and adopting voluntary measures of advanced energy efficiency, you ought to be putting these measures into every building.

The prerequisites for the nonresidential voluntary standards are that the installed outdoor lighting power is, again, less than or equal to 90% of Part 6 allowance, so that's a 10% improvement.

The reason we have to call this out as a prerequisite is because our compliance software doesn't include outdoor lighting. So to be comprehensive in a

"Reach" standard, if you want to do 10% better, you also have to address outdoor lighting power. And so we're doing it this way as a prerequisite.

And then through our commercial refrigeration stakeholder process, when we're developing the covered processes mandatory requirements for commercial refrigeration, we also identified one very important "Reach" measure and this is -- is important for both energy efficiency and for reducing greenhouse gas emissions, so it's very appropriate for this to be adopted in a green building standard. And that is that we tell food stores greater than 8,000 square foot, and that's the same limit we have in the base standard as far as the size of grocery stores that need to comply with our commercial refrigeration standards.

Use CO2 indirect or cascade cooling for refrigerated display cases and walk-ins. And the exception being that if you -- if a store really wants to use indirect glycol, which is -- which it has to make up the difference with additional efficiency measures because it is less efficient than the CO2 secondary system.

And we think most stores, as far as our market intelligence goes, would be doing CO2-based refrigerant systems. There still are some stores interested in

having an option for indirect glycol, so we think that's fine as long as they make up the difference in efficiency that makes it comparable to the CO2 indirect system.

Another prerequisite that's still partially under development, so we're not quite done with this, is that for very large independent restaurants, the water heating for those large restaurants needs to have a portion of its water heating provided by solar thermal.

So, a minimum of 25% of their annual water heating energy would need to be met by a solar water heating system. But because this is a prerequisite, basically, we don't want to eliminate other options that for a particular restaurant might be better, so we are thinking of other -- sort of like the indirect glycol thing, if there's other things that are comparable, that people would want to do instead of solar water heating to basically have the same energy saving impact, then -- and they're clearly applicable to this large restaurant building sector, then we will include them here.

And I think that's all we have.

Does anybody want to make comments on our voluntary energy efficiency recommendations?

MR. GABEL: Mike Gabel. Martha, can you go back to the first slide in this section?

MS. BROOK: Uh-hum.

MR. GABEL: So, the revised Cal Green standards is going to include language that I proposed to specify that the reduction in energy used below the Title 24 standard, in the calculation to achieve this 90% that we exclude unregulated energy-use --

MS. BROOK: That's right.

MR. GABEL: -- components, like process receptacle.

MS. BROOK: And that's right, and the reason that "Energy Budget" is capitalized there is because it's defined in our Part 6, 140.1 as just regulated loads.

So, we can definitely make a note of that --

MR. GABEL: Okay. Yeah, we just want to make sure that this time around we capture that definition.

MS. BROOK: Yeah. Okay, good.

MR. SPLITT: Pat Splitt from APTEC.

MS. BROOK: Uh-hum.

MR. SPLITT: Just a couple things. One, just to comment on the last item you spoke of, the restaurant solar DHW --

MS. BROOK: Uh-hum.

MR. SPLITT: -- you have to figure out the configuration of the building. If a restaurant's on the first floor of a high rise, it might be very difficult for them to put solar panels anywhere.

MS. BROOK: Right. But I think that the intention of this is that's a huge restaurant and I think we actually -- didn't we agree that it would be independent, it wouldn't be part of another building? I thought that might have been part of what we were proposing. But, anyway, your point's well taken.

MR. SPLITT: And if these are going to be incorporated into the Green "Reach" levels, would that mean then if some municipality approved -- say, went to a Tier 1 Green Code, would they still have to go to the CEC to get their energy code certified?

MS. BROOK: They still have to go through that process, yes. And the other thing is they don't -- they can change, they can adopt anything they want. So, if they don't want to have a solar water heating requirement for restaurants, but want to adopt the rest of the recommendations, they're free to do that.

MR. SPLITT: But what happens a lot of times is, even though we're calling these voluntary, is that once a municipality adopts it --

MS. BROOK: It's mandatory.

MR. SPLITT: -- it becomes mandatory.

MS. BROOK: That's right.

MR. SPLITT: Yeah.

