BEFORE THE
CALIFORNIA ENERGY COMMISSION

In the matter of Building Energy Efficiency Standards Revisions for Nonresidential Buildings	Docket No. 12-BSTD-01 45-Day Language Hearing

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

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Reported by:
Kent Odell

ORIGINAL

APPEARANCES

Commissioners Present:

Karen Douglas

Staff Present: (* Via WebEx)

Martha Brook
Mazier Shirakh
Gary Flamm
Payam Bozorgchami
Ron Yasny
Patrick Saxton
Pippin C. Brehler
John Arent

Mike Gabel, Gabel & Associates
Darren Cline*
*Aniruddha Roy, Air-Conditioning, Heating, and
Refrigeration Institute (AHRI)
*Frank Morrison, Baltimore Aircoil Company
*Frank Stanonik, Air-Conditioning, Heating, and
Refrigeration Institute (AHRI)
*Ira Richter, Heatcraft
Bill Callahan, Associated Roofing Contractors of the Bay Area
also representing Union Roofing Contractors Association
Reed Hitchcock, Asphalt Roofing Manufacturers Association
Jamy Bacchus, Natural Resources Defense Council
Lee Shoemaker, Metal Building Manufacturers Association
Amy Dickie, Global Cool Cities Alliance
Jim Calkins, Sika Sarnafil
Eric DeVito, Cardinal Glass Industries
Ken Nittler, Enercomp
Dimitri Contoyannis, Architectural Energy Corporation
*Charles Cottrell, North American Insulation Manufacturers
Gary Klein, Affiliated National Management
Jon McHugh, McHugh Energy
Gene Thomas, Ecology Action
Bob Raymer, California Building Industry Association
Cathy Chappelle, Heschong Mahone Group
*Mudit Saxena, Heschong Mahone Group
*Eric Emblem, Joint Committee on Energy and
Environmental Policy
Helene Hardy Pierce, representing GAF
John Ferraro, Roof Coating Manufacturers Association
*Steve Heinje
Peter Hart, Attorney for Asphalt Roofing Manufacturers Assn.

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P R O C E E D I N G S

MARCH 12, 2012 9:05 A.M.

MS. BROOK: Good morning. This is Martha Brook. While we're waiting for our Lead Commissioner to arrive, I'm going to go ahead and talk about the emergency exit procedures for this room and also, just to make sure, for those of you who haven't been here before, that you know where the restrooms are located, they're just on the other side of the atrium in that direction. In the case of an emergency and the building needs to be evacuated, we ask you to follow staff out of the building and just keep up with us because we're going to be running like heck to get out of the building, so just pay attention. And what we're going to do is meet outside, across the intersection at the Roosevelt Park over there, and that's where we'll ask you to follow us. And that's all I have to say about that. We'll get started very quickly. Thanks.

COMMISSIONER DOUGLAS: Good morning. Welcome to this hearing on the 45-Day Language for the Title 24 Standards, 2013 Update. Let me ask staff to kick this off.

MS. BROOK: Okay, great. I'm Martha Brook. I'm one of the Program Managers for the 2013 Standards Update. And Mazi Shirakh is the other one and he'll

arrive when he arrives. I'm sure it will be very shortly. And do you want to have the other introductions here?

MR. FLAMM: I'm Gary Flamm, Supervisor for the Building Standards Development Unit.

MR. BREHLER: Pippin Brehler, Office of the Chief Counsel, advising staff on legal matters.

MS. BROOK: And here comes Mazi.

COMMISSIONER DOUGLAS: So Mazi Shirakh is here, and let me also introduce -- I'm Commissioner Karen Douglas. I think I neglected to mention that. To my right, Galen Lemei, my Advisor; to my left, my Advisor, Jennifer Nelson. So, welcome.

MS. BROOK: Okay. So today we're going to cover the updates to the Nonresidential Building Updates to the Standards and we're really only going to cover what staff believes are the substantive changes. We have an Initial Statement of Reasons, an ISOR document that is posted on our website that explains every single change to the language, including just typo and the editorial-type of clean-up language.

So what we'd like to do is go through the day and we have breaks in between sections for comments, and then we have a section at the end for general comments. And so if there is anything that any of you think are

important that staff has failed to bring up, then that would be the time that we would like you to come up and talk to us about that.

So that's the agenda that you have, there are some hard copies out in front for you to follow our day-to-day. This is just a quick look at the things that are coming up on the calendar. We have today and tomorrow for the 45-day language hearings. We'll release 15-day language on April 11th. We're scheduling an ACM Workshop to discuss the performance compliance approach to the Standards on May 3rd, and then we have on our calendar an adoption hearing for these Standards on May 9th.

So we're going to jump right into it. The first section we're going to cover is the Mandatory Requirements for Space Conditioning Equipment, Section 110.2, and some of the updates for the equipment efficiency, basically we updated this section to match the ASHRAE 90.1 Standards, and also the non-AHRI Standard Water Cooled Chilling Equipment Efficiency Requirements have been updated to match ASHRAE 90.1. And there is heat rejecting equipment, we added closed cooling tower efficiency requirements in Table 110.2(G).

We have a new section in this Mandatory Requirements chapter on Evaporative or Open Cooling Towers, this is the measure where we're saving water,

this update in the Nonresidential Standards, significant water savings from the installation of controls that maximize the cycles of concentration for cooling towers. And then a requirement that you document the maximum cycles of concentration for the specific cooling tower that is getting installed using a Commission provided calculator. And requirements for flow meters, overflow alarms, and efficient drift eliminators.

On to Section 120.1, Requirements for Ventilation. Under this section of Operation and Control Requirements for the Minimum Quantities of Outdoor Air, we've added Occupant Sensor Ventilation Control Devices as a type of control suitable for a Demand Control Ventilation. So the new requirements for the functionality and installation of these Occupant Sensor Ventilation Control Devices have been added. We specified where the Occupancy Sensors will be required. Basically what we're doing is we're taking advantage of the fact that these Occupant Sensors are going to be installed for lighting control, and so they're very cost-effective to add the functionality to also control ventilation during unoccupied periods for these spaces. So this is the only occupancy-based ventilation control requirement that will be in the Standards for HVAC systems without economizers. This means that, for

smaller HVAC systems that don't have an economizer requirement, but still serve high density spaces such as classrooms or conference rooms, that these spaces that are often during the day completely unoccupied can now reduce ventilation rates.

And the other reason that we're able to do this as far as the indoor air quality is because we require a daily pre-occupancy purge; this is really a good mechanism to really get good clean fresh air into the building every morning, and this actually allows us to reduce ventilation rates during unoccupied periods without having a detrimental effect to the indoor air quality.

What we'll be adding for 15-day language through discussions with our consultants and stakeholders is that we're actually going to require a fan cycle control sequence to make sure that, even though we're shutting off the fan completely during unoccupied periods, that if the space continues to be unoccupied throughout the day, but it does get some average ventilation rate over the course of that unoccupied period, to maintain an average rate that is equivalent to our lowest rate in our standards. So that's the intent of that proposed change.

For the Design and Control Requirements for Quantities of Outdoor Air, we have requirements for VAV

Systems to install dynamic controls that maintain outside airflow rates within 10 percent of our requirements. And for constant volume systems that have measured outside airflow rates, that measurement needs to be within 10 percent of these requirements.

For Section 120.2, Required Controls for Space Conditioning Systems, under the section for Shutoff and Reset Controls for Space Conditioning Systems, we've added requirements to set up and set back the temperature set points by two degrees and use these occupancy sensors I was speaking about to control the ventilation rate for unoccupied classroom, conference rooms, and multi-purpose rooms.

Under the section for Economizer Fault Detection and Diagnostics, we've added that all economizers for Air-Cooled Unitary Direct Expansion Units greater than equal to 4.5 tons are required to have fault detection and diagnostic systems, and we've specified the requirements for this fault detection and diagnostic capability in Nonresidential Appendix 9.

Section 120.3, Requirements for Pipe Insulation, we've updated the insulation levels in Table 120.3 to match ASHRAE 90.1.

For Section 120.5, Required Nonresidential Mechanical System Acceptance, we've relaxed the

requirement for Acceptance Testing if Economizers are factory installed. So the only time you need to do an Acceptance Test for an Economizer now is if it's a field installation. We've added new Acceptance Tests for Supply Temperature Reset and Condenser Water Reset Controls. And we've added a requirement that, if you use an Energy Management Control System to function as a thermostat, that that control system must functionally meet the thermostat requirements in Section 110.

120.6, Mandatory Requirements for Covered Processes, so the only covered process we had in this section, in the current Standards, is refrigerated warehouses; we've modified the requirements for refrigerated warehouses, we've added definitions for freezers and coolers, which are the more robust definitions and work better with the industry stakeholders than the frozen storage and cooled storage definitions we have in the current standards.

We've clarified which sections apply based on size and type of refrigeration system configurations, and also which requirements apply to newly constructed vs. altered refrigerated warehouses. We've revised the space and surface installation requirements for the warehouse building and clarified the 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, and we've added condensing temperature reset controls.

We've also added efficiency requirements for fan-powered condensers, we've clarified the requirements for variable speed screw compressors. Screw compressors must now vary compressor volume and response to pressure. We have freezer and cooler infiltration barrier requirements, and we have added Acceptance Tests for Electric Resistance Under-Slab Heating Systems, Evaporator Fan Motor Controls, Condensers, and Variable Speed Compressors, and they're located in Nonresidential Appendix 7.10.

The rest of this Section 120.6 is new for the 2013 Update. It includes our Standards as they apply to New Covered Processes, the first one of these is Commercial Refrigeration. This applies to Retail Food Stores greater or equal to 8,000 square feet of conditioned floor area. 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, Liquid Sub Cooling Requirements for Low Temperature Parallel Compressor Systems, Display Case

Lighting Occupancy or Time Switch Controls, and HVAC systems must recover a portion of available heat from the refrigeration system without a significant increase in the greenhouse gas emitting refrigerants in the system.

Moving on to the next Covered Process for Enclosed Parking Garages, basically we're adding requirements to modify the ventilation exhaust rate of garages with design exhaust rates greater or equal to 10,000 CFM, cubic feet per minute. So these garages must now automatically detect contaminant levels, reduce fan airflow 50 percent or less, which maintenance of acceptable contaminant levels. Fan motor demand during this reduction period must be less than or equal to 30 percent of the design fan power, at 50 percent of the airflow. The Carbon Monoxide concentration must be kept at less than 25 ppm at all times, ventilation rate of .15 CFM per square feet, and for all scheduled occupation. So basically the garage, even if it's not being occupied, if it's scheduled to be occupied, must meet this minimum ventilation rate. The specifications for the Carbon Monoxide Sensor Count and Location, Calibration and Monitoring have all been added. And the Ventilation System Acceptance Testing has been added in the Nonresidential Appendix.

The next Covered Process is Process Boilers.

This applies to boilers greater or equal to 2.5 million Btus per hour; they must have a combustion air positive shutoff. The combustion air fan motors that are greater than 10 horsepower shall be variable speed, or have the motor demand limit control such that the motor demand is less than or equal to 30 percent of the power at 50 percent of the airflow.

Boilers that are greater or equal to five million Btus per hour must maintain excess oxygen by no more than five percent by volume, and boilers greater than 10 million Btus per hour must maintain excess oxygen at less than three percent by volume.

Finally, the last Covered Process for the 2013 Update is Compressed Air Systems. This applies to Compressed Air Systems greater or equal to 25 horsepower. There are requirements for the Trim Compressor and Primary Storage required. A Compressed Air System Controller must be installed and the Compressed Air System must be functionally tested with our Acceptance Tests in the Nonresidential Appendix.

MR. SHIRAKH: So this next section is the Mandatory Insulation Requirements for Nonresidential Buildings. Under the current Standards and the previous cycles of Standards, we've never had these requirements for Nonresidential Buildings, there was no mandatory

requirements for insulation. We're changing that this time around for several reasons. You know, we feel building envelope efficiency is basically the first line of defense, is the most efficient way to move towards Zero Net Energy, especially if you're considering tradeoffs against renewables, or even mechanical equipment; it's good to have some minimum insulation requirements.

This will not impact the Standards design budget, it just basically puts some limits on how much you can tradeoff against insulation. So these requirements in 120.7 are for new construction, we have similar requirements in 140 -- I'm sorry -- yes, 140.1, which is Alterations to New Buildings with some modification, they're roughly the same, but we're only presenting here for the new construction.

So for roof insulation, the requirements depends on, for metal buildings, the weighted average U-Factor must be equal or less than 0.098; for wood frame weighted average, U-Factor must be equal or less than 0.075.

Wall insulation, again, the requirement varies based on type of construction. For metal buildings, the U-Factor weighted average must be equal or less than 0.113. Metal frame weighted average U-Factor must be equal or less than 0.098.

For Mass Walls, light mass walls, U-Factor less than 0.44; for heavy mass, it would be less than 0.69.

Wood Frame weighted average U-Factor must be less than or equal to 0.110.

Floor insulation, again, it varies depending on the construction. Raised mass factor must be -- that are greater than three inches of light weight concrete over a metal deck, the weighted average U-Factor must be 0.69 or less. Other floors, the weighted average U-Factor of the assembly must be equal or less than .071.

MS. BROOK: Okay, the next section is 120.8, Building Commissioning. This is a new section for the 2013 Standards Update. For those of you who don't know, Building Commissioning is actually a requirement for all buildings in the State of California. It's been in Part 11 of the Building Code, that's the Green Building Standards. And so what we've done this time is we've basically copied the Building Commissioning text from the Part 11 and moved it into Part 6. So by and large, the most systems that get commissioned in commercial buildings are energy-related, and so our stakeholders actually encouraged us to have all energy requirements in one section of the Building Code, and so we're relocating the Building Commissioning text from Part 11 to Part 6 with this update. And we'll be talking to the Building

Standards Commission about how they want to encourage commissioning of non-energy-related systems in Part 11, going forward.

So we took the existing text, we removed redundant requirements, and we added design review requirements. So the summary of the Commission requirements in Part 6, it includes an owner or owner representatives project requirement, so that it must be documented. The basis of design must be documented. And then what we're inserting new is a design phase design review, which I'll talk about next. We have Commissioning measures that need to be shown in the construction documents, there must be a commissioning plan produced. There must be functional performance testing, which we do pretty -- we do a substantive job of that with our non-residential acceptance tests. There's a requirement for documentation and training of the energy systems and a commissioning report.

Design Phase Design Review is basically, you know, recommended as an improvement to the Code-related Commissioning process because it basically makes a better communication happen between the contractor and the building owner. So what we've included here is Design Review requirements and they vary by building size and system complexity, so it's pretty simple for small

buildings to do their own design review check-off, and for larger more complex buildings that actually requires a third-party design reviewer be part of their design team. In the schematic design phase, there's a requirement for a kick-off meeting with the owner, the design team, and design reviewer, and a completed design review checklist. At the construction design phase, they have to complete the design review compliance form that lists items that need to be checked, and they have to confirm that they have been checked. So they're pretty simple requirements, but we think really make the commissioning process more comprehensive and really get people to think about it earlier in the design process. And we do have examples of the design review checklist on our 2013 Standards website.

So the last of the 120 sections is Mandatory Requirements for Commercial Boilers, and the last time we talked about this, this was included in the same section as process boilers, and our stakeholders told us that that was confusing because it was actually existing within a covered processes section of our standard, and so we've pulled it out here to make it clear that for commercial boilers there are also some mandatory requirements.

So very similar to process boilers, for

commercial boilers greater or equal to 2.5 Btus per hour, they must have a combustion air console shut off. The combustion air fan motors that are greater than or equal to 10 horsepower must be variable speed, or have motor demand limit controls such that the motor demand at less than 30 percent of design power is accomplished at 50 percent of the airflow. Boilers that are greater or equal to 5 million Btus per hour must maintain excess oxygen less than or equal to five percent by volume. And the exception to this is that, if you have a boiler with greater or equal to 85 percent thermal efficiency, you don't have to meet the excess oxygen by volume requirement.

So that's a stopping spot in our presentation that we would welcome anybody in the room to come up to the podium to ask questions or provide comment on those sections of the standard you just heard about, and we can also take comments online.

MR. SHIRAKH: Mike, you're on.

MR. GABEL: Thank you. Mike Gabel, Gabel Associates. On Mandatory Measures 120.7, I'm just reiterating briefly one comment I made to you in writing on metal frame walls; the concern is that, for high-rise buildings, the incremental costs of adding continuous rigid insulation is very high, and I would still

encourage staff to take a look at that. In the studies we did for the cost-effectiveness studies of Reach Codes in 16 climate zones, something like $6.00 to $8.00 a square foot incremental cost because the fire safety rules in that whole assembly cause a great increased expense. So, whether you want to look at that again for 2015 language, I don't know. But --

MR. SHIRAKH: Actually, it may be the case that we changed the 45-day language, but the slide didn't change. I think we may have actually incorporated your comment.

MR. GABEL: Okay, because I --

MR. SHIRAKH: But I'll check.

MR. GABEL: Okay, because I would encourage you to go back to the retrofit -- you have mandatory measures now for alterations only. For that one assembly, I would consider that --

MR. SHIRAKH: Yeah, I think we've actually captured your comment. I'll check and look into it. Thanks.

MS. BROOK: Do we have any other comments in the room? Do we have any comments online?

MR. YASNY: Yeah, there is.

MR. ROY: Can everyone hear me?

MR. YASNY: Yes.

MR. ROY: Okay, I have a couple of comments with respect --

MS. BROOK: Excuse me, sir. Could you just introduce yourself for us, please?

MR. ROY: Yes, Martha, sorry about that. My name is Aniruddh Roy. I represent the Air-Conditioning, Heating, and Refrigeration Institute (AHRI).

MS. BROOK: Great, thank you.

MR. ROY: Sure. My comments are with respect to the tables, you know, 110.2(A), 110.2(D), and 112(E) for Package Terminal Air-Conditioners and Heat Pumps, the first one being the unitary air-conditioners and condensing units, one is I think the size categories that are mentioned in the table, there are some greater than and equal to signs that are missing. You have greater than 65,000 Btus per hour, but for the 90.1 ranges, it should be greater than or equal to. So I think there are some inconsistencies with those tables.

MS. BROOK: Okay.

MR. ROY: Also, for air-conditioners, water-cooled and air-conditioners evaporative cooled, I think you're missing the range, 65 to less than 165. So I would encourage CEC to look into those ranges.

MS. BROOK: Okay.

MR. ROY: And also, for the water cooling

packages, in the first row for air-cooled with condenser, you have under Path B efficiency NA with a superscript d. That superscript d is not consistent throughout the table. There are some NAs that are missing, that superscript, whereas, in the 90.1, those superscripts are present.

MS. BROOK: Okay.

MR. ROY: And also, you know, the footnotes of the table where it says less than 36 Fahrenheit --

MS. BROOK: Uh huh.

MR. ROY: -- design chilled water supply temperature, I think there is a little bit of variance from what is there in the 90.1 table. Also the 32 Fahrenheit is actually less than, equal to 32 Fahrenheit instead of the less than that has been testified in the CEC document, so again, just some inconsistencies. Also, with respect to the package terminals, the reference to the standard could be HRI vs. ARI.

MS. BROOK: Okay.

MR. ROY: So these are just some general comments regarding the tables. And another comment I have is with respect to commercial refrigeration in 120.6.

MS. BROOK: Uh huh.

MR. ROY: There is a statement which says "upright low temperature refrigerated display cases that

are designed for a supply air temperature of five degree Fahrenheit or lower shall utilize reach-in glass doors," and again, I understand where the CEC is coming from, but one concern of ours is that, with respect to this mandatory requirement, it's varying from what the Federal Regulation allows manufacturers to do because, right now under the Federal Regulations, manufacturers are allowed to produce low upright temperature display cases that are open, and essentially this requirement in Title 24 would ban the use of such an equipment class for those manufacturers.

MS. BROOK: Uh huh. Okay -- is that the only thing you have on commercial refrigeration?