MS. BROOK: Voluntary to us, but it won't be if

it's adopted by a local jurisdiction, that's right.

MR. GABEL: I could speak to that briefly, just a minute, Mike Gabel. I work with several dozen local governments on their "Reach" Codes in the last few years and in a very few instances they adopted a Tier 1 standard without looking under the hood to see what was there. It happened in a few cases.

But given the new economic and political climate, and given the stringency of the new Code, I think Martha's right, it's going to be a buffet, they're going to look at the Tier 1 as a buffet and they'll pick out things that they want. And if they don't feel they're appropriate for the local government jurisdiction they won't include them. So, I don't think there's a fear that they're just going to swallow the whole thing whole.

MS. BROOK: Okay.

MR. SPLITT: Yeah, it seems like a waste of time to me if we've gone through all this process, and incorporated -- the Energy Commission's incorporated it with the Green Code, and everybody's all -- it's already all been vetted, why would the city have to come back and go through this whole process of applying to the Energy Commission? What are you going to find? I mean they just adopted what you approved, it doesn't make any sense

to have to do it.

MS. BROOK: Well, I think part of the requirement is that they vet the proposal at their city council and that they have some due diligence to say that it's cost effective.

And we didn't go through a rigorous cost effectiveness evaluation for these voluntary standards, though we did quite a bit on the residential side. It's not the -- we think there are definitely ways to meet this in a cost effective manner, but we didn't go -- we didn't develop that whole -- you know, we didn't use the lifecycle cost analysis approach, we didn't document it in the CASE reports. So, that's the due diligence that still needs to be required for the Commission's process to approve local code.

MR. SPLITT: But it --

MS. BROOK: We're still, hopefully, trying to make it easier. I mean but they still -- don't you think they still need to vet that with their public?

MR. SPLITT: Well, I know some municipalities that, say, have Green Code ordinances in my area and they've done this, and the building department adopts the Energy Code complete, res/nonres, they've adopted it, they've adopted your Code.

Then they go beyond that, the planning

department maybe adopts this Green Code and has some other -- gets credit for other energy things.

MS. BROOK: Yeah, uh-huh.

MR. SPLITT: Well, why should they have to come back to you to justify doing more, if they've already approved and said we're going to follow your regulations? What else do you want?

MS. BROOK: Okay.

MR. SPLITT: It just seems like you're adding a lot of bureaucracy, you know.

MS. BROOK: All right. Well, appreciate your comment and I don't have all the answers to that one.

MR. SPLITT: Well, anyway.

MS. BROOK: Yeah, Jon.

MR. MC HUGH: Hi, this is -- sorry, this is Jon McHugh. Just a short clarification, I believe that all the measures that you're showing here are measures that we did have case study -- the California State IOU, Codes and Standards Program, had case studies that indicated --

MS. BROOK: The prerequisites.

MR. MC HUGH: -- cost effective -- even for the prerequisites.

MS. BROOK: No, no. I think it's true of the prerequisites. I don't know that anybody did an analysis to say that 10 or 20 percent is cost effective, that we

all believe it will be.

MR. MC HUGH: Okay.

MS. BROOK: I don't think we did that analysis.

MR. MC HUGH: Okay, I thought -- I just want to make sure that the prerequisites have all worked out to be cost effective.

MS. BROOK: The prerequisites are.

MR. MC HUGH: Okay.

MS. BROOK: And that was actually how we drew the line, as you know.

MR. MC HUGH: Okay, I just wanted to have that for the record. Thanks.

MS. BROOK: Uh-hum.

MR. JOHNSON: Hi, this is Karl Johnson again. First of all, I'd like to compliment you on a great job, this is really making a big progress, some big improvements.

And, secondly, an observation and a question which is these are making such fundamental changes, like shifting to 10% for the threshold, and matching these stretch goals. How do those sync with the other programs, particularly the incentive programs on the CPUC incentives, because they're always based upon Title 24.

MS. BROOK: Right, right.

MR. JOHNSON: And I think it's kind of clear

that we have to think through that really carefully. So, I think it addresses the gentleman's question on adding the controls, is that's where they need to shift their rebates. It's not a percentage against the Title 24 and the illuminares for light, only, it really starts shifting.

MS. BROOK: Uh-huh.

MR. JOHNSON: Because if they don't, it will make the rebates almost disappear.

MS. BROOK: Right. Now, that's a very good point and one of the reasons that -- you know, typically, we've always set our voluntary tiers to 15% and 30% and one of the reasons we backed it down for nonresidential to 10% and 20%, or 90% and 80% is that we think that we're making significant advancements in the nonresidential code this update, and our stakeholders are telling us that they weren't sure that they could easily meet a 15% next step.

MR. JOHNSON: Uh-huh.

MS. BROOK: And in fact, the information coming back from Savings By Design was that they typically are at the 10% level for entry into that program --

MR. JOHNSON: Yes.

MS. BROOK: -- and that's where they do a lot of the work, so we wanted to make that consistent.

And we are working with the PUC, hopefully more now than we have in the past, but even in the past we've tried to align our tiers with their incentive programs.

MR. JOHNSON: Oh, I know, but I'm saying this could reach new challenges with the changes.

MS. BROOK: Yeah.

MR. JOHNSON: So, yeah, thank you.

MS. BROOK: Thanks.

MR. THOMAS: This is Gene. I just wanted to make a follow-up comment on that. As part of the -- one of the proceedings at the PUC, the decision that just came down on ex ante values, they address a lot of what you're talking about in terms of the approach of the program.

So, if like the programs that we are typically geared into are retrofit, early replacement, and those are treated where it's existing equipment to new equipment, existing equipment being the baseline and you capture those first-year savings.

If it's replace on burnout or new, then it's code minimum to what you're putting in. And so even with these changes in the Code, those two approaches still, you know, rule basically, is what the decision says. And you may have to show evidence as to which, you know, justifying, yes, this is an early replacement retrofit

strategy here and not it broke and we were going to have to replace it anyway type of thing. But that's part of where that's coming, that's all.

MR. YASNY: There are a couple of comments online.

MS. BROOK: Okay.

MR. YASNY: KC, let me unmute him.

MR. KOLSTAD: Yes, can you hear me?

MR. YASNY: Yes.

MR. KOLSTAD: Great. Yeah, we have some concerns regarding the commercial refrigeration requirements.

MS. BROOK: Uh-hum.

MR. KOLSTAD: So, we've test a liquid CO2 refrigeration system for --

MS. BROOK: Hold on just a second to clarify, this is KC with Target?

MR. KOLSTAD: Hi, KC Kolstad, Target Corporation, yes.

MS. BROOK: Okay, thank you.

MR. KOLSTAD: And we've tested a liquid CO2 refrigeration system for over a year in a small format grocery market, with approximately 9,000 square feet of grocery area. Our results indicate that this system requires 70,000 to 100,000 kilowatt hours per year in

increased electrical demand when compared to a traditional direct expansion type refrigeration system.

This is approximately a 30% increase in electrical demand.

We believe that this increased electrical demand is counterproductive to the goals of Title 24.

Furthermore, our testing has also shown that the electrical demand from these CO2 systems increases faster than a traditional direct expansion system as the outside air temperature increases.

We expect that these systems will place a disproportionately larger load on the grid when electric demand is highest.

Even though the supermarket refrigeration efficiency report made an effort to model the energy consumption of these types of systems, we believe that their theoretical models did not capture the multitude of variables associated with such a highly complex system.

We request that their models be validated in empirical data, such as the information that we've gotten through extensive third-party electrical sub-metering of actual stores.

Also, since we believe that the technologies utilized for those type of systems are not scalable to small market sizes due to the component availability, we

ask that the Committee redefine the requirements for CO2 based on the connected refrigeration load or required refrigeration horsepower.

Also, through extensive testing empirical data show that using commercially available refrigerants with TWP values of 1,500 or less can drastically reduce the overall system carbon footprint without impacting energy consumption, such as with these CO2 systems.

Therefore, we also ask the Committee to change the definition of a load GWP refrigerant in Appendix J(a)(1) to any component or blend of components with a GWP value of less than 1,500.

MS. BROOK: Okay, thank you for those comments and we will definitely work with you and our consultant, Doug Scott, to work through your issues.

MR. KOLSTAD: Great, thank you.