MR. ROY: Yes, yes, Martha.

MS. BROOK: Okay, so thank you very much for pointing out those inconsistencies in the equipment tables, we'll definitely fix that because our intent is to basically replicate ASHRAE 90.1, so any mistakes that are just mistakes and not intended, so we'll fix that. In regards to the commercial refrigeration display case stores, we actually took your comment that you provided to us earlier and responded to it by removing that requirement. We agree with you that it's basically a Federal preemption issue, and it's probably not a huge deal for California because, based on our industry

exports, they tell us that everybody is already using doors on these display cases, but we have removed that requirement. So please take a look at our 45-day language and, if you still see it there, then I would be surprised, but it's not intended to be there.

MR. ROY: Yeah, again, the 45-day language which is on the website, it's on page 128, I still see that language in there, so that's why --

MS. BROOK: Okay, good, I'm glad you did because I thought we had taken care of that. So thank you very much for your comment. Anything else?

MR. YASNY: Frank. Is Frank Morrison online?

MR. MORRISON: Yes. My name is Frank Morrison and I'm with Baltimore Aircoil Company. I'm here speaking for TC8.6, the ASHRAE Technical Committee on Cooling Towers and Evaporative Condensers.

MS. BROOK: Uh huh.

MR. MORRISON: And we have some comments regarding some of the definitions and things, which we can send to you.

MS. BROOK: Okay.

MR. MORRISON: I don't think we should take time right now to go over those, they just basically clarify open and closed circuit cooling towers. But the two substantive changes, one is on the minimum efficiency for

cooling towers --

MS. BROOK: Uh huh.

MR. MORRISON: We had been working with the CEC on that and I know you had some high numbers that you would have liked to have seen, but we voted on an increase on open-circuit axial fan cooling towers to 42.1 Cpm per horsepower. And based on your limitation for air-cooled chillers, we feel that's a reasonable number to increase that to.

MS. BROOK: Okay.

MR. MORRISON: And we can send you a sheet on that to document that.

MS. BROOK: That would be great.

MR. MORRISON: Okay. And the second one has to do with the water control for blow down.

MS. BROOK: Uh huh.

MR. MORRISON: I believe that's on page 74 and 75. There are some clarifying wording we'd like to see, but the two substantive changes there is we'd like to see the LSI increased from 2.5 to 2.8 as the upper limit.

MS. BROOK: Uh huh.

MR. MORRISON: And the second one is the exception would be for towers -- currently, it says less than 150 tons. Because of the limitation on air-cooled chillers is 300 tons, we'd like to see that at 300 tons;

that way, the market under 300 tons is on a level playing field.

MS. BROOK: Okay, it would be very helpful to get your written comments so that we can understand them in greater detail and converse with you about that in the next few days.

MR. MORRISON: Okay.

MS. BROOK: Okay.

MR. MORRISON: We can send those in. I know -- I see Gary Klein is on the line, he may also want to add some comments on the LSI issues.

MS. BROOK: Okay, thank you.

MR. MORRISON: Thank you. Oh, should we send that to you, Martha?

MS. BROOK: That would be best, yeah. Uh huh.

MR. SHIRAKH: And to myself.

MS. BROOK: Yeah, cc Mazi Shirakh. That would be great.

MR. MORRISON: Okay, will do. Thank you.

MS. BROOK: Do we have any other comments, Ron?

MR. SHIRAKH: It would also be helpful, you know, if you want your comments to be entered into the official record, to send it to our docket so it becomes a part of the record for the rulemaking.

MR. YASNY: If they send it to dockets and cc

Martha and Mazi, that would work out great.

MR. SHIRAKH: Yeah, generally if you send your comments directly to the docket, they will docket it and then will notify the staff and we all get a copy of it and it's docketed.

MR. STENANECK: Martha?

MS. BROOK: Yeah, this is Martha.

MR. STANONIK: I had my hand raised, but I'm not sure I'm connected. This is Frank Stanonik with HRI also.

MS. BROOK: Yeah, hi Frank. Go ahead.

MR. STANONIK: Hi. I just wanted to make a quick comment. Obviously there's a short period between when the language came out and this hearing, and I just wanted to let you know that, you know, we're still reviewing the commercial boiler requirements with our members, so just because we don't have any comments at the moment, I just want to alert you there still may be some written comments to follow. I'm not sure that we're totally in accord with where this ended up.

MS. BROOK: Okay, so I guess I would just encourage you to send those in as quickly as possible. Obviously, the 45-day comment period is still open, but the sooner that you get them to us, the more time we have to work with you on it.

MR. STANONIK: And there is one thing I wanted to mention because I did -- I did look at the comments you had sent back to us and I think perhaps on this issue about parallel positioning controls, which would apply to boilers over five million, I think maybe I'm a little concerned we actually may have been talking on two different -- information from, let's say, two different perspectives. And what I'm talking about is our comments were related to new boilers which we believe really don't come with this equipment, and I think some of the information you may have seen in the studies was really looking at what people were doing to boilers that existed in the field to comply with NO_x Regulations. And so I'm going to research that a little bit and hopefully clarify that because I think it does make a difference, obviously, in Title 24 when we're talking about new boiler installations.

MS. BROOK: Okay, great. Yeah, so I'm not surprised, this is technical stuff and it's going to take a few iterations for us to work with you on it, so just again, as soon as possible, that would allow us to continue talking about it.

MR. STANONIK: We'll work as quickly as we can.

MS. BROOK: Okay, thank you.

MR. STANONIK: Thank you.

MR. YASNY: Ira Richter.

MR. RICHTER: Yeah, this is Ira Richter from Heatcraft on the refrigerated heat recovery section 120.6. The way it's written, it seems like it's limited to space heating. Would you consider expanding that to other heat reclaim applications such as automobile water heating?

MS. BROOK: That's an interesting point. Yeah, so that's a good suggestion. We can talk about it with the other industry stakeholders and see -- basically, we're just saying that you should reclaim heat and the most obvious place to do that is space heat, but I can't think off the top of my head why we wouldn't also consider water heating applicable.

MR. RICHTER: Yeah, I'd just like to say that hot water heating is probably the most common application at this point in time.

MS. BROOK: All right, well, let me talk to our consultants who guided us through the complex world of commercial refrigeration and, if you could send me a note, I would make sure that I could get back to you on that?

MR. RICHTER: All right. Thank you very much.

MS. BROOK: Thanks. All right, now we're ready for lighting, I think.

MR. FLAMM: Okay, the next series of slides are going to be on lighting controls. We're going to talk about Section 110.9 has been edited for clarity. Self-contained lighting controlled devices have been moved from Title 24 and have recently been adopted into Title 20, so that it is official now, they are officially adopted into Title 20 already. Lighting control systems are going to remain regulated by Title 24 and lighting control systems are no longer going to require to be certified to the Energy Commission, but they will be required to have an installation certificate.

Information about track lighting integral current limiter, some of the elements that were in Section 130 have been moved to Section 110.9 for clarity. The same for Supplementary Overcurrent Protection Panels and Residential High Efficacy LED Luminaires, Light Engines, need to be certified according to our reference Joint Appendix JA8.

Relative System Efficiency requirements that we had for earning a power adjustment factor, this was not a requirement, this was only for earning a PAF. Those have been removed to not conflict with pending Federal ballast luminous efficacy requirements that are expected to be adopted federally soon. And because we're basically requiring more -- increased dimming of linear fluorescent

T5/T8 systems, not dimming but controls, that Power Adjustment Factor has gone away.

Section 130.0, Luminaire classification and power has been edited for clarity. The different types of systems are incandescent systems with ballasts, low voltage lighting, track lighting, LED and miscellaneous. There were a number of requirements for recessed luminaires, basically a floor below which they cannot be labeled. All of that table has been simplified to say that it cannot be less than, it has to be greater than or equal to 50 watts per socket. Because of some misinformation, the standards never have recognized permanent adaptors, but we're seeing it in the language just for clarification. And another clarification statement is that lamps do not change the classification of a luminaire. And there is a global statement that says lighting control must comply with Section 110.9. That statement existed in the current standards in a dozen places, so rather than keep stating it over and over, we just put it into one place here.

The NA-8 default luminaire power options, this is a voluntary table. If somebody doesn't want to follow the Section 130 requirements for determining luminaire power, they can use these default tables. We've gotten rid of most of it. The only things that are remaining

are more current technologies, efficiency technologies, and the thought was that, if you're using an old technology, then you need to provide documentation of what that exists. We did get comments from Mike Gabel in the workshop that maybe we should replace some of that and I've wrestled with that and you kind of have to guess or leave it all there, or just go the direction we're going and have only efficient technologies. So when we get to that point, Mike, if you want to comment more about that.

Section 130.1, or the Application of Lighting Controls, the area controls -- the basically manual on and off controls -- have been edited for clarity and to clarify that it could be a dimmer. There's a requirement that separately controlled lighting systems, that general lighting has to be separately controlled from other lighting systems, floor display, wall display, windows display, case display, ornamental, basically everything needs to be on its own control. And then, if you're using track lighting for multiple purposes, then the general display, ornamental, special effects lighting, shall each be separately controlled.

Multi-level lighting controls, this is for rooms where the room is greater than 100-square-feet and the installed lighting power is greater than a half a watt a

square foot, you have to meet the multi-level requirements in Table 130.1(A) and 130.1(A) basically has different levels of lighting control, depending on the type of technology that's installed. In addition to that, each luminaire has to be controlled with a manual dimmer, lumina maintenance, tuning, automatic daylighting, or demand responsive, so it's one of the following.

Section 130.1(C), which used to be (D) and it was moved for clarity to (C), basically a requirement for automatic shutoff controls. There are requirements for occupant sensing devices, automatic time controls, a signal from another building system, or other device that automatically shuts off the lighting when the space is typically unoccupied, that's basically just clarification language, clarify that no countdown timer switches shall be used. Now, the Standards have never recognized countdown timer switches as an automatic time switch and, again, because of misinformation, this has been specifically added to the standards. However, in doing so, there was some discussions with stakeholders where we now actually allow these countdown timers in smaller bathrooms and closets that are less than 40-square-feet if the countdown timer is less than or equal to five minutes in duration.

The requirements for Partial On Occupant Sensors to be added in addition to shutoff, so this is to shut off the lighting partially in aisle ways and open areas and warehouses, in library book stacks and corridors and stairwells. And there are requirements for partial occupant sensors in some spaces instead of shutoff, so in stairways and common areas, basically in high-rise residential and dwelling units, hotel/motels, and partial off occupant sensors in parking garage parking areas and unloading areas.

Section 130.1(D), which used to be (C) again, that was rearranged for clarity, clarification definitions on what are daylight zones. There are mandatory daylight controls that no longer have the off ramps that we used to have. All skylit daylit zones and primary sidelit daylit zones shall be shown on the building plans. Luminaires that are in skylit daylit zones shall be separately controlled from primary sidelit daylit zones, there are requirements for the daylighting control device installation and operation, and there are requirements -- new requirements for parking garage daylighting controls.

Demand Responsive Controls -- staff is considering changing this language from 45 to 15-day language. Basically, what the language says is, if you

have a building greater than 10,000-square-feet, which is being reduced from a current standard of 50,000-square-feet for only retail, but this is all buildings now, and if you have Section 130.1(B), it's required, then you have to basically put in this Demand Responsive Control. So there are some conflicts in that current language in that we are looking at complete buildings and areas together, it's kind of like mixing apples and oranges, so we are looking at proposing different language, similar intent, but different language for 15-day language.

Section 130.1, Outdoor Luminaires, simplified to basically say incandescent luminaires that are rated greater than 100 watts shall be controlled by a motion sensor. And the luminaire cut-off requirements have changed from the old IES definition of cut-off to the new IES definition of bug, which is basically backlight-uplight glare, and the wattage threshold is being reduced from 175 to 150 watts.

Indoor lighting, controls for outdoor lighting -- actually the header on this slide is wrong -- photo controls or astronomical time switch controls are required to automatically turn off the lighting during daytime. Outdoor lighting needs to be controlled independent from other electrical loads, basically pedestrian height luminaires, those are mounted greater

than or less than 24 feet, need to have a motion sensor to reduce them partially when no one is around, a requirement for part-night device on motion sensors on specific areas, and basically for outdoor sales, building facades, etc., another option for centralized time clock for building facades, ornamental, outdoor lighting.

Section 130.3, Signed Lighting Controls, there's no substantive changes; however, it's been edited for clarity. Section 130.4, the Acceptance Requirements, the section has been edited and split into two different subsections. There are acceptance requirements, which site non-residential appendix NA-7, and the acceptance requirements are for automatic daylight controls, shutoff controls, demand responsive controls, and outdoor lighting controls. The other section of 130.4 are installation certificate requirements. These are basically where the Standards are not mandatory, but credit is given, or additional power can be earned, a requirement for an installation certificate to be signed. So that includes lighting control systems, as I said in the earlier, that's Section 110.9, Lighting Control Systems are still regulated by Title 24. And Energy Management Control System has to have the installation certificate, line voltage track lighting, integral current limiters, and supplementary overcurrent

protection panels if interlocked lighting systems are being claimed, if somebody is earning Lighting Power Adjustment Factors, and if additional wattage is being claimed for a video conferencing studio, all of those require an installation certificate.

The new section is 130.5, Electrical Power Distribution Systems, what is newly required is user accessible metering for buildings in accordance with Table 130.5(A), and a requirement for disaggregation of electrical loads basically on bigger buildings. There are minimum voltage drop, which are identical to ASHRAE 90.1. Their requirement for circuit controls for 120-volt receptacles, so basically half of the receptacles in each private office, open office, reception, kitchenette, and copy room, need to be on an automatic control to allow the user to turn off those sockets, those receptacles. There are specifications for what a demand response signal must be and there's a requirement that if you're going to install an energy management control system, that it has to provide all of the applicable functionality that are in the standards. And those are the lighting control requirements. And any comments?

MR. SHIRAKH: Anything online?

MS. BROOK: I feel like I need to scream "wake up!" I can't believe nobody has comments. They must not

be listening. Okay, we're moving on to Section 140.1. This is just a general section of the Standards where we explain the Performance Compliance Approach and the term "Energy Budget," so we clarified the basis of the performance compliance approach in the section, basically got rid of a lot of confusing text, and boiled it down to just a few concise paragraphs, and we also clarified in this section that the compliance software approval process is documented in the Nonresidential ACM Approval Manual, this is also explained in our Administrative section. And over to Mazi.

MR. SHIRAKH: So this 140.3 used to be 143, is where we describe the Prescriptive Requirements for Building Envelope, and the most significant change here has to do with nonresidential roofs. There are two kinds, there's steep slope, there's basically no change from 2008. Still, we are asking or requiring a reflectance of .20, which is the existing requirement and the thermal emittance hasn't changed until .75. Related to low slope roofs in all climate zones, the minimum aged solar reflectance is proposed to be raised from the current .55 to .65. And that's the age reflectance. And the thermal emittance remains the same, and then you can also comply using an SRI of .78. What we are proposing to do in the 15-day language is provide a prescriptive

alternative where you can trade-off insulation for reflectance, which is reflected in this table here, you can go all the way down to .50, you know, if you provide an additional R-12 on the roof. So this is meant to basically provide more flexibility for the roofing industry and if they have existing products, that doesn't quite mean the .65, that wouldn't shot them out of the market, you know, they can put a little bit additional insulation and still install their products. In addition to this, they can also use the compliance offer trade-off approach. We're hoping to have a version of this software which will allow relatively simply tradeoff. You know, we used to have an overall envelope equation which was kind of unruly, we could never tame it, and we've decided to abandon that and instead come up with a simplified compliance software approach, which hopefully will make it easy, and the idea of this software is that you don't have to do a full-blown simulation, the software will neutralize many of the non-relevant fields. So you can only do the tradeoffs for the fields that you want. So that is the changes related to roofs.

We also have several proposed changes for side fenestration windows and there's a four bullets here, there's a lot of changes, we haven't captured any of them, just not room here, we have basically

representative numbers; you know, to see the full changes, you need to go to the 45-day language or the NOPA. And the first bullet for non-residential buildings, these are all weighted average U-Factors. For fixed windows here, we've proposed to be no greater than .36; again, this is a partial listing. These U-Factors will change whether it's operable window or fixed window, in blocked glass, so we've only presented the typical -- for one of the examples here. The second bullet for nonresidential buildings, area weighted performance rating, relative solar heat gain, and a coefficient again for fixed windows will be no greater than .25. The third bullet for nonresidential buildings, Area Weighted Performance, the VT transmittance, again, just for fixed glass is proposed to be no greater than .42. And for dynamic glazing, these are the electrochromatic windows that kind of change with any amount of daylight and these are very cool products, but still rather expensive. The U-Factor SHGC and VT will be listed. They can use the listing on NFRC label and it's going to be the lowest of those values; basically, we're giving them the highest possible credit for these products.

For skylights, same as before, you know, the numbers here are only for one product out of many possible, so you need to go to the language. For

nonresidential buildings, again, area weighted performance, the U-Factors for glass curb mounted skylights no greater than .58; for non-residential buildings, area-weighted performance rating for solar heat gain for the same product is .25, no greater than .25. And the third bullet is for non-residential buildings, area weighted visual transmittance for curb glass mounted skylights, no greater than .49.

There are new requirements for air barriers in Section 140.3(A)(9), this is a continuous air barrier to control air leakage into the conditioned space, shall be installed to building envelope in Climate Zones 10 through 16, and then there are some exceptions. And they can be met by testing of the material assemblies or the entire buildings, so there are two ways to comply, you can test a building and if it passes the test, then you're in compliance. Section 140.3(B), this was the old overall envelope measure, which I just mentioned, and we've been having problems with these equations, we couldn't tame it; in 2008, we tried to go to an Excel-based spreadsheet, which we ended up with about 900 coefficients, and so forth. So we basically tried to abandon it and go to the performance software. There is also a possibility that, through the Compliance Manual, we can come up with another alternative, you know, when

we have more time to go back and revisit this.

Some changes and new requirements for minimum daylighting requirements in large spaces, the current threshold is 8,000-square-foot under the roof; we're dropping that down to 5,000, so more buildings will have to comply.

Greater than 50 percent of the floor area in the skylit daylight zone, it changed to 75 percent. Now, it used to be that 50 percent of your floor area had to be within the skylit daylit zone, whether it was top skylight or side lighting. Basically, the requirement is that this changed to 75, so more of your floor area now has to be within the skylit zone.

And there is no longer a minimum skylight area or effective aperture requirement, you know, we basically abandoned the effective aperture. We have provided a version of the effective aperture as an alternative to the Prescriptive Requirements, but that is just an option. People can use or not. It's not a requirement. Comments?

MR. CALLAHAN: Hi, my name is Bill Callahan, I'm Executive Director of Associated Roofing Contractors of the Bay Area. I'm representing my association today, as well as the Union Roofing Contractors Association, which is a counterpart organization in Southern California.

Between us, we represent about 100 Union Roofing Contractors in the State, we employed about 3,000 Union Workers in the last year, and we performed over four million hours of work in roofing, primarily in commercial and industrial. We need -- what we are large companies that deal with difficult work. We very very rarely ever see a flat roof with no skylights and no penetrations. We see roofs that are littered with machinery and equipment, HVAC units, photovoltaic panels, difficult for us to do work, but it's the kind of work that requires a very skilled workforce in a capitalized company, and that requires more moxie than your average roofing company needs. And from a regulatory point of view, what we need is flexibility, we need to offer our customers, who tend to be pretty demanding, folks like laboratories and refineries and research institutions, University of California, we need to give them compliance options, give them the roof they want at an affordable price and, because our guys tend to be good and employ people like me to explain codes to them, ones that are within the regulations and within the law. And right now, we've got a fair amount of flexibility. We can put on a cool roof, we can put on a non-cool roof, and put above-deck insulation to compensate for it, or we can put on a non-cool roof and go under the roof deck to compensate. And

by eliminating the overall energy TDV approach in 140.3(B), you're taking flexibility out of our hands. You're taking something we have now and removing it, and all we've got left is the promise that, at some future point, there may be software that might allow us to do what we're doing now. But it seems to me premature to remove what we have and that we can use successfully, and replace it with a promise that something will be developed in the future. Frankly, the track record of developing compliance software around here is not particularly impressive, honestly.