MS. BROOK: Thank you. Any other comments on our “Reach” standards.

MR. YASNY: George Nesbitt.

MS. BROOK: George.

MR. NESBITT: Yes, can you hear me?

MS. BROOK: Yeah.

MR. NESBITT: Yes, George Nesbitt. First, I wanted to touch on alterations and additions. It’s a little hard to get it -- get our attention on the phones

sometimes. So it appears that all mandatory measures, all nonresidential mandatory measures and all prescriptive measures are required for not only additions, but alterations, almost without exception.

What I did not see is the prescriptive process requirements applying in any of those conditions.

MR. SHIRAKH: Not sure what you mean by prescriptive --

MR. NESBITT: So, basically you only -- you referenced basically Sections 110.0 all the way through 140.8, and 140-9 is the process requirements. So, basically what you're saying is if you're doing an addition and you put process equipment in it, that doesn't have to -- you know, if you're altering process or putting in a new process, it does not appear to apply.

MS. BROOK: So we're going to clarify that. I don't know if you were on the phone when Mark Heydeman called in, but he also requested us to work with them on clarifying where covered processes are also --

MR. NESBITT: Right.

MS. BROOK: -- also need to meet the mandatory and prescriptive requirements that are elsewhere in the Code and we definitely will clarify that, and potentially the --

MR. NESBITT: Yeah, I may have missed that, I

had stepped out to --

MS. BROOK: No, that's okay. That's a good point and we will definitely reorder the items in the proposed language to make that crystal clear.

MR. NESBITT: Yeah. And then on the above code I ran a recent low-rise residential project, zone 4, to about 38 percent above Code. Now, if I tell the software it's a high-rise residential, it drops to 18. And this is taking no HERS credits, nothing on the low-rise side or on the high-rise.

So 20%, and this is 2008 Code, so 20% is not exactly easy. I mean this is a building with condensing furnaces, water heaters, you know, good insulation, .23 solar heat gain windows, very little windows on east and west, and we're talking about Zone 4 which is quote/unquote, not an air conditioning climate. The TDD energy use increases by about 40% and the only -- the only HERS credit you can get is duct testing.

And, you know, so in high-rise residential and nonres basically you can't get anything from quality insulation or, you know, most of the EERs, or air flow, refrigerant charge, none of that -- none of that gives you anything. So, other than duct testing, you know, you have purely insulation values, window values, orientation and equipment efficiencies, so there's no --

MS. BROOK: So are we recommending that we have -- we extend our acceptance tests and credits for those HERS verifications to more of the high-rise residential measures, is that what you're recommending?

MR. NESBITT: Absolutely. I've been on lots of especially high-rise and low-rise residential and I can tell you insulation is not installed well as the default.

MS. BROOK: Uh-hum.

MR. NESBITT: You know, definitely get to all of it. It's just not -- you know, I've done enough nonres, as well as res testing, small commercial to tell you that if it's not being tested, it's not likely being done to a higher standard.

MS. BROOK: Uh-hum.

MR. NESBITT: And so, I mean I've been harping on this for some time, I definitely believe that those credits should be available and especially if we're going to maintain some ability to go above Code.

MS. BROOK: Uh-hum.

MR. NESBITT: Because like with high-rise residential you're talking about making the water heating system a high efficiency with solar hot water, with the best distribution system as the standard budget and that, you know, takes away a significant ability to gain any margin.

MS. BROOK: Okay, that's -- thank you for your comment and we will discuss that and work with you on that. Thanks.

Any other comments? Our next section is just general comments so if -- and you all get to look at the cute pictures of the ducts stuck with duct tape. That's why we're here today, for this final slide, I know you've been waiting.

So if you -- if you have any comments, now's the time, and we'll be back here tomorrow to talk about residential and administrative Code recommendations.

MR. HOROWITZ: Hi. Hello?

MS. BROOK: Hi.

MR. HOROWITZ: Hi, this is Mike Horowitz, I'm speaking on behalf of Cal-OSHA. Two things, one is we did write a letter in July which, looking online today, we can't find it in the public record, so we'd like that to be in the public record.

MS. BROOK: Okay.