Now, it may be true that trying to apply that approach to an entire building envelope is difficult. There are a lot of components to a building, but we're talking about a roof, you're talking about a handful of equations -- I can do it, and I don't have a doctorate in mathematics, my members can do it, I've explained to them how to do it, I've written a compliance manual, Payam vetted the calculations, we know how to do it, it's not rocket science, and it is useful to us. We'd like to keep it.

Now, I want to go to one other section to explain why this whole thing bothers me a little bit, and my members. If you go to proposed exception 1, to Section 141.0(B)(1)(b), and that's on page 230 of the 45-day

language, that says the overall envelope energy approach to Section 140.3(B) may be used and the standard building shall be based on the higher roof/insulation ceiling insulation value of the following, and it goes on to explain what your options are, what parameters you have to stay in with. Every one of my colleagues who looked at this said, "Oh, this is cool, nothing has changed. We can still do what we've been doing and that's great. We have flexibility." But it's only when somebody like me, who is a little obsessive compulsive, actually traces back the reference to 140.3(B) to find out that it's not, it's not there anymore. That's a problem. My guys thought that they were going to keep what they had, but in fact you're proposing to eliminate it and, again, what we end up with is a promise that there may be something in the future, you know, if the Executive Director approves it, and if it meets certain criteria. But we have no alternative right now, nothing in hand. For the time being, or until such time as somebody comes up with a new formula, a new approach, a new software, and nobody should hold their breath on that one, options are taken off the table. The area below the roof deck is now off limits and we can't deal with that. I see you're disagreeing.

MS. BROOK: I do disagree, but go ahead, keep

going.

MR. CALLAHAN: We don't think you should do it. We think you should keep it, or if you're concerned that the overall approach to an entire building is too complicated, then live in a choose to individual building components, or retain the components that we have, the cool roof multiplier, the couple of tables we need to figure out what do we need to do to substitute insulation for a non-cool roof. Very simple solution, you want to remove it in the future, replace it with something better? Great. But we were told back in October when this was first proposed for removal that you were working on the software; we haven't seen anything since.

MS. BROOK: Yeah, so this is Martha, and first off, we gave you right there the tradeoff for insulation, so we've definitely given you the availability to tradeoff insulation --

MR. CALLAHAN: The term is continuous insulation that is defined throughout the Energy Code as insulation above the roof deck.

MS. BROOK: So we're only --

MR. CALLAHAN: And if you look at the values, the difference you go below because the roof rafters, so --

MS. BROOK: You need to come to the table. So are we only giving them the tradeoff above the roof deck?

MR. BOZORGCHAMI: Currently, yes.

MS. BROOK: Okay, so this approach gives you the tradeoff above the roof deck, we have -- we've always had, because we are mandated to have, the performance software that you can tradeoff anything for cool roofs, so you always have that approach, we're not taking anything away from that, but what we are doing is we're taking away an equation that was significantly flawed and we could not defend it, it's not defendable in the way it exists in the current Code, and we did not feel comfortable continuing that into a future Code update. And so, because we didn't have the resources to replace it, we are providing the mechanism of the compliance software, the performance approach, to allow those tradeoffs to happen. And if industry really wants this one envelope-only tradeoff mechanism, they could work with us, we have an open source software collaborative established for the compliance software, they can come into that collaborative and help us get what you want. So we want to work with you, but we can't continue in Code to have a flawed mechanism for tradeoffs. It's just not appropriate.

MR. CALLAHAN: Well, from my personal opinion, I don't know that it's flawed, there's nothing in any of the documentation to say it's flawed, it says it's

complicated. We did trade business cards in October and I volunteered to help work with you, I haven't heard from anybody in the Energy Commission in five months.

MS. BROOK: Right, so --

MR. CALLAHAN: Instead of what we had was a reserved section --

MS. BROOK: Uh huh.

MR. CALLAHAN: -- and a deletion, now we have, well, what appears to all of us to be a promise that we're going to replace it with something in the future if certain conditions are met and, again, we just haven't seen a lot of --

MS. BROOK: Right, but you --

MR. CALLAHAN: -- production.

MS. BROOK: -- but you have to depend on the performance approach for this for now, that is a promise you can count on because it's a mandate, we can't implement the Standards without the performance software. So you always have that approach. And if we have time and resources, working with you hopefully to help on the resources side, we can get a simplified envelope tradeoff approach that works for all your members.

MR. CALLAHAN: Well, that's something we'd like to have now and have it before we have to give up what we have. And, again, it's something we use that we all

understand, and that I've written a manual about, and it's useful to us. To give it up in exchange for something we can't see -- and we've been down that road before.

MS. BROOK: But what you have now is not -- is something that we can't defend as professional staff at the Commission, and proceeding down a Standards update. We don't feel comfortable that that approach is really appropriate the way that it's designed now, it's flawed.

MR. CALLAHAN: Well, for each individual envelope component? Or for the entire --

MS. BROOK: So the problem is that it's so complex and it has so many different parameters, and we can't trace back to understand how it was developed to be able to defend it, and we really think we need to do that work before we could promote it in the standards.

MR. SHIRAKH: Mr. Callahan, maybe another alternative, we have that table in front of you for continuous insulation, there's nothing to prevent us to create another table for other types of insulation. And we can basically add that as a prescriptive alternative.

MR. CALLAHAN: That would be nice.

MR. SHIRAKH: We can do that with 15-day language.

MR. CALLAHAN: Yeah, it would be nice to have

before the next Code cycle --

MR. SHIRAKH: I'm not talking about before the next Code cycle, I'm telling you in the 15-day language, we can expand, have another table that has the batt insulation --

MR. CALLAHAN: The batt insulation, or blown-in, or whatever that we could refer to, that would be great.

MR. SHIRAKH: That's what I'm offering.

MR. CALLAHAN: That would be terrific and we would not have a problem with that.

MR. SHIRAKH: The mic, Payam, don't let him get away with it.

MR. CALLAHAN: Okay, thank you.

MR. SHIRAKH: Thank you.

MR. HITCHCOCK: Good morning. Reed Hitchcock with Asphalt Roofing Manufacturers Association. I have more detailed comments I'm going to share later because they don't make sense now until the afternoon section is over. But I just wanted to indicate support for some of the concerns that Mr. Callahan raises. And we have a fundamental problem with backing proposals, especially we're moving ACMs, we're taking this out, what have you, until all of those things are in hand. Until we can really see what it looks like, it's a very slippery slope to say, "Yeah, we agree," "No, we don't agree." Again, I

think there's a lot that still needs to be worked out and it feels like this meeting is very very premature. But again, I'll comment more later, but I did want to support my colleague.

MR. SHIRAKH: Okay, thank you.

MR. BROOK: So are your members just concerned with below deck insulation?

MR. HITCHCOCK: Oh, no, we have concerns across the board.

MS. BROOK: No, I mean for this tradeoff approach.

MR. HITCHCOCK: No, no, I mean, any type of insulation is a tradeoff, is something that we want to see.

MS. BROOK: So would you be satisfied with Mazi's proposal to just have another tradeoff table for below deck insulation?

MR. HITCHCOCK: On the issue of insulation, possibly. I'd have to see what the table looks like. I mean, right off the bat, you know, we've said before going down simply to a tradeoff of a .50, we think limits still a lot of products, if you look at the CRC database. But again, that's an argument for --

MR. SHIRAKH: I mean, we've picked .50, but if you have to go lower, we can go lower for more

insulation, it will be -- you want to consider batt insulation? I mean, there is nothing to prevent --

MR. HITCHCOCK: There should be as many alternatives as possible.

MS. BROOK: There is, it's called a performance approach.

MR. SHIRAKH: There is the performance approach.

MR. HITCHCOCK: It doesn't exist yet.

MR. SHIRAKH: No, we have a mandate --

MR. HITCHCOCK: I understand that, but you don't have a mandate to make it work.

MS. BROOK: It never exists at this time in the Standards.

MR. SHIRAKH: The Standards cannot become effective if we don't have the software.

MR. HITCHCOCK: But until you can see at least to some extent what that looks like, especially, "Oh, you know, the other day when we talked, we took that out of the Code and we put it into the ACM." Well, that's great, now that's one more factor in the Code that we can't see or comment on as part of this cycle. And, again, you have to understand, that's very dangerous for our industry and, you know, my testimony later is on behalf of 16 trade associations that couldn't be here.

MS. BROOK: Uh huh.

MR. HITCHCOCK: And so, again, I don't want to preempt any of that because there are factors on new construction and reroof in that, but it is concerning.

MR. SHIRAKH: Okay, so for now, we'll be happy to work with you to expand these tables so that you will have something in front of you.

MR. HITCHCOCK: I think the other important thing there is sort of a common understanding of what working together is because that's been an issue in the past. Thank you.

MR. SHIRAKH: Okay.

MR. GABEL: Mike Gabel again. Relocatable Classrooms, I think you still have window-to-wall ratio in there. I would strongly recommend taking out window-to-wall ratio and just setting it as the value for 20 percent window-to-wall ratio or higher, which is a .26 SHGC. I mean, it just seems odd to continue that paradigm and that metric, and I think you're not going to give up anything by doing that.

MR. BACCHUS: Jamy Bacchus, Natural Resources Defense Council. I applaud the Committee on what they've been doing at the Commission and I'll point out, in the case reports on the SRI and the roof reflectance that we didn't capture any non-energy benefits like urban heat island effect, so if you start allowing really really

dark low Albedo roofs and tradeoff with more insulation, that would be saving the same energy to the customer, but it doesn't have the same societal impact.

MR. SHOEMAKER: Metal Building Manufacturers Association. Our concern is with the competition there seems to be now for the roof area. You know, we're increasing the number of skylights to effect daylight and we think that's good, we've seen these studies that show the benefits of that. But in the afternoon session, you're going to be talking about the solar-ready zone of the roof, of 40 percent of the roof, and we're concerned that we are running out of space up there in terms of putting skylights and then now setting aside 40 percent of the roof area for solar panels. We haven't seen any real good studies of showing how that's all going to fit on the roof, and having sufficient pathways, firefighting, you know, it's going to be very congested roof and we're just concerned about that. We'd like to see some more layouts of how this is all going to fit on the roof.

MR. SHIRAKH: Patrick Saxton here? Does he have any -- go ahead, please.

MS. DICKIE: Amy Dickie from the Global Cool Cities Alliance, and I wanted to also voice support for the proposed changes, and also echo the comments from the

gentleman from NRDC that the added reflectance has the urban heat island benefit and that's an important thing to keep in mind when considering the tradeoffs. Thank you.

MR. SHIRAKH: Thank you.

MR. HITCHCOCK: Reed Hitchcock with ARMA again, Asphalt Roofing Manufacturers Association. Just in light of comments on the societal benefit, there's a lot of debate out there right now. My understanding is that the CEC is about energy, not necessarily about heat island. I encourage those that are interested in that space, there's a great paper that's come out from Stanford University that counters some of the common conceptions and misconceptions about cool roofing and urban heat island. So my only point is that my understanding this is about energy and not society. Is that true?

MR. SHIRAKH: Yeah, I think we have a mission for both, so….

MS. BROOK: Are there some key words you could give us so we could find that Stanford University --

MR. HITCHCOCK: I can give you the actual title of it.

MS. BROOK: Okay, great. Thanks.

MR. CALKINS: Good morning. My name is Jim Calkins, I'm the local technical sales representative

from Sika Sarnafil here in California. Fundamentally, we strongly disagree with any changes being made to the Prescriptive Requirements in Title 24. To date, no comprehensive compelling evidence of quantifiable benefits have been presented justifying the proposed changes.

MR. SHIRAKH: Which prescriptive requirement are you referring to, sir? For the roofs?

MR. CALKINS: Yes, for roofs. Conversely, the changes are likely to lead to significant disruption in the marketplace, particularly in light of the very short timeframe to implementation. These changes will not benefit the State, nor the consumer, and may result in the introduction of untested products rushed to market without proper long-term testing. Untested products carry a high risk of having shorter service lives for the building owner, the ultimate waste of resources. The CEC's willingness to move on some elements of the original proposal such as reducing the emittance requirement from .85 to .75 is recognized and appreciated. There are, however, still numerous problems with the current proposed language. There is absolutely no credible scientific basis for having different prospective reflectivity requirements for new construction and alterations. Additionally, the

potential energy cost savings differential between .63 and .65 aids reflectance are at best in the order of one-tenth of one penny per square foot per year. Considering the numerous ranges of air in many of the parameters of the model, the tolerance is in the measurements of the property, etc., there is no statistical difference between the two. If the prospective reflectance value is to be increased from .55, it should be set at .63 for both new construction and for alterations. Similarly, there is no reason not to allow the insulation tradeoff to be applicable to both new construction and alterations. Low levels of compliance appear to be one of the program's most serious issues, there are no doubt many reasons for this, and although we believe this is a critical problem, this is clearly not the forum to begin these discussions. We are certain, however, that we can all agree that increasing the complexity of the prospective requirements by having differences in age reflectance and Solar Reflectance Index Values, and in the allowance for the use of insulation tradeoff between new construction and alterations will only lead to further confusion and, no doubt, even lower levels of compliance. There is no need whatsoever, or any benefit to be gained doing so. Prospective requirements should be simple, transparent, and easy to understand for all

stakeholders. The data supporting the need for any change is still sorely lacking and we believe maintaining the status quo would be the best under the circumstances; however, if changes must be made, we believe the compromises we and others have proposed will allow the CEC to achieve their objective by raising the bar with each Code cycle, not eliminating, but reducing market disruption. We appreciate the opportunity to communicate our position to the CEC, and we urge you in future Code cycles to engage the industry much much sooner in the process, the adversarial situation created by inviting industry's participation so late in the process could be one of cooperation if the parties were not operating under such difficult time constraints.

MR. SHIRAKH: So your compromised proposal is .63 for both alteration and new construction?

MR. CALKINS: Correct.

MR. SHIRAKH: And I didn't quite understand related to insulation tradeoff, what is your position on that one?

MR. CALKINS: We're fine with that, it's just making it uniform for all areas.

MR. SHIRAKH: And are you a member of ARMA?

MR. CALKINS: I'm representing Sika Sarnafil, a membering manufacturer.

MR. SHIRAKH: Okay. Thank you, sir.

MR. CALKINS: Thank you.

MR. DEVITO: Hello. Eric Devito, Cardinal Glass Industries. I've participated in these workshops before and thank you again for the opportunity. A couple of -- I'll keep my comments pretty brief -- specifically on the fenestration Prescriptive Requirements, we worked with staff a good bit and provided our comments. I still have about three things that I want to bring out today, 1) the EA formula that got added to for the minimum VT requirement, you know, we personally have not supported that particular formula, we certainly understand staff's reasoning for putting it in. We still do not support it. At the same time, if it has to be there, we also don't support the .11 factor, we've submitted comments on that before. We thought a higher factor above .11 was more appropriate, and our concern for that is that a .11, if driven out in a 40 percent window-to-wall ratio, for example, would equate to about a .28 minimum VT requirement. Well, when you compare that back to the prescriptive requirement, it's much lower than what the Prescriptive Requirements are. We think it's a big giveaway, particularly with curtain wall. And we've made those comments known and we reiterate that position. But, again, we would welcome the opportunity to continue

discussing that one, I won't dwell on it much longer today. We have submitted written comments on that and probably will do it again.

Some very specific comments, in the VT requirement, I guess it would be 140.3(D), where the language requires an area weighted average of visible transmittance, you know, less than the values, it says "or shall have a…," it gives the requirements of meeting the table, and it says, "or shall have a VT determined in accordance with NFRC," and then it says "or equation 140.3(B)." I think the "or" related to the NFRC requirements doesn’t belong there. 110.6 already requires a minimum of VT be met. The way it's being written here, it's almost as if you just, you know, get a VT in accordance with NFRC 200, you've met the minimum VT requirements. So I would like -- and I can discuss this further with you afterwards -- I think that language should be removed from (D).

The other question I have is with regard to the U-Factors in the prescriptive tables. For the nonres, pretty much every value in both tables for RSHG and VT are identical between nonres and the hotel, except for U-Factor. In the nonres table, it's .47, and in the high-rise and the hotel table, it's .45. They're very close, I think for market transformation reasons, there's no

reason why they can't be the same, whether it's .45 or .47, I'm not really suggesting either one, I just think whatever they are, they should be the same, maybe split the difference and make them .46 just as an average, but with all the values being pretty much identical except for those two, the U-Factors, that is, I would suggest that you make them the same. It would just be easier for compliance. And that's all I have right now. Thank you.

MR. SHIRAKH: Thank you. Ken.

MR. NITTLER: Good morning. Ken Nittler with Enercomp. One of my business interests is I operate a business that does NFRC ratings, and I know quite a bit about the rating of fenestration products. I'm looking at the language on the dynamic products and I think it's slightly a case of a slippery slope. I can't name too many other products in the standards where we start off by assuming the very best possible values. I understand your arguments about the cost, however, again, I can't name anywhere else where we start off by assuming the very best values. I would suggest you reconsider using the best values as a starting point. I think dynamic glazing is a case where performance calculations with reasonable assumptions about how they're controlled is the ideal place to take care of that. And finally, there's sort of a very -- at least do the following,

which is there is a real inconsistency -- most of these dynamic glazings, some sort of power source is supplied, you get, say, a lower solar heat gain; at the same time, you get the lowest solar heat gain, and you get the lowest visible transmittance. And what this proposal here does is they get their cake and they get to eat it, too. They get at the same time the lowest U-Factor, the lowest solar heat gain, and the highest visible transmittance. And those, I can sort of see, if you really want to go lowest or something, but on visible transmittance, then you should also use the lowest and not the highest. But my real problem is from a Building Code perspective, I don't know of too many other things where we would choose to choose the very best performance values. I don't know whether the assumptions in here have included some of the power and energy that's needed to make these products dynamic. So that would be my suggestion.

MR. SHIRAKH: Actually, I talked to Nelson, I don't know if he's here, this morning about this same issue and he tells me this is basically what is in IECC. Is that true?

MR. NITTLER: Well, I've been a participant at the IECC for 20 years and don't let that confuse you as a good Code choice!

MR. SHIRAKH: Well, it sure confused me.

MR. SAXTON: This is Patrick Saxton with the Energy Commission. There was a prior comment about the solar ready roof reservation for three-story and fewer nonresidential buildings. We're actually going to cover the solar-ready requirements tomorrow and Tuesday in more detail, but there is information in the Case Report on the amount of roof area obstructed, there's also an alternative allowance for a space that's off the roof of the building, and I could discuss that offline with anyone who had additional questions.

MR. SHIRAKH: Thank you, Patrick.

MR. BACCHUS: Jamy Bacchus, NRDC. I'll echo some of the comments made by Cardinal Glass that we support the case author, Eric Shadd, from AEC's comments initially that the effective aperture allowance for .11 over the window-to-wall ratio, that's gone, but essentially the same formula is still there, which would allow a dark glass in a high percentage of glazing.

MR. SHIRAKH: Well, we actually when we -- this was a result of a long negotiation with them and Cardinal Glass was very helpful and, you know, was very instrumental where we landed. But we had to negotiate with the other members. And so we had our Prescriptive Requirements, the VT, SHGC, and the U-Factor, and then,

so as a compromise, we offered this modified formula and when we had Mudit at HMG and John McCue and they all looked at how much energy we were giving up -- we are giving up some, but not a whole lot, I mean, as a whole; this is a huge improvement over 2008.

MR. BACCHUS: Uh huh.

MR. SHIRAKH: And there is precedence in the Code to actually step things in, kind of phase them in and not go all at once to allow industry to adjust, so this was a response to that. So, you know, our feeling is that we're still saving a ton of energy, we have given up some, and we're going to monitor to see how industry responds. And if you have our registries and the repositories, we can see what kind of glass is going in, what type of practice it is, and based on that in the next Code cycle, you know, we'll make adjustments as needed.

MR. BACCHUS: Understood.

MR. CONTOYANNIS: This is Dimitri Contoyannis with the AEC. We're a contractor to the Energy Commission. We've also been heavily involved in the case efforts here. And I just wanted to address a comment made by the gentleman from Sika Sarnafil about the cost-effectiveness of the cool roof proposal. I'd just like to state for the record that every new proposed measure

that has gone through the case process needs to demonstrate cost-effectiveness and there's a very rigorous calculation methodology that has been specified and released to the public, and all the proposed new measures do meet the cost-effectiveness requirements. Thanks.

MR. SHIRAKH: Thank you, Dimitri. Any other questions or comments?

MR. YASNY: There's a Charles Cottrell online.

MR. SHIRAKH: Okay, go ahead, Charles.

MR. COTTRELL: Yes, this is Charles Cottrell representing the North American --

MR. SHIRAKH: We're not able to hear you. We hear every other word.

MR. COTTRELL: Hello. Okay, sorry. Charles Cottrell, representing the North American Insulation Manufacturers. I just wanted to state that our association and members support the revisions to the Title 24, but we do encourage CEC to work with the roofing industry to try and resolve some of their concerns regarding the cool roof issues. And I know that there are some tradeoffs available, but believe that maybe we could expand those to include different systems and improve the overall usage or user-friendliness of the new Title 24 provisions. Thank you.

MR. SHIRAKH: Thank you. And, again, I think we've already committed to looking at perhaps expanding this table that's on the slide, you know, to other types of insulation and maybe going a little bit lower. You know, we'll be working with the industry perfecting that language. Thank you.

MR. COTTRELL: Sure. And we would offer to lend whatever expertise we could to that process, so thank you.

MR. SHIRAKH: Thank you. Any other questions on this? Okay, if there are no other comments, we're going to move on to the next section. Thank you.

MS. BROOK: Okay, Section 140.4, Prescriptive Requirements for Space Conditioning Systems. In the section on Power Consumption of Fans, we've removed the requirement for variable air volume fans greater than 10 horsepower to be variable speed. This is replaced with a new section I'll talk about later. And we've added efficiency requirements for HVAC pump and fan motors from 1/12 horsepower to 1 horsepower.

For Space Conditioning Zone Controls, for systems that have direct digital control, we've added control requirements to reduce the degree to which primary air is reheated. For economizers, we have updated Table 140.4(A), the economizer tradeoff table

that allows you to install highly efficient air-conditioning equipment instead of installing economizers, we've updated the efficiency requirements needed for that tradeoff, updated Table 140.4(B), the air economizer high limit shutoff control requirements. We've eliminated several types of economizer control types related to the enthalpy controllers that have high maintenance costs and are difficult to keep calibrated. So those are no longer allowed to be used in the State of California. Economizers and return air dampers on the individual cooling fan systems have requirements for warranty, drive mechanisms, reliability, leakage adjustments to adjustable set points, stamp or control sensor locations, sensor accuracy, sensor calibration data, prevention of sensor false readings, and relief air systems. So these are all new functional requirements for economizers and return air dampers.

Interlocked controls such that mechanical cooling only comes on when economizer is 100 percent open, has been installed as a new requirement. And direct expansion systems with economizers must be able to stage or modulate cooling capacity for constant volume systems less than 75,000 Btus per hour. They need to have two stages of cooling capacity starting when the 2013 standards are implemented in January 2014. For

systems that are smaller, for 65,000 Btus per hour, this requirement will kick in January 2016, again, for two stages of cooling capacity. And then, for variable volume systems starting in January 2014 that will require three or four stages, depending on the size, and the timing of these requirements have been negotiated with HRI and their members, and are aligned with the proposed work that is getting done in the new ASHRAE Standards.

For Minimum Chiller Efficiency, we have a requirement that chillers must meet or exceed the Path B efficiencies listed in the Table 110.2, that's the ASHRAE Chiller Efficiency Table. The table itself includes Path A and Path B, and we're requiring that Path B efficiencies be met.

Limitation for Air-Cooled Chillers, it has been modified so that chilled water plants can provide up to 300 tons with air-cooled chillers.

For Fan Control, this is a new section that replaces the earlier Fan Control Limitations. The Fan Control Systems must vary the airflow rate as a function of actual load, either two-speed or variable speed with fan motor demand limitations for constant volume systems, two-stage fan controls required for variable volume, commercial fan controls required. And, again, the timing for this, direct expansion systems of 75,000 Btuh, and

chilled water and evaporative systems greater than or equal to 1HP fan motor starting right away, January 2014, and then smaller systems will have the requirement kick in January 2016. That's all we have for mechanical prescriptive requirements. Do we have any comments or questions, or anything at all?

MR. MORRISON: This is Frank Morrison for TC8.6, on the air-cooled chiller limitation, we had submitted some comments earlier in the process, but two that we'd like to still comment on are the first exception to the air-cooled limitation, which is water quality.

MS. BROOK: Uh huh.

MR. MORRISON: And our comment is that we'd like to see that deleted because the industry offers a wide variety of material construction options that can handle virtually any water quality. And then the last exception, which is for -- I'll use the quote -- "high efficiency air-cooled chillers," it's been virtually impossible to get this list of high efficiency air-cooled chillers, so we'd either like to see that deleted or some more visibility as to what this list is.

MS. BROOK: Okay.

MR. MORRISON: And we'll include those in our comments to you.

MS. BROOK: Okay, that would be great. Thank you very much. So, yeah, we're always looking for exceptions that aren't particularly valid any longer, and so we will definitely review these to see if we can remove those. So thank you very much. Any other comments?

MR. MORRISON: One other one.

MS. BROOK: Yeah.

MR. MORRISON: Have you gotten to page 187? Would that include that on the fan speed control for heat rejection equipment?

MS. BROOK: Yeah, we're there, uh huh.

MR. MORRISON: Okay. There is an ASHRAE 90.1 addendum that is going to come out for public review very shortly and it basically has to do with controlling the fans on heat rejection equipment.

MS. BROOK: Okay.

MR. MORRISON: And we'd like to see that also included in Title 24 if for no other reason than they stay in sync, but also that it would save energy. And it's basically in a nutshell calling for when you have moveable cells of heat rejection equipment to say open circuit axial fan cooling towers, that you run all the cells that you can in order to have the minimum fan energy that is consumed when you're running on VFDs. And

what I can do is send in a copy of the addendum that's going to be coming out, as well as our proposal, which virtually matches that same 90.1 proposal.

MS. BROOK: Okay. At this late date, we'll have to consider it in terms of -- I mean, if it's a brand new requirement that nobody has discussed in public before, we can't include it at this late date, but if it's a modification to something else that we're considering changing, then we might be able to fit it in there, so we'll have to review your proposal and see which bucket that falls into.

MR. MORRISON: Okay, well, it's supported by TC8.6, as well --

MS. BROOK: No, I know there's a lot of good reasons to do it, so it's more of a timing issue for us, I think. So we'll do what we can. Thanks.

MR. MORRISON: All right. Thank you.

MR. YASNY: Online, there's Aniruddh Roy and Darryl Klein -- Darren Klein.

MR. KLEIN: Yes, can you hear me okay?

MS. BROOK: Uh huh.

MR. KLEIN: Okay, yeah, I just concur with Frank. I provided some supporting information to TC8.6 and I thought this time the Commission would still consider input and changes, so I don't know where we

missed the deadline on that.

MS. BROOK: So I'm not sure that you have. We need to look at the proposals, and if it fits into our existing recommendations, then we can make the modification. If it's a brand new requirement that we haven't ever discussed in public before, it's not appropriate to include it at this late date, so we'll have to look at what your proposal is and see if we can fit it in.

MR. KLEIN: Okay, all right. Thanks, Martha.

MS. BROOK: Thanks.

MR. ROY: Martha, this is Aniruddh Roy with AHRI. I have a comment on fractional HVAC motors for fans, that particular section. And I believe in December we had provided you with an exception based on, of course, our industry's conversation with you and Mark Hydeman, and the exception was motors for belt-driven fans do not require variable speed control; however, the sheaths must be sized to ensure that the motor speed will be within 10 percent of the rated nameplate speed. I don't know if you have gotten a chance to review those documents, but, you know, based on that discussion at length, we had provided a rationale as to why that exception should be added to this language based on the availability of the products in the market currently.

And also, we had commented on the 29 percent full load efficiency assumption for PSE motors in the study that was conducted?

MS. BROOK: Uh huh.

MR. ROY: So I don't know if CEC, as well as Taylor Engineering has gotten a chance to review that exception. What we would encourage you to, again, review that and let us know as to why that has not yet been considered in this final language.

MS. BROOK: Okay, yeah. So is this in the same letter that you have your other space conditioning comments in? It's all in the same letter? Or is it --

MR. ROY: Actually, yeah, this was specific just to the fractional --

MS. BROOK: Okay, okay, I'll look for that in the docket and make sure that we address it. Okay, thank you.

MR. ROY: And I'll definitely, before the end of the day, I'll send that over to you again just as an FYI.

MS. BROOK: That would be great. Thank you.

MR. ROY: Also -- absolutely -- also another comment I have is, if you give me one second here, it's with respect to Section 140(E)(4)(b), the driving mechanism. And under that section, you know, there is a

sentence which was added by CEC in the 45-day language, and what that sentence does is it adds towards the end of the sentence "or tie bar and crossover side interconnections, the gear or linkage interconnection shall be located out of the airstream." And so there are some additional damper requirements that were added in the 45-day language and I think we submitted comments, again, in December stating that we feel this is unnecessary because you're already addressing damper reliability testing in 140(E)(4)(c), as well as damper leakage in 140(E)(4)(d). And so you're already specifying damper requirements in there. And this particular language adds an unnecessary prescriptive requirement for manufacturers which we feel, you know, is already addressed in those previous sections.

MS. BROOK: Okay, that sounds reasonable, yes. Thank you very much. Anything else?

MR. ROY: And one -- I have two more comments. One is on 140.4(e)(iv)(g), with respect to sensor abrasion. We are currently doing a study which we'll probably share with you very shortly, with respect to the accuracies that are specified in that section. We feel that those accuracies are extremely stringent and difficult to achieve in the field while installation, and also the language does not specify as to whether the

sensor calibration needs to occur during the installation, or throughout the lifetime of the equipment. So there is a room for confusion because there's no clarity in that language, and so we feel that, you know, CEC should consider those accuracies. I know in your response to us, you told us that you might share with us the studies that the consultant has done as far as justifying those accuracies are concerned, so I'm not sure if you've received that feedback from the consultant yet.

MS. BROOK: Oh, okay, all right. So, yeah, let's work together in the next several days and make sure that we have those resolved. I appreciate that.

MR. ROY: Okay.

MS. BROOK: Anything --

MR. ROY: And my last comment is based on the slides that you have. If you don't mind, could you pull up the slide on the Path B efficiency?

MS. BROOK: Where do you want us to land?

MR. ROY: Okay, yeah, that's the slide. In that slide, you state chillers must meet or exceed the Path B efficiency listed in Table 110.2(D).

MS. BROOK: Uh huh.

MR. ROY: Now, I'm looking at the 45-day language that is on the website right now and it states

in the footnote "must meet the minimum requirements of Path A or Path B, however, both the full load COP and IPLV must be met to fulfill the requirements of the applicable path." So that language right now in the footnote seems consistent with ASHRAE 90.1, the table in there. So is this something that you are planning to change to, I guess, you know, coinciding with what you're saying in the slide?

MS. BROOK: I don't -- somebody needs to come up here. Siram is going to help us with this. I think that there's some confusion about how those ASHRAE tables were put together. Hold on a second.

MR. THAMILSERAN: This is Thamilseran, staff here at the CEC. In regard to the requirements specified in that mandatory Table 110.2(D), came from ASHRAE and it looks at both cost-effectiveness from Path A and Path B, and processes that into the Standard. But this Prescriptive Requirement is slightly on the higher side where the Path B takes a higher efficiency into consideration, therefore it comes from the prescriptive requirement under the mandatory path.

MS. BROOK: Yeah, so does that make sense? So the first section where the table is introduced are mandatory requirements, but we've increased that mandatory level to a prescriptive requirement that

requires Path B efficiencies, or that level of efficiency traded off in the performance approach. Does that make sense?

MR. ROY: Yes, it does.

MS. BROOK: Okay. Did you have anything else?

MR. ROY: That’s all. Thank you, Martha.

MS. BROOK: Thank you very much.

MR. MCHUGH: So this is Jon McHugh. And I'm actually going to talk about something that was earlier this morning, but was related to mechanical, and so I thought while we're talking about mechanical issues, and actually it's in direct response to Mr. Roy's comments this morning. He had brought up the issue about Federal Preemption of requirements of doors or covers on vertical display cases. Mr. Roy and I have discussed this earlier in my role on the ASHRAE 189.1 Committee where the same issue came up. And I believe he agreed to the resolution that's going out for the second public review of Addendum Z of 189, and my understanding is that the committee felt that this does not violate preemption. The language is "open refrigerated display cases shall be covered by field installed strips or curtains or doors to comply with the standard."

So the issue is that the Federal Standards do prohibit states from requiring that manufacturers

manufacture their equipment in ways that are of higher efficiencies than the Federal Minimum Standards, however, there's no prohibition about field installed strips, curtains, or doors. So I'd hoped that we would look at similar kind of language be in concordance with the ASHRAE Standards to get those savings.

MS. BROOK: Okay, so thank you for bringing that up because now I remember what we decided about that was, and I agree with you, that we could certainly require field applied doors, but our analysis did not determine that those were cost-effective, it just basically didn't do the work. We didn't ever go there, we never actually developed the cost-effectiveness justification for field installed doors in our analysis, so that's one of the reasons why we decided to drop it.

MR. MCHUGH: So I'll make sure that I enter into the record the work that Ramin Faramarzi of Southern California Edison has done on just that issue. They ran a cost-effective program installing doors on display cases. I'll be happy to submit that to the Commission.

MS. BROOK: Okay, thanks.

MR. MCHUGH: Mr. Roy, did you have any comments? Or is that also your understanding of where we ended up with ASHRAE Standard 189?

MR. ROY: Yes, I think with respect to that

addendum, we accepted the changes that 189 recommended. I think we're going to be resolved on that issue with ASHRAE 189.1.

MR. MCHUGH: Thank you.

MR. SHIRAKH: Thank you, Jon. Any other questions on Mechanical Prescriptive Requirements? In the room or online? So we're going to move to Lighting.

MR. FLAMM: The next set of slides are going to go over nonresidential indoor lighting, outdoor lighting, and sign lighting. And I see we're about an hour ahead, so that means I can take an hour and a half on this section?

MS. BROOK: Uh huh.

MR. FLAMM: Oh, thank you. So Section 140.6 has been edited for clarity. The number of watts that are excluded for portable lighting, excluded from being counted as being installed, has changed from .2 to .3, and along with that, the wattage allowed to be installed in the ceiling has gone down. So when two interlocked systems serve a space, currently there are allowances under certain circumstances, and that's been edited for clarity and it requires an installation certificate now. The reduction of wattage through controls where one could earn a power adjustment factor has been edited for clarity, and for consistency with the changes to Table

140.6A. Now that daylighting requirements are mandatory, there are no more daylighting power adjustment factors in the table. There's a new power adjustment factor for occupancy sensors when installed in open spaces. The whole list of wattage applications that are excluded from being counted in that list, the lighting for video conferencing studio has been removed and that function area has been moved to the area category table and, along with that, as somebody takes the additional wattage, they have to do an installation certificate. We add an exclusion for lighting in elevators that are meeting the requirements of ASHRAE/IES 90.1, 2010.

The Tailored Method Narrative has been expanded for clarity and one of the tables where we referenced the IESNA categories for luminance values, our categories A through G, has been changed to illuminance values to match the changes from the 9th Edition Handbook to the 10th Edition Handbook.

There have been changes in the tables. Table 146(A), Lighting Power Adjustment Factors, have been basically reconstructed and some changes there. The Complete Building Method Table, some function areas, lighting power densities have gone down. The area category method, the same thing, and the Tailored Method, a lot of the function areas that were in the Tailored

Method, that were similar to the area category method, have actually been removed from this Tailored Method Table and put into the area category table. So the Tailored Method Table is much smaller. The mounting height adjustments for wall lighting, display lighting, and floor lighting display lighting has been changed. The room cavity ratio equations, which used to exist in the narrative, for clarity have been moved from the narrative and put into the table and referenced.

And as I said, the illuminance categories have changed from illuminance categories A through G to Illuminance Lux in Table 146.6(G). The requirements for outdoor lighting has been edited for clarity. Some of the lighting power densities have been reduced, and what was available for lighting power allowances for local ordinances has been removed.

Requirements for sign lighting has been edited for clarity even though there's no substantive changes. The current standards do not regulate unfiltered signs, those are signs in which the light bulb is the sign, and there have been requirements added that, if you have a neon sign where the neon light is the sign, or if you have LED signs where the LED is the sign, those don't qualify as internally illuminated or externally illuminated signs, and the new requirements states that

they have to meet the efficiency requirements for LED power supplies and for transformers for neon. They don't fall under the watts per square foot requirements. And those are basically the lighting changes. And I'm sorry, I could not take an hour and a half to do that, but we can have an hour and a half's worth of discussion if you would like.

MR. THOMAS: Hi, Gene Thomas with Ecology Action. And I had a question, a couple questions about 140.6-C as it relates to the watts per square foot requirements for retrofits, which we'll get to after lunch, but a couple things I noticed, housing, public and commons in multi-family areas and dormitory areas were deleted from the table, as were senior housing, and I was curious as to your thinking on that, especially with senior housing and the aging eye, and all.

MR. FLAMM: Sure. So there was confusion in the Standards in the fact that those are really mixed use buildings where you have residential-type areas and you have nonresidential-type areas. So the anticipation is that those areas that are common areas like hallways, etc., are going to meet the nonresidential standards. And there are already requirements for hallways and public bathrooms, etc., but that the living quarters will have to meet the residential lighting standards, which is

actually more favorable to the senior eye because there's no wattage constraints in the residential Standards. So in those function areas that are residential, there are no requirements. I mean, there are no nonresidential requirements, they will have to meet the residential standards.

MR. THOMAS: And so that would be something we would discuss after lunch in terms of the alterations and repairs, implications of those kind of areas?

MR. FLAMM: Well, no, because when you look at the definitions of nonres and residential function areas, the living quarters are residential.

MR. THOMAS: And the common areas, as well? I mean --

MR. FLAMM: Well, the common areas are already defined in the table, there are already requirements for hallways in the Standards. There are already requirements for dining rooms. There are already requirements for all these function areas that are nonresidential. So they are already in the Standards.

MR. THOMAS: Okay. Okay, then the other question related to tenant lease space. Is this any and all lease space, even if the use is comprised of other specific categories?

MR. FLAMM: So the tenant lease space fits into

the area category method and this is where you're looking at room-by-room, and if there is not a tenant identified at the time of the building permit, then the requirement is to use the tenant lease space. And so your question has to do with spaces like bathrooms, etc., I assume, that only allow .6, is that the nature of the question?

MR. THOMAS: Well, yeah, or a lobby area, or something like that. With respect to retrofits, we would be talking about spaces that are leased, so would the -- in that case, would it be whatever has the higher lighting power density would rule?

MR. FLAMM: You ask a good question, Gene. I think that's a definitional question and I think we need to do a better job of defining what is a tenant lease space. From what you're saying, I can see that it's broadly defined right now, and I think we need to have a better definition than we currently have for a tenant lease space.

MR. THOMAS: You could have a tenant lease space that has an auditorium area and, you know, several other areas here that have different and greater LPDs, and so if it's a tenant that's already leased, as opposed to a vacant tenant space, you would think those areas would govern.