MR. HOROWITZ: And in that letter we expressed our continuing concern, which has been consistent through a number of iterations of changes to the Title 24 here about the adequacy of some of the like demand control technology to adequately ensure that sufficient makeup air is always supplied for these processes, like

laboratory hoods. And so, specifically, we were concerned in this iteration with the laboratory hoods in the kitchens.

I think you've worked with us on the garages pretty well. So that, you know, people's health and safety is not contradicted by the energy requirements. And we just remain, I guess, unconvinced.

MS. BROOK: Okay. We have been working with you and we appreciate your participation in our process and we will respond to your letter, and keep working with you on this.

MR. HOROWITZ: Okay. You'll make sure that the letter is put in the public record?

MR. SHIRAKH: I remember you gave us that, it was a -- not an electronic communication, it was on paper.

MR. HOROWITZ: No, it was mailed, it was dated July 28th.

MR. SHIRAKH: Yeah, and we've scanned it, I have it on my computer. We'll put it in the public record, that's not a problem.

MR. HOROWITZ: Okay.

MR. SHIRAKH: And, you know, we'll be working with your staff on various proposals for the garages, kitchens and the labs, and I think we've addressed many

of them, but there may be still some remaining issues. You know, we'll work with you to finalize.

MR. HOROWITZ: Thank you.

MS. BROOK: Any other comments? Pat?

MR. SPLITT: First off, I'll let you know I'm not going to be here tomorrow, so that may mean it will be lots quicker.

MS. BROOK: Oh, okay.

MR. SPLITT: Just a few comments, one that was mentioned earlier about the enforcement not being very well implemented in some areas and in my area, too, and actually around the State we see something similar, that it's spotty. And I try to come up with some way of not waiting for 2014 to do something about this and the most efficient way I can think of the Commission handling this is to try and to concentrate on the third-party plan-checking companies. Because with a lot of the cities being under-staffed, a lot of them in my area at least are going out to third-party checkers, and they don't seem to be doing a very good job.

And I think if you -- I don't know how many there are, half a dozen, a dozen in the State, there aren't that many and they handle a lot of different building departments.

And I think it would be most cost effective for

you to try to just really train them and make sure they really toe the line, and that will get you a lot of effect around the State for more bang for your buck.

With the requirements for VLT today, and I think it's similar tomorrow, I just want to be sure that there's still going to be some way, if somebody actually wants to do a passive solar building, that they can do it, that they can put in, you know, high solar gain glass and trade it off somehow.

And I was thinking about this similar concept with having a cool roof on a ski resort. If it's a building that's just used in the winter, it's counterproductive to put a cool roof on there, so maybe you need some sort of exception for something like that.

MR. SHIRAKH: Yeah, I think we talked about that. What's the impact on passive solar? Of course, res doesn't have a VT requirement, this is for nonres but, still.

MR. SHADD: Eric Shadd from AEC. Yeah, we looked at passive solar gains on a cost effectiveness basis and it didn't turn out to pay off in general for most buildings. But there still is the flexibility within the Code to construct a passive solar sort of building. You would use the performance approach or you would use the -- it's no longer called the overall

envelope approach but, yeah.

MR. SPLITT: Yeah, just so we can get credit for things like thermal mass and that sort of stuff.

MR. SHADD: Oh, yeah, yeah, that --

MR. SPLITT: Because if you can't do that, then you can't do it.

MR. SHADD: Right, yeah, you would use one of those other two approaches. But, you know, building a passive solar building has so much to do with, you know, your exposed square footage, and how much windows you have in there, and the ratio to your density of occupancy, and things like that, so it's best addressed in the performance approach and things like that.

MR. SPLITT: Something like daylighting.

MR. SHIRAKH: Well, my understanding is passive solar has a more function of SHGC than VT, isn't that true?

MR. SPLITT: Well, they're very similar, usually they track. But yeah, SHGC would be the --

MR. SHADD: Right, yeah, so you would encourage a higher SHGC so you can help to heat the building. And also with the -- you know, he's talking about strategies such as solar mass -- or not solar mass, but mass walls where you can use the time constant or the -- you can delay the heat gains to occur at night and have the

cooling gains from the nighttime, you know, sort of eek through the wall to come out during the day.