MR. FLAMM: I think we need to wrestle with

that and, from the inception of that concept, the whole -- the rationale for developing that were basically strip malls, etc., that were being defined as retail, and they ended up being something else, and so a lot of light was put into them. I think you're pointing out some flaws, and I'll work with you on those.

MR. THOMAS: Okay. All right, thanks.

MR. SHIRAKH: Any other questions on lighting?

MR. YASNY: There's an Ira Richter online.

MR. SHIRAKH: Go ahead.

MR. RICHTER: 120.6 -- or should I wait for a while?

MR. SHIRAKH: We couldn't hear all your comments, you got cut out. Could you repeat, please?

MR. RICHTER: Yeah, I was kind of slow raising my hand before you left the mechanical section. Can I ask a question about 120.6?

MR. SHIRAKH: Yeah, please identify yourself.

MR. RICHTER: Yeah, I'm sorry. This is Ira Richter from Heatcraft. I understood earlier than Item B about the upright low temperature cases requiring doors was an error. Is that still the case, that you're going to be removing that part?

MS. BROOK: So we intended to remove it because we didn't -- the staff and their consultants didn't do

the due diligence to prove that field installed doors are cost-effective; however, Jon McHugh came and put on the record that there is a study done by Southern California Edison that did prove that field installed display case drawers are cost-effective, so we need to figure out what we're going to do there.

MR. RICHTER: So it's up in the air, then?

MS. BROOK: Yeah, but not for very long.

MR. RICHTER: Okay.

MS. BROOK: So my tendency would be to leave it out, but I haven't seen the report from Edison and, you know, so what is your opinion about -- what is your vote?

MR. RICHTER: My vote?

MS. BROOK: Uh huh. See, you're about where I am.

MR. RICHTER: I would say the great majority of customers that are using vertical cases at low temp are using glass doors, but there are some grocery stores that have exceptions.

MS. BROOK: Okay.

MR. RICHTER: I would probably go with -- I would really need to consult my customers first.

MS. BROOK: Right. And our understanding is that the vast majority are already buying because they see it in their pocketbook the cost savings, they

purchase the display cases with doors, but anyway, so we'll be glad to keep you in the loop on that one.

MR. RICHTER: Thank you very much.

MS. BROOK: Uh huh.

MR. SHIRAKH: Any other -- so with the Commissioners' permission, I would like to propose maybe we proceed because according to the agenda we're at lunchtime, but we're ahead of schedule, so if it's okay, we're going to cover some of the topics that would be presented this afternoon; then, after lunch, we can probably break out early.

So the next topic is going to be Revisions to 140.9, the Covered Processes.

MS. BROOK: Okay, so the other part of the covered processes are the prescriptive requirements, so these are areas where there are no mandatory requirements, but there are prescriptive requirements that you can trade away in the performance approach. So the prescriptive requirements for computer rooms are that an integrated economizer is required for each cooling fan system to meet 100 percent of the expected load. And the calculation method for the expected system load will be approved by the Commission. Controls that prevent reheating, re-cooling, or simultaneous heating and cooling are required. Non-adiabatic humidification is

prohibited. There's a limitation on fan power and requirements for two-speed or variable speed control on fans with motor demand limitations, and there are requirements for air barriers for containment to prevent discharged air from re-circulating.

Prescriptive requirements for commercial kitchens, we're trying to reduce short-circuiting of kitchen exhaust hoods by limiting replacement error to 10 percent of the hood exhaust airflow rate.

Maximum exhaust flow rate requirements are included in the new Table 140.9-A. Limitations on heated or cooled makeup air for spaces with exhaust hoods are included. For kitchens with Type I and Type II exhaust hoods greater than 5,000 cfm, the transfer air must be at least half of the replacement air, so this is transfer air that would otherwise be exhausted, which is to say that there is a requirement to make use of that for the replacement air needed by the exhaust hood. The demand ventilation controls are required for at or over 75 percent of the exhaust air system.

Energy recovery devices with recovery effectiveness greater than 40 percent are required on 50 percent of the total exhaust airflow. And 75 percent or more of the makeup air volume needs to be unheated, or uncooled. And there will also be requirements for

kitchen exhaust system acceptance testing.

Prescriptive requirements for laboratory exhaust systems, this is for laboratory circulation rates less than or equal to the 10 air changes per hour, and we're requiring that the zone exhaust and makeup airflow rates shall be capable of reducing to regulated minimums for circulation rates, or the rate necessary to maintain pressurization, whichever is larger. So this is in regards to when the hood is not operating at full capacity, there could be reductions in the zone exhaust and makeup flow air rates in the room where the laboratory hood is.

And that's it for the Prescriptive Coverage Process Requirements. Comments?

MR. GABEL: Mike Gabel. So without getting into details, I just want to make sure you guys checked the compliance software to make sure you can trade all those things because, if you can't, you might want to make them mandatory measures instead of prescriptive.

MS. BROOK: Well, part of our case analysis was proposing the new system types that will be in the performance standard for kitchens and laboratories, or in computer rooms --

MR. GABEL: So as long as you're -- I just wanted to make sure that all those things really can be

monitored, otherwise --

MS. BROOK: Yeah, and they are pretty simple additions to the system mapping table in the performance standard.

MR. GABEL: Okay.

MS. BROOK: Any other questions or comments? Okay, moving on.

MR. SHIRAKH: So these are -- 141 used to be 149, these are the requirements for addition and alterations for nonresidential buildings. This section has been edited extensively, and a lot of it is for clarity. We added exceptions for solar requirements for additions and alterations not having a solar zone, I think Patrick talked about that briefly. We added, when a space conditioning system is altered, unitary systems with an economizer shall have controlled systems that cycle compressors off when economizers can provide partial cooling.

These are the nonresidential cool roof requirements. Earlier, we talked about the prescriptive requirements for new buildings, and this is for alterations and specifies that the reflectance requirements for low slope roof is .63. You recall the proposed reflectance for new construction was .65, and I think there was a commenter who said that the two should

be the same. But for now, it's .63 in Climate Zones 1 through 16, so that's all throughout California. Emittance, .75, hasn't changed since 2008. We've also provided insulation tradeoffs against reflectance and, in this scenario, you can go down to reflectance at .45 provided that more insulation is added. This was basically in response to industry comments throughout this process.

Steep slope roof requirements pretty much stays the same as 2008. The reflectance and the emittance remains at .2 and .75 SRF 16.

This is Section 141.0(b)1D, Altered Duct Systems, that must meet the criteria of Section 140.4(I). It clarifies the qualifications for entirely new replacement duct systems, always a murky area in the Standards, you know, what is an entirely new duct system, so we've got a lot of comments and we've tried to clarify. You know, a lot of times, and this is true in residential, too, you change the air handler, or the condensing unit, and part of the duct system, but not all of it, so what does that mean? What kind of requirements would apply? So we were tempted to clarify some of that. We deleted the 60 percent reduction of duct leakage compliance option, a requirement that was hard to enforce and was rarely used; but instead we added the smoke test

protocol to the verification for accessible leak compliance option. Go ahead, Gary.

MR. FLAMM: The lighting sections of Section 140.0. There's two basic constructs here, one are Lighting System Alterations. Currently, if somebody replaces 50 percent of the luminaires in a room, they need to meet the current standards. And that's being reduced to a threshold of 10 percent. So, in a room, when greater than 10 percent of the luminaires are replaced, there are requirements in the Standards that must be complied with.

There's a new allowance, though, that if somebody only installs 85 percent of what they're allowed to install, according to the area category table, for the multi-level lighting controls, they only have to put in one step in the middle, you have 100 percent on, zero percent off, and something in the middle. But if somebody installs 100 percent of what they're allowed in accordance with the area category table, then they have to meet the new Table 130.1-A Multi-Level Lighting Control Requirements. And so the significant difference is the threshold has been reduced from 50 percent to 10 percent.

The new requirements are what we're calling Luminaire Modifications-in-Place. This is where each

room -- well, once a building, what we define as a building area, changes 40 luminaires within a year, then they will have to look at each individual room in which greater than 10 percent of the luminaires are what we classify Luminaire Modifications-in-Place. That's basically where ballasts are changed, significant rebuilding of what we define a Luminaire Modification-in-Place, and that also has the same allowance that if somebody only installs 85 percent of what they're allowed, they only have to do one intermediate control step; but if they install 100 percent what's allowed according to the area category table, they have to meet all of the requirements, the control requirements of table 130.1-A.

That's all I wrote on the Lighting Standards.

MR. SHIRAKH: One of the slides I showed under the cool roof tradeoffs, I had mentioned the insulation tradeoff goes down to .45 reflectance, now I was notified that the actual language reflects tradeoff down to .25, not .45. I just wanted to mention that. Any questions on material that Gary Flamm just presented?

MR. THOMAS: Gene Thomas, Ecology Action. Some different points and the first one in terms of clarification, on your shall not's for lighting modifications-in-place, number 2, shall not cause or be

the result of or involve any changes to panel board or branch circuit wiring, including…," some other things and then it says "dimmers and other control devices," and so my question for clarification, are you talking about like a panel level dimmer? You're not talking about putting a dimmer switch in, are you? Because that would conflict with --

MR. FLAMM: The Standards -- let me see if I've got those with me, hang on, please.

MR. THOMAS: When I read "dimmers or other control devices providing power to the lighting system, shall not…," to me that's something that takes place at the circuit panel as opposed to putting a dimmer switch on the --

MR. FLAMM: So the intent of the language, I would have to read the language again, is to define what is regulated and what is an alteration that is regulated, and what is not. So simply putting in a control, a self-contained control in a box is not regulated, but once you're doing the major wiring change-out, a panel change-out, you're rewiring. At that point, it is an alteration that is regulated by the Standards. So this language is intended to differentiate between, you know, are you just going to throw in an occupant sensor, or a dimmer in an existing wall box? Or, are you going to put in a new

panel board?

MR. THOMAS: Right, okay, so that relieves our concern on that one. First off, I want to say this is a big advance over how it started out and it's been great working with you and the case team on some of these things to make it better, and I think that Table 141(D) and (C) are great ways to do that. On 141.0-C, requirements for alterations, on that -- it's the second row down where it says "alterations that do not change the area of the enclosed space or the space type," and in that first column, it says "none," in other words, quantity of existing affected luminaires per enclosed space, I think that should be less than 10 percent, it shouldn't be "none." So, in other words, if there are less than 10 percent of the affected luminaires in the enclosed space altered, then existing lighting power is permitted, existing provisions are permitted, because otherwise you are not saying anything about what happens in --

MR. FLAMM: That sounds appropriate.

MR. THOMAS: Okay. And I would also say that that same row, those same two rows should apply to 131.0-D, so for Luminaire Modifications-in-place, where the sum total is less than 40 Luminaire Modifications-in-Place, then existing controls apply, and so forth. So it should

be consistent between the two tables.

MR. FLAMM: That sounds appropriate.

MR. THOMAS: Let's see what other questions I had here. Going back, and I guess we'll talk offline about the table 140.6-C, the Area Category Method, to clear up what happens when you're in a leased space, I mean, because about two-thirds of the businesses that we retrofit are in leased space, so once again, we can talk offline unless you want to discuss it here. We think that the function areas of those in that leased space should govern in terms of lighting power density as opposed to just a leased space.

MR. FLAMM: I agree; it's not the same issue. When a speculative building is being built and there's no tenant, then that's why we have the tenant leased space. But once you have a tenant, and I'm assuming your alterations are where there's a tenant, there's already a function area defined, and so if we need to capture that in the language, I --

MR. THOMAS: Yeah, I would just be adding a sentence at the appropriate place.

MR. FLAMM: Yes.

MR. THOMAS: And the one other thing I would say is just I know there's been a lot of back and forth in terms of the cut-offs, the 10 percent, and the 40

Luminaires, and trying to find that happy point where it causes the least negative impact on the retrofit market, and we still feel that the cutoff for Modifications-in-Place should be 100. We think that the 40, besides its impact on the retrofits, could still have a significant impact on maintenance programs where they're doing group re-lamps, and that goes back here, b) to qualify as a Luminaire Modification-in-Place, 1) replacing lamps and/or ballast, so that "and/or" means if you're just replacing lamps and you replace 40 of them in a space at a given time, then now it's a modification in place that could trigger those other things. And I think that's -- I think it would be a lot better, still, if that were cut off at 100. And then, referring back to -- I didn't have this question earlier, but it came to me on 131.0 in terms of the language on retrofit for socket fixtures, and then there were some other language on linear LED lamps. Since you're talking new construction there, as opposed to retrofit, is this just you're talking of those two things specifically in terms of how they're used to determine lighting power? Or something else?

MR. FLAMM: Two components, how do you classify a luminaire, and how do you determine an input wattage. And basically, the construct in the Standards has been it's the manufactured luminaire, whatever it's rated as,

so to change sockets or to change lamps does not change the personality of the luminaire. So, are you asking that, if you put in LED lamps, would that be recognized as an LED Luminaire? I'm assuming.

MR. THOMAS: Well, there's a little confusion between -- and when you're putting in new construction, if you're putting in an LED linear luminaire, and you're putting in a new LED linear luminaire, but you've brought into it replacing lamps, which now moves it out of the new construction into some kind of gray area. So I can understand if the concern is to determine allowable wattage, but you don't want to do something that's going to put a break on the development and implementation of really absolutely necessary new technologies, and you know, LEDs and linear LEDs would be one of those that we have big hopes for, and so if you could speak to that, that would be good.

MR. FLAMM: So what you're suggesting presents a significant loophole in defining what is a luminaire, and how do you classify a luminaire, and how do you determine the input wattage. I don't know how to do that without undermining everything we have already in classifying luminaires because, quite frankly, those linear LED lamps, most of them do not match the optics, and there are concerns, right. And so we don't want to

just open that door and all of a sudden allow LED lamps to be classified as LED luminaires because that's a significant change, and until there is a way to specify the optics, matching the optics, I don't see how we can do what you're recommending.

MR. THOMAS: I mean, I'm not necessarily recommending that a change is needed there unless it's affecting retrofits, because as it is right now, that's with the exception of outdoor sign lighting, 130.0 is not triggered. So it's not a concern from that standpoint. If it's affecting retrofits, then that would be a concern.

MR. FLAMM: Let's discuss this offline. Let's see if we can come up with some conclusion. I'm very concerned with, you know, I don't want to change Section 130.0, but maybe we may be able to do something in 141 without losing that precedence that we have.

MR. THOMAS: Okay, thanks.

MR. SHIRAKH: Bill, I'll get to you in one second. There's one more slide left in this -- I kind of jumped ahead a little bit. So continuing with Alterations, there's two sections where Performance Approach is discussed within this section, one is related to existing plus additions for plus alterations. And the language that was in 2008 and prior, I'm going to -- kind

of a source of entertainment because it's very hard to understand, so we will work with Mike Gabel and CABEC, actually we think we've come up with language that at least I can understand, so it's an improvement. And I think it's going to simplify things quite a bit.

There's also performance-related language related to altered components and that's also been a source of entertainment over the years, and I think we finally, with the help of CABEC, you know, we've been able to nail that down to a more workable and more easily understood and hopefully simulated. We'll have parallel changes in the residential Section 150.2, which we'll present tomorrow.

So with that, I'll open it up again.

MR. CALLAHAN: Bill Callahan, Associated Roofing Contractors, and Union Roofing Contractors Association. And we are signed to a letter that we will discuss in detail later, I think it's quite lengthy and he doesn't want to interrupt your lunch. We agree with everything he has to say, but there's a couple of points I'd like to make. One was it was interesting earlier to hear the statement that all of the various changes that had been vetted through very rigorous cost-benefit analysis. I think "rigorous" is too strong a term, at least when it comes to the study that was done by

Architectural Energy Corporation about the cost-effectiveness of changing the roofing standards. That survey, that report, which is dated February 8th, Non-residential cool roof cost summary, is based on 12 responses, three by email, nine by phone. The entire State of California, 5,000 licensed contractors, 12 survey responses. I would submit that that is a statistically insignificant survey sample. And when you look at the table that arrays the results, it's an 11 X 9 table, 49 cells -- sorry, 11" X 9" -- it's 99 cells, 47 of them are blank, no information. So all of the data points, it's just 52 percent of the entire table. And in a number of cases, there aren't any data points at all for different materials. I see three, I see one, I see none, I don’t see any explanation between the difference for not applicable, and a blank cell, or don't know. But I assume all of them are non-data points. So you really don't have much to go by here. And if you look at them closely, I represent Union Contractors, so I know a little something about the prevailing wage, which is normally Union wage; there's two columns in here for Fresno, the one that is over to the right-hand side, Fresno Prevailing Wages, is based on the wage rate of $35.70 an hour, that's a lot higher than in most of Fresno and the surrounding counties, and yet the

installed cost for the various roofing materials listed here are considerably lower for the prevailing wage contractor, the Union contractor, than the other Fresno contractor whose affiliation isn't identified. It seems suspect to me, and that's a big piece of your data. I don't think this study is worth very much. I don't think it's rigorous, I don't think it provides any cost justification to the changes. Again, Reed, we'll talk about that later.

I do like Exception 1 to 141(B)(1)(b), as I mentioned earlier because it gives us the overall envelope energy approach of 140.3-B, and there I suspect your intention was to strike it out, but I like it the way it is right now for the reasons I stated earlier, and also because it's free. I just want on your website to look at the software that is available for nonresidential, none of it is free, I'd have to pay for all of it, as would my members. So I kind of like things that don't cost me much, especially since I don't have to pay now.

You have a table which you brought up earlier on the tradeoffs, I'm not going to get into whether the underlying value is correct or not, but I think there's a compliance problem here and I mentioned it in October. You've got these tradeoffs here, and it tells you how you

can tradeoff insulation for reflectivity, and then you move to the next page and you get the minimum insulation requirements for retrofits. Now, right now it refers to the wrong table, it needs to be updated to 140.C. What I'm concerned about is, by having this first, and then the minimum requirements second, people are going to read through this, building officials and, believe me, I talk to a lot of them, and say, "Okay, the guy is putting on a .39 reflectivity, R16 is what he needs to trade off for that," then he's going to get to the next page and he's going to say, "Oh, well, wait a second here, they're not going to move the roof equipment and an exception applies and they don't have to have any insulation at all." I don't think that's your intent, I think your intent is that they're additive. And, at a minimum, what you need to do is put in a note that says, "These insulation requirements are in addition to," and not "in lieu of," the minimum insulation requirements that you've got set off in what I think should be labeled 140(C). So that's a typographical thing.

And that brings me to my final comment, which does have to do with enforcement. I deal with building officials a lot, and over the years, they've testified here a lot. I can't remember any of them saying that they enjoyed the Energy Code, understand it, some of them

even said that they won't enforce it. That's problematic. I would be very interested to know if somewhere out there there's a calculation of what the proposed changes to roofing contribute to the overall energy savings proposed in the 2013 Code. I suspect it's a very very small amount of the overall savings that are associated with everything you want to do, and I think you could save a heck of a lot more money by concentrating more on making sure that the Standards we have are enforced, that they're understood and they're enforced. Just last week, I got a call from a building official in North Bay County, who advised me that one of my contractors who had complained about a bid was wrong, he complained about his attitude and a number of things. Well, my contractor had complained because he was bidding on a mixed-use facility, two two-story buildings, one of them was going to be apartments, the other was going to be offices, so you've got a low-slope, low-rise residential, low-slope, low-rise nonresidential. Looking at the Energy Code for low-slope, low-rise non-residential in their particular climate zone, there's no cool roof requirement. He actually told me, "We are exempt from the Energy Code," and I had to say, "Well, wait a minute, you're really not exempt, there's just certain portions of it that may not apply. And by the

way, there's a difference between nonresidential and residential, and in your climate zone, there is a cool roof requirement for one of those two buildings. And, oh, by the way, for both of them, you have insulation requirements, as well." And all I'm trying to do is make sure that my contractor has a level playing field with everybody else. And yet the guy who was way under him, and is probably going to get the job, is going to put on a roof that saves that town money, but doesn't save any energy, and that defeats your purpose. You know, the metaphor may stretch a little bit, but I look at some of what goes on here with changing from regular .5 to 8.55, from .55 to .62 or .63, and we get a bunch of virtual energy savings, and if we run it through our software, it looks like we save a lot. But if people don't actually apply those roofs, you don't save anything. It seems to me that what we tend to do, stretching the metaphor, is we rearrange deck chairs on the Titanic and we ignore the breach in the hull. And if we were really concerned about the breach in the hull, we might save the ship and save energy. So I think a lot more effort needs to go there and I think you'd be much better served to have simple understandable Regs, which I think you largely do now, that are consistent between new and re-roofing, and make sure that people actually enforce them. That's

where the big energy savings are. Thanks.

MR. SHIRAKH: Reed, did you have any comments? Okay, on the -- Bill -- Mr. Callahan, I had a question. Related to the cost, you mentioned the 12 data points that we have is not statistically significant. Can you define what that term means? Not being statistically significant?

MR. CALLAHAN: Well, it's been a while since I've done survey research, but I did take a course at the University of Michigan as an undergraduate, where most Gallup Polling is done. And when you're looking at, you know, 5,000 contractors, 12 gives you results that are usually well outside several -- what's the statistical term?

MS. BROOK: Standard deviations?

MR. CALLAHAN: There you go.

MR. SHIRAKH: Is that like, you know, when people want to do a roof, they do standard deviation analysis, analysis of variance, high score -- I mean, that's what is implied in statistically significant. I mean --

MR. CALLAHAN: No, statistically significant is when you tell us that this measure is cost-effective and you base it on 12 responses in a state like California. Are you kidding me? When even the most rudimentary look

at this says, "Hey, how is it?" And I hate saying this, representing Union Contractors, but generally speaking, our roofs are going to cost more. You know, it's hard for us to compete on a cost basis, and yet I see here your results say that we're half as expensive as the guys in Fresno that are non-Union? If that were true, my contractors would have a lot more money and be a lot happier, and they are not happy. And I've had a bunch go out of business in the last couple of years because of the recession. That makes me question the validity of this survey. I mean, come on, do you do this in other areas? Do you base deciding what you're going to do, you know, with the electrical standards and the mechanical or anything anyone else talks about? On 12 price points?

MS. BROOK: So --

MR. CALLAHAN: From 99 cell data -- cell table -- and 47 of them are blank?

MS. BROOK: So just to the point of the availability of cost data, everybody knows how challenging it is for the public sector to obtain cost data, and we certainly surveyed many more than 12 to get 12, it's just that by and large the private sector is unwilling to provide cost data to the Commission, so we try very hard to get it, and we've asked your members, you and your members, over and over again to help us with

that, and --

MR. CALLAHAN: Well, I don't --

MS. BROOK: So it is a challenge.

MR. CALLAHAN: I agree, it is a challenge and I don't know what you've done with Reed and ARMA, I haven't been involved in that, but in my impression over the years, is that based generally speaking when Commission staff says "we," they mean you do a survey, you come up with a result, and we're told it is solid, and we respond to it.

MR. SHIRAKH: But we actually send inquiries to --

MR. CALLAHAN: You send a lot of emails, I see that.

MR. SHIRAKH: Well, we also use the published data, the means data, prevailing wages, independently, and in every single case, whether it was a survey data with published data, we received -- the information we got indicated that what we are proposing is very cost-effective and there was not one single instance where cost-effectiveness was an issue. But, yeah, we have only 12, plus the published data, but every single case it's been widely cost-effective.

MR. CALLAHAN: Well, I'll let Reed talk about how the industry feels, in general. I just know I got

this and took a look and said, "Wow, you've got to be kidding."

MR. SHIRAKH: I mean, it would be nice if the industry was more forthcoming, but this is what we have.

MR. CALLAHAN: It's hard to get, but it's also hard to get on one month, or two months, or three months, no, and that's what we continually get -- this cycle has been going on for a while, and we've had a lot of workshops, and a lot of stakeholder meetings, and not one single one of them, not one, was any mention made of any change being contemplated to the roofing centers, not once. I was at every one of them. I was told repeatedly no --

MR. SHIRAKH: I think the public record is very clear on that one, I don't want to debate that, but we've been going over this --

MR. CALLAHAN: Since October.

MR. SHIRAKH: No, sir, since April of -- about a year and a half ago.

MR. CALLAHAN: No, I talked to --

MR. SHIRAKH: I don't want to debate that, but if you can check the public record --

MR. CALLAHAN: I disagree, I was there. I'm looking at a staff member right there who told me the opposite, okay? In a meeting at Davis and --

MR. SHIRAKH: Again, the public record is there.

MR. CALLAHAN: I have no problem with that. Again, though, how can you point to something like this, there's justification.

MR. SHIRAKH: Thank you.

MR. HITCHCOCK: Reed Hitchcock, Asphalt Roofing Manufacturers Association. I'm going to read the Coalition letter into the record in the afternoon because we are ahead of schedule, I know there a people planning to connect later today that may want to add comment at that time. But to Bill's point, and the data collection issue, if you go back -- and I think I say this again later, but if you go back in the record, in the public record, we've offered numerous times to help, but we acknowledge -- and if you go back to the October transcripts, you'll see it in plain writing -- we acknowledged it takes time, it takes a lot of time, which is why we can't support you ramming it through with shoddy data, in a poor report. We're not saying it's not cost-effective, we're not saying it is; we're not saying that there's not good times to use cool roofs and not saying there's not bad times to use them. But it's going to take time to put together a meaningful robust analysis and it's going to take probably a good part of the next

cycle. We are ready, willing and able. You responded after the last meeting and said, "No, we're just going to do this, we've got our guys working on it." Okay. And we said at that time, it's -- you're not giving yourselves enough time. And you said, "Well, we're going to do this anyway." Okay, you did it and you got three months worth of work, and three months worth of response, so anyway, I'll read the Coalition position later, but this is dodgy math. Thank you.

MR. RAYMER: Yes, Commissioner, Bob Raymer representing the California Building Industry Association. And while our primary focus is on residential construction, I hadn't intended to make comments today, but I would like to, I guess, reinforce staff's concern about getting cost data, although I wouldn't characterize it as industry unwilling to give the data. Mike Hodgson and myself have had a heck of a time getting cost impact data, particularly with this update of the Standards. Unlike any other, I can't tell you how many times we've made calls to businesses to simply hear the recording on the other end of the line saying, "This number is no longer in service." It's a very different state that we're in right now as opposed to previous updates of the Standard, and that has created a heck of a problem. We, too, want to get this data.

It's very vital to us. And it's been the hardest of any of the last, I'd say, 10 updates of the Standard to get this kind of data. And when we get it, it's very lean, it's usually somebody who just came on with the company, if at all, and so we effectively have to take them from start to finish. So I understand staff's concern about the inability to get the data, but, believe me, it's not because industry is unwilling, we just have to find the people that are still there doing this. So with that, once again, we look forward to continuing to work with staff.

And also, you know, the roofing provisions have been brought up off and on for some time. One thing I did notice, though, with a lot of the case studies that were going on that Console and CBI were attending in the April, May and June time period, a lot of times we were the only private sector group that was sort of there. There was a lot of consultants, Energy Commission staff, in some cases PUC staff, and consultants to the Energy Commission, but these were very technical meetings and, to get general industry representation there is very difficult. It's highly tech meetings where you're talking about .044 vs. .045, and that's a tough one. It's hard to get people excited for six-hour workshops on these types of intricate issues. I love it, you know,

Hodgson loves it, but then again, what can I tell you? So anyway, we would get you that data if we had it, it's just -- it's not like pulling teeth, we just have got to find the mouth before we can pull the teeth. So, thank you.

MR. SHIRAKH: Just to clarify, you know, basically we're making the statement that we've sent a survey to a lot of -- I wasn't questioning the motivation, it was just a statement of fact that we got very few responses.

MR. HITCHCOCK: I understand.

MR. SHIRAKH: That's all I was saying.

MR. HITCHCOCK: I understand and that is a function of the economy right now, it's not that people want to keep this data from you. Some sure do for trade purposes or whatever, but for the most part, heck, if they're going to keep it from me, you know, it's not that they're doing that willingly, it's just that they're not there.

MR. SHIRAKH: I'm glad Cathy Chappelle is here. On the question of industry participation in the stakeholder meeting, was it for lack of effort on our part?

MS. CHAPPELLE: Uh, Cathy Chappelle, Heschong Mahone Group, leading the IOU case effort. We started

this process when, what in 2010, early 2010, and we do -- the utilities presented the stakeholder meetings at the request of the Energy Commission staff, and we had outreach to all the various stakeholders, both from your past Standards Updates, as well as additional information from CBIA and other stakeholder groups, and we do have the records of who was notified about those meetings, who responded, who attended, and so forth, and we also have some detailed information on all of the case reports of who we, you know, tried to contact to get that information, and I do agree with Bob that it's definitely difficult when a lot of the industry, private businesses have gone out of business, or people have moved on, but we did do very due diligence of contacting industry and we do have a record of that.

MR. SHIRAKH: Thank you, Cathy.

MR. DEVITO: Eric DeVito again, Cardinal Glass Industries. One comment, I notice there's a new table 141-A for Altered Fenestration. I guess -- a couple comments about it, really, 1) you know, generally the way replacements and additions in fenestration, they usually have no problem meeting the same requirements as new because you're swapping out the same product. I can understand possibly an alteration scenario where you're leaving the existing frame and you're just swapping out

the glass, maybe that's what you're trying to capture, but my comments would be, 1) with this table, you're reintroducing the 16 different climate zones in non-res, which we're not there now, so one option would be to go back to the same approach you have in nonres and just say one-size-fits-all standard, which I think makes a whole heck of a lot of sense, and 2) you're bouncing around a little bit on U-Factor and RSHGC, obviously because of different climate zones, but one approach would be go to the worst case scenario in the nonres, which would be .47 U, a .25 RSHG, and then I also am curious why no VT requirement, as well. I mean, in a situation where you're replacing the glass, even if the frame does stay the same, there's no reason why that glazing can't meet the SHGC and the VTs that you would want for new. So my comments would be to re-tool this table somewhat, simplify it, if you're going to keep it at all, simplify it, and then introduce the VT and make the Standards consistent with them. Thank you.

MR. SHIRAKH: Thank you. John, then Mike.

MR. ARENT: Thank you. John Arent, CEC. So I was doing a good portion of the study for the cool roof for nonresidential. So, as was mentioned, you know, it's quite obvious and I will of course admit it, it is a small sample of results that we got for cost data. We

did do a comprehensive effort, we worked with ARMA to develop a survey that would address our needs, and we contacted approximately 80 contractors throughout the state. Of those, I got approximately two dozen to agree to participate, but only got a few responses. So, subsequently, I worked to gather results over the phone which, of course, is a little bit less comprehensive than a survey, and with regards to some of the blanks, maybe the documentation wasn't quite done properly, but in some cases, the contractors didn't work with particularly roofing systems, so they didn't have a comment on price.

And I'd also like to mention that, in some cases, one of the challenges was that the contractors that did respond and give us prices weren't able to sufficiently distinguish the costs of a product that meets the current standards with a product that meets the proposed standards. And so, so that end, I worked with the Energy Commission to -- and they contacted manufacturers and distributors so that we could determine at least the component of price differences that was attributed to different system materials, and I got in those cases some confirmation from some of the contractors that there shouldn't be an installation cost difference, that the primary cost difference would be the roofing product. So, you know, it is a challenge, of

course, and the data is limited.

And then I'd also like to respond to an earlier comment made on the question about whether or not we should have a different requirement for alterations vs. nonresidential. I think the comment was made to have it at .63 H Reflectance for both. You know, for Alterations, there's a couple different things at play, one is that there's obviously a limited number of alternatives that you can do when you're re-roofing. You're not going to replace your windows or put in some other necessarily some air-conditioning equipment, so your tradeoffs are limited, so we wanted to consider that. And then the tradeoff table, it should be noted, for alterations is based on a different design assumption than for new construction. So you'll notice that the required amount of insulation for alterations is lower because there's an assumed less insulation underneath the roof, so there's probably more comments to come later, so I'll just leave it at that.

MR. SHIRAKH: Thank you, John. Mike?

MR. GABEL: Mike Gabel. On fenestration alterations, I put this in writing, just want to mention in the meeting, the staff in the 2013 Code has proposed going back to referencing the existing opening, and we didn't have that in 2008, we took it out for good reason;

I think we want to go back to not specifying the opening because keeping track of openings in a building and what glass is replacing whatnot, is insanely difficult, it's never enforced, you want to keep it to the glass area that is existing in an existing surface, and essentially use that area as the reference for the amount of alteration. And I proposed language in writing to you as a new definition that simplifies that.

MR. SHIRAKH: Can you work with Nelson on that?

MR. GABEL: Yeah, sure.

MR. SHIRAKH: Thank you. Any other questions on nonres alterations? Bill.

MR. CALLAHAN: One clarification, and I just went back to all the workshop notices and agendas and so on, the reality is in between our positions, the new and at the time it was .70 proposal for nonresidential, it was made on June 10th, so it wasn't April or May, but neither was it September of October. You can review them all yourself, but I just did.

MS. BROOK: That sounds right.

MR. SHIRAKH: That was a stakeholder meeting we had, yeah.

MS. BROOK: Thank you.

MR. SHIRAKH: That sounds about right.

MR. YASNY: Online, there's Mudit.

MR. SHIRAKH: Go ahead.

MR. SAXENA: Hi, can you guys hear me?

MS. BROOK: Yes.

MR. SAXENA: Okay, thank you. This is Mudit Saxena. I was a case author for the daylighting topic for the IOU case team. In our report to the CEC, we developed some language and cost justifications for requiring photo control when there is lighting alterations in daylit areas. We looked at cost of photo controls, and also costs of installing them in a retrofit situation, came up with a threshold which was more than twice the threshold that we came up with for new construction. I'm not able to find that in the 45-day language. It used to be what was proposed as Section 149(B)(1)(I)(vi). Has that been taken out? And what was the reason? Because we were able to show cost-effectiveness to it.

MR. SHIRAKH: Nelson, do you know?

MR. FLAMM: No, that's mine. Mudit, when we converted to the table and we cited, you know, 130.1(B) and (C), I remember an earlier version of that table where (D) was in there also, 130.1(D), and honestly I don't remember what happened to it, if it was on purpose or inadvertent that it was left off. I need to talk with Jim Benya and with you offline to figure out what

happened there.

MR. SAXENA: Okay. Yeah, I'll be happy to talk with you about it. If it got left out inadvertently, they should definitely transfer it back in.

MR. SHIRAKH: Just one response to Mr. Callahan. I think you are correct that June was when we presented it, so basically that was a staff workshop. What is not there is all the case stakeholder meetings where the cool roof requirements were presented, and I can ask Cathy Chappelle to actually give us the dates of when the cool roof requirements were presented and who was contacted. That would be appreciated. Any other comments on nonresidential alterations? Gene.

MR. THOMAS: Gene Thomas, Ecology Action. It's a clarification, really, for Table 141.0-C, Enclosed Space type. Could you give some examples of what you're talking about in terms of a change to a space type?

MR. FLAMM: So if you've got a space and let's say it's an office and you're changing it to a retail space.

MR. THOMAS: But you wouldn't like -- it wouldn't count if you were changing -- you're taking an office and now you're calling it an employee lounge?

MR. FLAMM: No, it's only if you're doing a lighting alteration, anyway. If you're doing a lighting

alteration or Modification-in-Place, then it's effective. Simply changing it doesn't do anything, but if you change it and then you do the lighting, then that would affect what you can do with that.

MR. THOMAS: Okay, I'm just trying to get the sense of looking at, for example, the types, area types, and so forth, and building types and the area category method. So you don't necessarily mean changing from any one of those to any other one, triggering the full Code?

MR. FLAMM: No, it's the alteration that triggers the requirement of the Standards, not the changing of the room.

MR. THOMAS: Okay, so in other words, you've got the two different rows here, so alterations of greater than, or 10 percent or greater, and LPD, 85 percent below, then only these controls are required and multi-level things are required that do not -- if the space type is not changed, but let's say you are replacing more than 10 percent of the existing luminaires, your less than 85 percent of the LPD in this room, but you have changed it from an office to an employee lounge, or something like that, that sole thing doesn't trigger all of the other Code requirements, does it?

MR. FLAMM: Well, most of the control

requirements are based -- are regardless of the function area, the lighting controls. The multi-level controls are based on technology; they're not based on where you put them. So if you're changing from -- if you're doing a modification, an alteration that makes you meet the new Standards, it's going to be whatever the room is functioning as is going to determine your lighting power density, not your lighting control requirements because the lighting control requirements are the same, regardless of the room type.

MR. THOMAS: Unless you're changing the space type -- unless you're increasing the area or you're changing the space type, or you're increasing the total lighting power, that's when it says "then these other things come into play." So that's what I'm just trying to --

MR. FLAMM: Right, if you change -- not simply changing the -- if you change the space type in conjunction with changing a wiring or luminaire modification, then you have to meet the requirements based on the new space.

MR. THOMAS: And that space type definition -- because you can't -- you know, I did a search for space type definition, I did a search for some other things that weren't in there, so the closest thing I could see

was Table 140.6(C) --

MR. FLAMM: So are you asking what is a space type?

MR. THOMAS: Yeah, what comprises --

MR. FLAMM: Okay, they're the function areas, the definitions of the area category, tailored method, in Section 100.1, there are definitions of function areas, so maybe we need to clarify that we're talking about function areas there.

MR. THOMAS: Yeah, if you change "space type" to "function area," then that would --

MR. FLAMM: Okay, I didn't understand what your point was there.

MR. THOMAS: Okay, I think that does it, then. Thanks.

MR. FLAMM: Thank you.

MR. CONTOYANNIS: Hi, Dimitri Contoyannis with AEC. I'd like to speak a little bit more about the cool roof measure. So there was a comment made earlier that insinuated that it was fuzzy math that led to the recommendation of the reflectivity --

MS. BROOK: It was "dodgy math," for the record, yeah.

MR. CONTOYANNIS: Dodgy math, sorry. So I'd just like to point out that the methodology used

throughout this case proposal, as well as many others, involves using a widely adopted simulation tool that's used throughout industry, and throughout many of these case reports. The methodology by which the simulations were prepared are clearly documented in the case report. The results clearly demonstrate that cool roof proposal leads to energy savings and TDV energy savings. The methodology by which cost-effectiveness is calculated is also available on the CEC website, and that cost-effectiveness methodology, as I mentioned before, is there, it's available, all the case reports use that same methodology. Now, the response rate of the survey for this proposal, I think we would have liked to see a higher response rate, but all of the responses that we did receive demonstrate the cost-effectiveness using the cost-effectiveness methodology, as well as the RS Means data, as Mazi pointed out, that is a widely used industry source of cost data. So I think, you know, with the data we had available, it can be shown that this cool roof proposal is indeed going to save energy and is cost-effective. Thanks.

MR. SHIRAKH: Thank you, Dimitri. Any other questions or comments on nonresidential alterations? Online? Shall we break for lunch?

COMMISSIONER DOUGLAS: Sounds great. We'll

break for lunch and give it one hour. Does that sound about right? Or a little longer.

MR. SHIRAKH: Come back at 1:30.

COMMISSIONER DOUGLAS: All right, let's come back at 1:30, then. Thank you.

(Recess at 12:05 p.m.)

(Reconvene at 1:37 p.m.)

MS. BROOK: Welcome back, everyone. Thank you for rejoining us on the 45-day language hearing. Are we ready to get going? Okay, so next on the agenda is Title 24, Part 11 on Nonresidential Voluntary Reach Standards. What we're proposing to put into Part 2 is the performance approach to be on Code Reach Standard, Tier I would be an Energy Budget that is less than or equal to the 90 percent of the Part 6 Energy Budget, or 10 percent better than Code; Tier II would be an energy budget that's less than or equal to 80 percent of the Part 6 Energy Budget, again, 20 percent better than Code. And this would be verified through Energy Commission certified compliance software.