MR. SHIRAKH: So what I'm hearing is, you know, even given the current prescriptive requirement you can still do passive solar, just do tradeoffs against the mass, against the higher SHGC and VT, is that what you're --

MR. SPLITT: As long as the new software is going to still model thermal mass and light and take those credits.

MR. SHIRAKH: Yeah, which I expect. I don't -- there's been no --

MR. SPLITT: Well, expectation, I expect it, too, but I expect a lot that never seems to happen.

MR. SHADD: Well, let me say this, it would be pretty hard to get a software that does energy modeling for buildings to not take thermal mass or solar heat gain into account, you would have to cripple it on purpose.

MR. SPLITT: Okay. I just want to be sure if somebody actually, really does want to design a building, that they can still do it.

Let's see what else I have? Oh, one other thing, I think I mentioned this at some other meetings, but I'd also like to see, especially if we're shooting for zero net energy buildings, that even if it's just an

additional couple of lines of report in the performance method that along with the TDB energy that nobody can understand, that we also report either site or source annual energy, and maybe break it down into different categories, so it means more to somebody when they're making changes, you know, it's more intuitive.

MS. BROOK: Yeah. No, you did -- you actually came with a group and talked with me and Mazi about that, and we support that concept.

MR. SHIRAKH: Are you sure you don't want to be here tomorrow? We'll miss you.

MS. BROOK: Any other comments? Does our Commissioner want to make some final comments?

MR. EMBLEM: Martha, this is Erik Emblem, can you hear me?

MS. BROOK: Yeah, we can, Erik. What happened to you?

MR. SHIRAKH: He's just here.

MR. EMBLEM: Well, I came back to the office and I've been multi-tasking.

MS. BROOK: Okay, good for you. You're the only one that can do that.

MR. EMBLEM: But I've been with you in thought and mind. But just I want to kind of tag team with what Cal-OSHA said there about keeping our focus on IAQ and

ventilation, what's going on in these buildings and being careful that we don't tradeoff health and safety for energy.

That's something that's near and dear to us and it gets back to these -- these acceptance forms, and who's filling out the data, and who's checking these systems.

And, particularly, when you're talking about fume hoods in laboratories, but not only there, when you're talking demand control in school rooms and school buildings, and where school districts are broke and they don't have maintenance staff. And if these systems aren't working when they first start, we're putting a lot of other people at risk.

And I just want to emphasize that the data that is collected on the acceptance forms is crucial, not only for you for collecting energy efficiency and determining whether the Codes are effective in accomplishing their goals, but they're also necessary for things like indoor air quality and verifying ventilation.

MR. SHIRAKH: So these TAB contractors that you mentioned earlier, are they trying to do acceptance requirements for -- for these type of systems?

MR. EMBLEM: Yes. Yes, they are.

MS. BROOK: Okay, thank you, Erik.

MR. EMBLEM: In fact we have a whole new certification program going right now just on fume hoods, and it's an NSF certification program.

MR. SHIRAKH: Thank you, Erik.

MR. EMBLEM: Thank you. See you tomorrow.

MR. NESBITT: This is George Nesbitt.

MS. BROOK: Hi George.

MR. NESBITT: Hi. I will be coming tomorrow, to Pat doesn't have to worry, we'll make sure we don't get out too early.

I wanted to sort of follow up on something Pat said earlier about the solar fraction for space heating.

MR. SHIRAKH: Yeah, we're waiting.

MS. BROOK: Are you going to do that tomorrow or today?

MR. SHIRAKH: Okay, thank you George.

COMMISSIONER DOUGLAS: All right. Well, he'll be here tomorrow to repeat that comment.

MS. BROOK: Yes.

COMMISSIONER DOUGLAS: So we'll move on. If Mr. Nesbitt does call back, let him know that we'll give him time tomorrow and plenty of it, no doubt.

So I wanted to thank everybody for your participation in this workshop. It's been a long day and we've got another long day planned for tomorrow.

I heard a lot of substantive and helpful discussion, and some items to definitely follow up on. So, appreciate your participation and we'll all be here at 9:00 a.m. tomorrow, or at least many of us will. Bye. Thank you.

MS. BROOK: Thanks.

COMMISSIONER DOUGLAS: We're adjourned.

(Adjourned at 4:19 p.m.)

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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 28th day of November, 2011.

Kent Odell

Kent Odell
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