There's two prerequisites that we're proposing, one is for installed outdoor lighting power, which is not covered in the performance compliance approach to be, again, 10 percent better than Code, or less than or equal to 90 percent of the Part 6 outdoor lighting power

allowance. And the second prerequisite is for service water heating in restaurants larger than 8,000-square-feet would have natural gas water heater with a minimum 95 percent thermal efficiency, or solar water heating system that provides a minimum solar fraction of 15 percent.

That is it for the Reach Standard. Does anybody have comments or discussion about what we're proposing for the Voluntary Part 11 Standard? Anything on the phone?

Okay, so at this time, we're going to switch slide decks and talk about the Reference Appendices.

MR. SHIRAKH: So the Reference Appendices have three parts, the first is a Joint Appendices, second part is Residential Appendices, and the third is Nonres. It's all part of the same document, but today we are only going to be talking about the Nonres Appendices. Tomorrow, we'll talk briefly about the Joint and the Residential Appendices. But the history is the same. Joint Appendices were introduced in 2005 and had only four chapters, JA1 was the Glossary, JA2 was the Weather Data, JA3 was the TDV procedure, and JA4 was a U-Factor, C-Factor thermal mass data, and so forth. And the reason we created Reference Appendices in 2005 -- or Joint Appendices -- was because we need a place to put all this

data that is used by all Standard documents. Prior to that, you know, we kind of used the ACM Manuals for this purpose, which was not the right document for these because ACM Manuals are supposed to be documents that are used to certify the compliance software. So we have pulled that out and put them in the Joint Appendices.

And then the document was renamed in 2008 to reference Appendices, and that's where we had it under Residential and Nonresidential Appendices. And we pulled even more data out of the ACM Manuals and other documents where this information didn't belong, and put them all in here. And it serves as a common reference for all Standard-related documents, and well aligned with ACM Manuals for the sole purpose of compliance software development and approval.

And so, again, we're going to move to the Nonres data -- okay. So most of these are edits to existing language, either a result of new requirements or clarifications. NA2 is a Nonresidential Field Verification Diagnostic Test Procedure that is basically duct leakage for small constant volume system. These are very similar to the Residential systems, these are systems that are put into Nonres buildings that are 5,000 square foot or less, and they're constant volume system. Again, very similar to residential systems. And these

are the only nonres systems that are subject to HERS Verification procedures, similar to Res. And so these were the changes basically, to update to eliminate the ACM language, edited for clarity, added the smoke test apparatus specifications, clarified the connections to Plenum, and penetrations in air-handling unit, and air-handling unit access doors.

The next one was revisions to NA2.1.4.2.2, Sealing of All Accessible Leaks protocols to include smoke test. The next section actually describes the smoke test, the protocols. The next provision was the visual inspection to delete the excessively damaged inspection criteria that included an allowance for systems to pass verification with a two-inch diameter hole in the ducts, so, you know, we had to come up with some procedures to eliminate this problem.

And the last bullet is eliminating requirements for affixing a sticker to duct system to support the results of the duct leakage test.

NA5 is the overall envelope energy approach. As mentioned earlier, you know, we have proposed to eliminate this procedure and replace it with a compliance software fix, and so what is under NA5 has been eliminated.

Nonres NA7, this is Acceptance Requirements for

Nonresidential Buildings. A lot of changes to this section, a lot of them are through the feedback we get from the public, people who are actually doing their acceptance testing, you know, they always have suggestions how to improve the procedure, and kind of for clarity, change the things that don't work, and so we get constant feedback. So a lot of the changes to this section are a result of basically the experience people are gaining in the field and then giving it back to us.

We also have new requirements in the Standards. Martha showed all the process loads that we've added to the nonresidential buildings, for instance, and all of those have acceptance requirements attached to them. So changes in this NA7 captures these changes.

Of course, we added a Table of Contents that didn't exist before, revised the introduction for clarity. There was a lot of work that has gone into identifying the responsible person and the rules and responsibility of different people who do acceptance testing, so a lot of work has gone into this. You know, who is the responsible person, the field technician, and what is the definition of that, the documentation author. So there are new definitions for these.

And for the NA7.3, we revised the Acceptance Test Data and we have new tests. So for the

Documentation Author, the Commission's Fenestration Label Certificate eliminates requiring verification and required the documentation has been clarified. The VAV Outdoor Air Acceptance expanded construction inspection to include outdoor flow sensors, controls calibration certificates, and pre-occupancy purge.

And for Constant Volume Outdoor Acceptance, expanded construction inspection to include outdoor air provisions and pre-occupancy purge.

For Air Distribution System, expanded construction inspection to include duct system adhesive tape for economizer control, expanded construction inspection to include sensors, dampers, thermostats, and actuators. And a functional test added to confirm damper position control and economizer use for partial cooling.

For Supply Fan Variable Flow Controls, expanded construction inspection to include air flow modulation device and functional testing where clarified.

For Supply Water Temperature Reset Controls, the functional testing was clarified.

Hydronic System Variable Flow Controls, the expanded construction inspection to include static pressure location, set point and reset controls.

Functional test steps, they were reordered and clarified.

Fault Detection and Diagnostics for DX Expansion Units, expanded construction inspection to include hardware, air temperature sensors, and controllers.

We removed some eligibility criteria, added functional tests for air temperature sensors, excess outside air, economizer operations, and refrigerant diagnostic sensors.

We've added New Acceptance Testing in this procedure, in this chapter, for Supply Air Temperature Reset, Condenser Water Supply Temperature Reset Controls, Refrigerated Warehouses, which included Electric Resistance Under Slab Heating System Evaporators and Evaporator Fan Motor Variable Speed Controls, Condensers and Condenser Fan Motor Variable Speed Controls, and Variable Speed Screw Compressors. So they will all have new Acceptance Test requirements.

Outdoor Lighting Acceptance Requirements, new requirements for automatic daylight controls, automatic shutoff controls, and demand responsive controls.

NA7 is the Lighting Control Installation Requirements. Are these new requirements, Gary? Or are they existing and they have been changed?

MR. FLAMM: These requirements were vetted earlier, they're new to 2013 Standards.

MR. SHIRAKH: So these are new requirements for Lighting Control Systems and Energy Management Control Systems, Track Lighting Integral Current Limiters, Track Lighting Supplementary Overcurrent Panels, Interlocked Systems Serving a Single Area, you know, for using some Power Adjustment Factors (PAF), there are acceptance requirements. Is that correct?

MR. FLAMM: These are installation certificates, this whole list.

MR. SHIRAKH: Yeah. So Videoconferencing Studios, Extra Power Allowances, and for Outdoor Lighting Acceptance Requirements, outdoor lighting automatic shutoff controls.

For Nonresidential buildings, continuing new Acceptance Tests for Commercial Kitchen Exhaust Systems, this is the slide deck that Martha talked about this morning, new requirements for process loads, so there are associated acceptance requirements. Besides the commercial kitchens, there are Acceptance Requirements for Parking Garage and Compressed Air Systems.

NA8 is the Luminaire Power. I think Gary worked on this section and he significantly reduced the scope. Do you want to add something to that?

MR. FLAMM: Sure. The NA8 has been the default wattage list and it's intended to be conservative. It's

an alternate option to determining wattage according to Section 130.0. And most of the technologies in that document are outdated technologies, so there's a lot of legacy language that is not relevant to technologies being installed today, and furthermore, all we left in it were efficient technologies, so if somebody puts in something other than the most efficient technologies, they no longer have the option to use the list, they have to prove otherwise according to the rules in Section 130.

MR. SHIRAKH: Thank you. NA9 is the Nonresidential Fault Detection and Diagnostics (FDD), it is a new section. And so we have new Acceptance Testing for it. The things that are going to be tested will be temperature and refrigerant sensors, Unit controller, and the Unit controller shall provide system status for free cooling, economizer when it is enabled, Compressor enabled, Heating enabled, Mixed air flow limits the cycle that's active. Unit controller shall manually initiate each operating mode and Faults reported to the management application, and FDD system shall be certified by the Commission. So these are all the new requirements for Fault Detection Devices.

Did you want to add something to that, Martha?

NA9 Fault Detection, again, continuing. Specifies the requirement for Fault Detection, for the

Economizer operation and air-cooled Direct Expansion units. The Faults that will be detected under this procedure are Air temperature sensor failure/fault, not economizing when it should, economizing when it should not, dampers not modulating, and excess outdoor air.

So that's it for Revisions to Nonresidential Appendices. Any questions?

MR. GABEL: Mike Gabel. So thanks, Gary. I think I'm happy with the Luminaire Power Table. The only thing I would add maybe, perhaps is low voltage halogens. They're not the most efficient technology, but they're still commonly used and people might want to have a default value for those. I don't know if you have an opinion about that.

MR. FLAMM: Are you talking about resurrecting numbers that were already in there? Because, really, I believe the old was just ballasted technologies, wasn't it?

MR. GABEL: I don't recall any low voltage -- well, for example, it would take the lamp plus the other auxiliary --

MR. FLAMM: Well, let's talk about it offline.

MR. GABEL: Okay. And then the other thing was on Table 141.0(C), Standard Design for an Altered Component. There is supposed to be third-party

verification of an existing window characteristic as part of this deal we worked out about what alterations are going to do and how they're going to work, and so I probably want to have something in the Appendices that say what the third-party verification involves as far as windows. Thanks.

MR. KLEIN: Gary Klein, Affiliated International Management. I have a comment regarding Appendix A5, the Nonres Voluntary Measures. You've got an item for service water heating in restaurants. I appreciate that. I'm actually curious why we didn't think of putting in the volume from the recirc loop or other requirements that we have in the Res not voluntary standards for Green? We put in something which I'll talk about in more detail tomorrow, but it's 1E, Maximum Hot Water Pipe Volume for Res; why not non-res? The pipes can't tell what building they're in and it makes just as much sense to fix the problem in all buildings, as opposed to just residential building. I'm not sure we're able to do anything about it at this point in time, but I thought I should raise it because, if we're able to make a change, I would therefore put in such language.

MS. BROOK: So, Gary, you helped us with the residential proposal and we basically borrowed IAPMO Green language for the residential sector. Are you

suggesting that they have the equivalent --

MR. KLEIN: It's identical. The language for nonres is the same volumetric number you put in for res.

MS. BROOK: All buildings, they have those same restrictions?

MR. KLEIN: Yes, they do.

MS. BROOK: Hmm.

MR. KLEIN: They do. So I'm proposing that it's identical language and we might want to consider its use.

MS. BROOK: Well, is there any documentation that proves its cost-effectiveness for nonresidential buildings? I'm sort of surprised that you could make the same general proposal for residential construction as, you know, the extensive variety we have in nonres, and actually have those same volumetric limits applied in nonres buildings.

MR. KLEIN: Absolutely a great question. So the Energy Commission's bathrooms are a good example. When is the last time you actually got hot water in the bathroom over here? Have you gotten it since you've been here as a Commissioner? I used to work here for 20-something years, I've never had hot water in the men's room, I'm assuming the women's room is sort of similar. Thank you, I heard a verification, the ladies room is the

same. This is an office building, and this occupancy has a problem. There is a water heater in this building somewhere, I believe it, I've never actually seen it, but I believe there was one put into the building. The occupancy requires it. The problem is, it's eight miles away from the source, the uses of the hot water. And by the way, it's on a 24/7 recirc loop, we might be lucky, it could be on a timer here, it is the Energy Commission. But it's not delivering hot water to our fixtures. Why? The rules by which the building was built allow run-outs. This building is old. It may not have any limit to the volume in the run-out or length if it was limited by ASHRAE, which would have covered it, it would be a 100-foot run-out, no volume, no diameter intended. So 100-foot is going to be a one-inch pipe that's required because it's so long, and given the bathroom layout, I would assume that to be true based on IAPMO plumbing rules, so that's got five gallons of water in it. We retrofit with low flow fixtures. Good, it's going to take 10 minutes of continuous use to clear out the pipe. It isn't happening. I think I've made my point fairly clear, that if you have intermittent uses in office building-type occupancies, you actually want the water heater really close. I would say it's true in all building types. The more use you have, the more likely

you are to have a bigger boiler, or a bigger water heating system, and then you're going to have, if you've got a stack in a hotel, or you've got dorm rooms, or you've got gymnasiums, you'd want the water heaters to be big enough for the application, but you'd still want the pipe to be designed right. So I think that the case is that we can and should, the cost-effectiveness is probably better in most applications anyway because you want the water heater --

MS. BROOK: Well, I'm assuming that the residential proposal was derived -- the volumetric limit was derived from inefficient plumbing design in a typical single-family dwelling, so I need the math and the documentation that shows how you make that proposal and how you turn it into something that works for this building, and the size of this building and other commercial buildings. I don't see how the volumetric limits would --

MR. KLEIN: Would help you?

MS. BROOK: No, I know it would help; I don't see how it could be practical to require those same volumetric limits with the size of buildings and where you have to locate a water heater in these buildings, that you would need more capacity in the plumbing system.

MR. KLEIN: This building has, if we were to

look at the amount of hot water use relative to everything else in the building, would you assume it's pretty close to zero?

MS. BROOK: Well, yeah, especially since you can't get it out of the amp.

MR. KLEIN: Well, you're just spending the energy instead, so assume the real use is really small because it is, we would be way better off with small electric water heaters in every bathroom to supply the load and, rather than a gas boiler or water heater up on the roof.

MS. BROOK: So is there a study that has done that for commercial buildings that we could depend on for making this recommendation is what I'm asking for.

MR. KLEIN: I would say yes, but I'm not sure what you need in the way of a study, so when we're offline --

MS. BROOK: Well, whatever they use to -- well, I shouldn't say this, but it would -- I am assuming that they had such documentation when they made the decision in the IAPMO Green Building Code to include this requirement. So I'm asking for that same kind of report, or analysis, or justification, so that we can understand it and make use of it.

MR. KLEIN: I will see what I have to send you.

MS. BROOK: Okay.

MR. KLEIN: Obviously, we need it yesterday, I understand the problem.

MS. BROOK: Right.

MR. KLEIN: I'm just -- we didn't think about it when you and I worked on it, I realize that, I'm just proposing if we can fix it, it would be worth fixing.

MS. BROOK: Okay.

MR. KLEIN: A related comment to this is that I think, in our nonres, we essentially require -- do we allow 24/7 research systems in nonres buildings?

MS. BROOK: I don't know.

MR. KLEIN: So if we're not, sorry, I don't think we should allow 24/7 research systems in nonres buildings.

MS. BROOK: Okay.

MR. KLEIN: I think we should be going to demand controls, which I think is what the intent was, the underlying intent in this section, anyway.

MS. BROOK: Uh huh, okay.

MR. KLEIN: I'll come back with comments of a similar form tomorrow on the res section.

MS. BROOK: Okay, thank you.

MR. KLEIN: Thank you for your time.

MR. SHIRAKH: Any other questions on Nonres

Appendices? Online? Okay, we'll move to --

MR. EMBLEM: Are you taking questions from the phone?

MR. SHIRAKH: Is there a question on the phone?

MR. EMBLEM: Yes.

MR. SHIRAKH: Can you speak up a little bit?

MS. BROOK: And introduce yourself, please?

MR. EMBLEM: Yeah, this is Eric Emblem with the Joint Committee on Energy and Environmental Policy. Can you hear me?

MS. BROOK: Yeah. Hi, Eric.

MR. EMBLEM: How you doing, Martha?

MS. BROOK: Good.

MR. EMBLEM: Mazi, how you doing. Listen, I just want to reiterate my concern about the enforceability of the Code at this point. I support basically what you've done here and the addition of more Acceptance Tests and more rigorous requirements. But the concern I have is the ability to enforce it under the current conditions that you have in the language. Obviously, when you start putting the issues like demand control ventilation and acceptance testing to verify it, it's very important that the people that are carrying out that verification process and documenting to those acceptance forms know what they're doing. Under the

current process, I don't think that's happening.

Now, it would be nice if we could say that these acceptance forms were being gathered and collected by the various code authorities in the State of California, but in general, they are not. And in general, in fact, the proponents of the ones that are being collected are not being filled out correctly. And there's no way for the inspectors to understand whether they're correct or incorrect. So in order for the Code to work and for us to achieve the goals, we've got to make sure that the systems are being installed properly, and that when we've come to the determination that acceptance tests are required, that the people that are actually required to fill out those forms know what they're doing. Now, we had a workshop on this the other day, but I just wanted to go on the record here saying that I feel, we feel, that the people who fill out acceptance forms should be properly trained and certified to do so. And I hope that we could work out how those elements would come together and what those certifications would be, but without that, I think that we're doomed for further failure and less compliance, and not more compliance with the Code. And I think to adequately implement this, we're going to have to have more compliance. That's all.

MR. SHIRAKH: Thank you, Eric. Any other questions or comments on this section?

Okay, we'll move to the last.

MS. BROOK: The last section -- I don't know why we're talking about residential today -- for discussion today is the Nonresidential ACM Approval Manual. As heard in previous workshops on this topic, we've made substantive revisions to the ACM Approval Manual. We basically modified the manual so that it really just explains the process requirements for house compliance software shall be certified, and these are certified by the Commission. So it includes an application checklist in the manual, and it also includes the requirements for a compliance supplement to a software user manual. And, again, it explains the approval and decertification and challenge process for compliance software.

And then a separate document in a Nonresidential ACM Reference Manual will be a guideline for the implementation of our performance compliance approach and compliance software, that will be a separate document that is approved by the Commission, but not part of the rulemaking documents. And we'll entertain any comments, or questions, or suggestions on the ACM Approval Manual.

MR. GABEL: Mike Gabel again. So I put most of these comments in writing, but I just want to stress three quick points.

MS. BROOK: Okay.

MR. GABEL: One is I think Martha and we have talked about that the software should, both onscreen and in some form, print out a full description of the standard design, which we've never had for 35 years --

MS. BROOK: Okay.

MR. GABEL: -- so that you can troubleshoot and see, and also so someone can see what they're comparing their building to in detail.

MS. BROOK: Uh huh.

MR. GABEL: That's one point. Another point is that right now you have forms being printed out which, in the new Code, will go into a Registry, and there will be no access to sort of edit those forms, and right now the software doesn't give you the ability to fill in the fields in all those forms, so you can only fill in inputs to change the numbers. So the compliance software has to give you the ability within the program to put in notes, or fill in the fields that appear on the forms, unless you're going to let people edit the forms, they have to go to the Registry by creating some special system where they have access to some fields to edit it, and not to

other --

MS. BROOK: Right, and we are talking about a report generator that would have some of that functionality.

MR. GABEL: Okay, that would be great. And then finally, the third point is, this is Res and Nonres, but it applies to nonres, there are inputs into the software that change the numbers that don't appear on the Certificate of Compliance. In other words, there are certain things you can put into the software in good faith that you're modeling it correctly, but some of those things don't ever appear on the forms that the Building Department plan checks.

MS. BROOK: Yeah, and the challenge we have here, I think, and I completely agree with you, we need to figure out what is really important and what's not, because I've seen the software implementation where, you know, we have this thing, exceptional methods, and basically every single wall and frame assembly was printed out, and so this compliance form turned out to be, you know, 20-30 pages, but nobody is ever going to read that and so that challenge is to give the right information, but in a way that it's actually useful to the --

MR. GABEL: Right, so I think that's the

challenge. I think one approach is, if the Registries -- I think you did include the language and I thank you for the inclusion of the software, the input file has to be registered with the forms, that if someone has access to the file, they can always go back into the file and look at some of the things for enforcement purposes, but you're right, you have to be somewhat strategic, but I think big ticket items, I think anything that is significant, even if it doesn't detail every input, it alludes to the fact that those inputs were used to describe the buildings so there's something special.

MS. BROOK: Okay.

MR. GABEL: But we can, you know, we'll talk more offline, but I just wanted to make mention of that.

MS. BROOK: So the other thing that we're going to talk about more on May 3rd at the workshop, but just to remind everybody that we have been getting stakeholder comments about, you know, as we drive the performance standard to zero net energy, we need to allow more and more flexibility in designs because they actually need, in order to design the low energy building, you actually need to have specific, you know, building and application-specific schedules, for example. And right now, our compliance software requires you to have default schedules and not vary from them.

MR. GABEL: Uh huh.

MS. BROOK: So we've talked about being able to have some sort of third-party verification of the input file, or of the compliance process so that you can get credit, but you have to do an extra step to verify that you're not just gaming the system.

MR. GABEL: Right.

MS. BROOK: So --

MR. GABEL: So I think we're not going to do that for this Code cycle, but you're thinking about the next Code cycle?

MS. BROOK: No, I think we will do it this Code cycle.

MR. GABEL: Okay, so let's talk more about that. Thanks.

MR. NITTLER: Ken Nittler with Enercomp. This comment probably applies both to residential and nonresidential. As a software vendor, I've always had some heartburn over the sections that talk about approval and streamlined approval.

MS. BROOK: Uh huh.

MR. NITTLER: And I know some attempts were made to cleanup that language, but basically this language is language from the dinosaur era of computers when software was sent out on those little flat things

called floppy disks and so forth. And now days, you know, with Internet distribution, changes are made frequently, it depends on the program vendor, and right now this language says that full approval is needed when any other change occurs that in any way affects the compliance results. That's pretty broad. So I would suggest we put our heads together and figure out some way to soften that language to reflect the reality of how software is distributed these days.

MS. BROOK: Yeah, we would definitely welcome your suggestions as to the language in that manual to that regard.

MR. NITTLER: And then I just want to say one other thing. Some compliance software does print-out every single input that goes into the compliance --

MS. BROOK: No, no, I know -- and I think that's good, but that's also what I was complaining about, right? Because if you get too much of that, it just becomes like people don't pay attention to it because you have five pages that say what your wall assembly construction material is, so I think we have to think thoughtfully about how to do that in an effective way.

MR. RAYMER: Yes, Bob Raymer with California Building Industry Association, and I would echo Mr.

Gabel's comments about the need for the ability to, when you go into the registry to make in field changes, as we went into the last set of Standards, or the current set of Standards, that was a common issue that was talked about in the seminars that we were giving, where there was a rather intense amount of difficulty making these in field changes to stuff that was being registered.

MS. BROOK: Okay.

MR. RAYMER: And that applied to only those who knew there was a registry; unfortunately, as education went on, more and more people learned that there was something called a registry. So, anyway, we reiterate those comments.

MS. BROOK: Okay, great. Thanks. Any other comments on the ACM Approval Manual, on the phone or here in person? Okay, I think we're ready for general comments now.

MR. CALLAHAN: Ready? Bill Callahan with Associated Roofing Contractors of the Bay Area, and Union Roofing Contractors Association. And I spent the lunch period, since I have no life, wandering the Web and the Public Record, and I'm looking right now at the HMG Website, and H-M-G.com/T24/meetings.htm. And that's where there's a record of all the stakeholder meetings that the utilities group held, and it's a pretty

impressive record beginning on March 17th, 2010, and ending on June 1st, 2011, there were 48 stakeholder meetings, and they cover a wide range of things, Residential HVAC, Solar topics, ASHRAE 90.1, and so on, and 48 meetings, 15 months. The process ended on June 1st, and that's the day that the nonresidential cool roof proposal was unveiled, the very last day of the stakeholder process, and the next to the last meeting, there was a webinar in the morning, there was another webinar the next day, so all this time was spent in stakeholder meetings, but they were on topics that were not of interest to us. We get it June 1st, pretty radical proposal, I think, if you look at the comments, which are on the website, and people were really surprised at what happened. And within 10 days, we're at a workshop trying to react with them, to staff, and those comments go into the black box, four months later we get a new proposal with some other new ideas, I believe that's where the mandatory minimums idea was unveiled, which is a pretty radical idea to us, and fairly shocking. And then it's February 24th where we see the next iteration of the Code, so 15 months of all these hearings that were taking place, stakeholder meetings, but for us, you know, eight months to get to the February 24th 45-day language, and 17 days to get between the

release of that language and today. And for us, a very protracted, very compressed period of time. Now, maybe it was left to the end because it's a minor topic, and I think, in the grand scope of the whole Title 24, that cool roofing probably is a pretty small contributor to the whole thing. But it's what our members do for a living, so it's pretty important to us. And, you know, we would appreciate a little more time to work these things out.

And I'll bring up a comparison in terms of the way the process works. I've done a lot of work, and I know Bob has over the years, with the Cal OSHA Standards Board, we use advisory committees, they come up with an idea, "Hey, we think it would be a good idea to raise cool roofing from .55 to .70." We bring people together and we talk about it. What are the real world problems? What's good about it? What's bad? What would your concerns be? And so on. And over the period of six months to a year, we come up, usually, with a consensus proposal that everybody agrees on, and there's no black box. Here, part of our frustration is that these things, from our point of view, get dropped on our head, we get very little time to respond to it, and then it just goes off into a black box until we see the next iteration. I think you really really are better served to have a more

collaborative process, and then you wouldn't have to listen to me and a bunch of other people, perhaps principally me, whining about these things, there would be nothing to whine about because we'd have a proposal that we all agree could work. Thank you.

MR. HITCHCOCK: Reed Hitchcock, Asphalt Roofing Manufacturers Association. And, Madam Commissioner, if I may, I've got a letter, a consensus document prepared by 14 trade associations, if I could read that?

"Dear Commissioner Douglas, On behalf of the undersigned roofing industry and affiliated trade associations and stakeholders, we're writing to comment on the 45-day language posted to the CEC Website and to be presented at the March 12-13 California Energy Commission hearing on the 2013 California Building Energy Efficiency Standards. We appreciate your consideration of our collective concerns about the 45-day language.

While as individual organizations, we have numerous concerns and positions related to this language, which we'll share in more detail and testimony at the March 12-13 hearing or in writing. The members of this industry coalition share some critical fundamental concerns with the language in its current form, many of which have been stated before, but not addressed by CEC. Cost Justification: As we've previously expressed, the

baseline cost used for justification in the 2005 Code and again for 2008 were based on a Lawrence Berkeley National Lab Report from 2002, that has been publicly demonstrated and acknowledged by CEC staff to have used cost data that was not representative of the real world cost associated with cool roofing materials. Nor did this baseline data accurately reflect premiums for cool roof versions of existing roofing materials. The current prescriptive requirement for low slope roofing of 0.55 aged solar reflectance was based on that fallacious report, if the CEC has taken the position that they cannot go backwards in the surface reflectance requirements.

The proposed increases for 2013 continues to sustain and validate this flawed data since the justifications for the proposed increases of .63 and .65 for Alterations and new roofing, respectively, are founded by comparison against the existing requirement of 0.55. When challenged by this industry at the October workshop, the CEC opted to utilize their existing consultants to conduct what is a quick and dirty cost analysis, instead of considering the roofing industry's strong recommendation to work collectively with our industry to develop a strong, detailed and meaningful cost justification analysis.

The CEC's approach appears to rationalize an

increase in reflectance based on a self-imposed mandate to increase the requirement, regardless of benefit, as opposed to living up to your obligation to California consumers, building owners, and manufacturers to develop a true cost justification analysis that takes into account the numerous factors that have been raised over the last several years in written comments and verbal testimony from stakeholders and other parties interested in the Code development process. By not conducting this analysis in a proper, thoughtful, and responsible manner, the CEC is regulating durable proven reliable products out of the market, taking choice out of the hands of Californians, and putting hundreds of manufacturing and contracting jobs at risk, all based on flawed data that has failed under scrutiny.

The cost analysis conducted by AEC is seriously, if not fatally flawed in a number of fundamental areas, 1) limited responses, the responsible upon which the proposed Code is based is far too small to draw any sort of conclusion. Three written responses and nine phone interviews with no substantiation as to the validity of the data, or the qualification of the respondents to respond; 2) no statistically valid sample size. There are not enough data points to show a range of cost variability for each roofing material category.

The survey fails to pass any test of statistical significance; 3) dubious labor rates…," as Bob mentioned earlier, "…there is clearly an issue," sorry -- Bill -- "…there is clearly an issue with the labor cost when Union Labor rates come in at $225 an hour less than open shop rates; and 4) lack of confirmation of underlying premise. There appears to have been no attempt to confirm that respondents were basing their feedback on the 0.65 target, as requested.

In short, the AEC Cost Analysis contains very little real cost data, and what little has been generated demonstrates no validation of its accuracy. There is no way that a reputable organization can seriously draw any conclusions based on such an unsubstantiated and extremely limited response. The roofing industry formally restates our position that CEC should not change the current 0.55 solar reflectance in this Code cycle, and we reiterate our offer to work collaboratively with the CEC to collect real world data, which can be used to develop a robust, statistically significant cost justification analysis document that can be used to set fair, reasonable and sound solar reflectance requirements for low slope roofs in California.

The State of California and the CEC are responsible to set policy that offers as a benefit to the

citizens of California, their environment, and their standard of living. It appears to the undersigned that the CEC is operating with a mandate to make existing standards more stringent, but without going through a complete and thoughtful analysis that considers not only the economic basis for the changes, which we understand to be a mandate under the Warren-Alquist Act. Consequently, the full picture of the science behind the arbitrary changes that are being proffered, and the ripple effects they will create, is not complete and very poor science, at best.

In addition, we are concerned that current TDV calculations used in Title 24 were established without accurate consideration for the impact of increased penetration of various renewable energy technologies over time. Logically speaking, renewable energy penetration increases the value of incremental power during the peak hours of the day is expected to decrease, as indicated by a recent report from Lawrence Berkeley National Laboratory. As a consequence, as contracted renewable energy resources become operational, the assumptions used to derive the current TDV calculations will become increasingly inaccurate for purposes of valuing incremental energy savings. Failure to reflect this phenomena in current TDV analysis will tend to overly

burden building owners and building materials manufacturers with unnecessary increases in proscriptive energy standards, especially proposed increases in the minimum proscriptive solar reflectance of roofing membranes, which are most closely tied to TDV values most affected by increased renewable energy production.

To avoid this potentially adverse effect, we recommend the Commission reevaluate current TDV calculations and models prior to the implementation of any increase in solar reflectance.

Consistency in enforcement. CEC staff and members of the roofing industry have shared concerns over the enforcement of the requirements for roof surface reflectance under Title 24. Since the adoption of irradiative property requirements for roofing over seven years ago, there has continued to be a disconnect between what is required and what is, in fact, taking place on buildings. This disconnect is exacerbated by significant variation of local enforcement. Until such time as there is equal application of requirements of this energy code, any further stringency in its requirements seems to be made without any regard for reality.

Clear, Concise, Consistent Code Language. The approach taken by the CEC in the Draft Proposals for Low Slope Roofing, despite efforts to simplify, will create

additional confusion in the marketplace. Whatever level of surface reflectance meets with the cost justification requirement should be consistent for new roofs and alterations. As has been proven in the past, variable requirements by location or application leads to uncertainty and perplexity in the marketplace and confusion for all involved in the process of selecting the proper roof system for the building.

Summary. While we appreciate that the CEC staff has considered comments received from our coalition of industry organizations, individual manufacturers, and other stakeholders, and has invested in working to address some of the concerns that have been raised, we remain deeply concerned that many of the issues previously raised have not been addressed, which have direct impact on the standards proposed. Because of this, we continue to have fundamental concerns with the overall process. We do understand that there are alternative compliance options in the proposed language, but it is critical that the CEC recognize that experience with previous versions of the Code makes it abundantly clear that, no matter how simple alternate means of compliance may be, it is the prescriptive language in the Standard that receives the focus of the California building and consumer communities, and will therefore

have the greatest impact on the California market.

Your attention and response to our comments is appreciated. As an industry, we all want to ensure that the results of the 2013 Title 24, Part 6 process are Energy Efficiency Standards that make practical sense for the consumer and ensure that they continue to have choice in their roofing selection, that fits the needs of their home or building. The 2013 Standards should likewise continue to support the goals of the Energy Commission and the State of California and should be based on the sound, scientific, technical, and economic facts and data. As an industry, we remain ready, willing, and able to assist the CEC staff to work through the science, technology, and economics related to roofing materials and systems. We urge you to accept this offer and to work with our industry to come up with sound requirements for roofing. Please don't hesitate to contact any of the undersigned if you have any comments or questions regarding this letter." Signatories to the letter are myself, Dr. William Callahan, Associated Roofing Contractors of the Bay Area Counties, Dr. James Hoff, Research Director, Center for Environmental Innovation in Roofing, Stanley Graveline, Vice President, Technical Services, Sika Sarnafil, also for the Chemical Films and Fabrics Association, Mark Thimons, Executive Director,

Cool Metal Roofing Coalition, Tom Hutchinson, Technical Director, and Ellen Thorpe, Associated Executive Director for the EPDM Roofing Association, Matt Kolb, President, National Coatings Corporation, Mark Graham, Associate Executive Director, Technical Services for the National Roofing Contractors Association, Penny Gift, President, Reflective Roof Coatings Institute, John Ferraro, General Manager, Roof Coatings Manufacturers Association, Marc Connerly, Roofing Contractors Association of California, Mike Ennis, Technical Director, Single Ply Roofing Industry, Richard Duncan, Technical Director, Spray Polyurethane Foam Alliance, and Ron Johnston, Executive Director, Union Roofing Contractors Association.

MS. BROOK: Thank you.

MR. SHIRAKH: May I -- just a few points. Reed mentioned that the 2005 cost for cool roof study was flawed, and you brought that up several times, and you will probably recall --

MR. HITCHCOCK: 2002.

MR. SHIRAKH: -- 2002 and 2005 -- that we offered ARMA to actually disregard those cost studies and we set our costs and savings and --

MR. HITCHCOCK: But if you recall, your response was "tell us a number."

MR. SHIRAKH: No, we said we will ignore the

2005 and reset the basis to 2001 for both cost and savings as if that study didn't occur. It took you about two weeks and you basically decided you didn't want to accept our offer. So we actually just offered to discard that study, and you chose not to offer.

On the question of, you know, whether we were responsive to the industry or not, it is true that June 1 was the first stakeholder meeting, and our proposal at that point was .70 reflectance, .85 emittance. There was no prescriptive tradeoffs for either existing buildings or new construction. And as a direct result of what we heard from ARMA and their members, we have substantially changed all of those requirements. And we basically dropped our emittance change, we reverted back to .75. Initially, our reflectance offer was going down from .70 to .67, again, partly because of the comments received during the workshops, some of their members suggested that might be the appropriate level. We started offering prescriptive tradeoffs against insulation, first for in existing buildings, and subsequently in new buildings. We further dropped our reflectance requirements from .67 to .65 again in response to many of the comments we have heard. So, to suggest that, you know, we have been operating in a black box is a bit of an exaggeration.

On the question of costs, it is in the eyes of

the beholder whether 12 data points plus published data is too little or too few, I mean, we have adopted other measures into the standards that had maybe less, maybe more. The idea of going out with 80 surveys and getting back 12 of them, and all of them happen to say it's cost-effective, not one demonstrated that it is not cost-effective. The odds of getting like that, actually, is less than winning the lottery. And so on and so forth, so, you know, we've listened to them, we've worked with them, subsequent to the June workshop we had actually a stakeholder meeting in Hearing Room B and the purpose of that was cost, you know, we had many of the same members in that room and they helped us to fashion a survey, which we subsequently used to go out and get information, and they offered to help us get costs for various roofing products -- we never see any costs coming in after that, even though this was several months ago. So basically those are my points.

MR. HITCHCOCK: I would like to just address a couple of those. We're probably going to disagree on a couple of these points. When you talked to me about disregarding the 2002 study, you did say we could go back to the 2001 numbers, which are now, you know, 12-years-old and irrelevant, given the conditions in the market because the whole product availability, what things cost,

is not the same then as it is now. And you offered me, you said, "You tell me what that number should be." That was your statement to me, "You tell me what the numbers should be." I can't in good faith just say, "Oh, Mazi, you know, make it .22." There are processes that need to be undertaken and we thought it would be very irresponsible just to throw a number back.

MR. SHIRAKH: I remember what our offer was, to disregard the 2005 and 2002 and go back to the baseline of 2001 for both energy savings and costs, that was my offer.

MR. HITCHCOCK: Okay, well --

MR. SHIRAKH: And then you did not accept.

MR. HITCHCOCK: No, I did not accept because that's old information. We did offer, though, to work with you to get current, good, real information, and acknowledging that was going to take some time. That's number one. Now I forgot what your second point was. What was the second point --

MR. SHIRAKH: I remember my third point. We talked about the 2005, I forgot my own points, we talked about the costs, how many points, and --

MR. HITCHCOCK: I'm going to get an understanding because you talked about working with ARMA and responding, there were some things you responded to,

and --

MR. SHIRAKH: How we changed our proposals --

MR. HITCHCOCK: And you did change -- you changed things in response to some of the points. Now, understand, the letter that I read now is not ARMA, this is the 14 associations, I contributed to this letter, I'll have different ARMA testimony, you'll get to listen to me again, but there is a very strong feeling in the industry that there was very much a pick and choose attitude about what comments did get responded to and a number of professional associations, as well as individual companies that submitted comment, but were very upset that they never had any response at all from the Commission.

MR. SHIRAKH: Essentially, we have only one change related to 2008, it's the high reflectance. We haven't changed anything else.

MR. HITCHCOCK: And there's disagreement over whether there's cost-effectiveness.

MR. SHIRAKH: Yeah, so I don't know, we haven't changed emittance, we haven't changed anything else, the only change -- we haven't changed steep slope. The only change relative to 2008 is .65.

MR. HITCHCOCK: And you're going to have me sort of give away my little bit of testimony later, but

in 2008, do you recall having the conversation with me where you said, "We know this is wrong, the baseline is wrong, but we're not going backwards?"

MR. SHIRAKH: But again --

MR. HITCHCOCK: Do you remember that? It was wrong. It was wrong then. It doesn't get any better with age.

MR. SHIRAKH: I can't keep repeating myself, and I'm just --

MR. HITCHCOCK: I mean, you're not changing, but you still don't know if it works.

MR. SHIRAKH: We offered to disregard that and start fresh from 2001 baseline.

MS. BROOK: So the proposal basically that Mazi is suggesting is that we would assume we had no cool roof standards, and then we would propose .63 and prove that that is cost-effective from the point of view of not having any cool roof standards.

MR. SHIRAKH: And you did not accept.

MR. HITCHCOCK: Yeah, it's more complicated than that. And this is where, I mean, somebody made the suggestion of, you know, sort of these working groups that work together on these things, you know, sending something like that in an email is a lot less productive than sitting down with a group of experts around a table,

and having that discussion and working through it. But there's a lot more that needs to be considered than just, "Does this work?" We don't know. And what I told you at the time was it's not as easy as just saying, "Yeah, reset it." There's a lot of factors that have to be considered and when you go through this whole process, then you know.

MS. BROOK: Okay, the one thing I wanted to mention in regards to the Time Dependent Valuation, because it does factor into the cost-effectiveness calculation, is that we have published on the website, and we have presented in public workshop, the methodology for the Time Dependent Valuation, and it does consider the future that California is projecting for 33 percent renewables and contributing to the electricity grid, so I don't think your claims of our Time Dependent Valuation not capturing renewables is correct.

MR. HITCHCOCK: I have to be honest, I didn't contribute to that section, and so whomever did, I don't recall who did. They would have to speak to that.

MS. BROOK: Okay.

MR. HITCHCOCK: Thank you.

MS. HARDY PIERCE: Good afternoon, Commissioners, Martha, Mazi, and members of the CEC staff. My name is Helene Hardy Pierce and I'm

representing GAF. GAF is the largest roofing manufacturer in North America and a manufacturer with significant manufacturing investments in California. I have provided previous testimony regarding the 2013 Building Energy Efficiency Standards and I appreciate the opportunity to do so again today.

First, I want to remind you that GAF offers our roofing contractors, building owners, and homeowners, a full line of low slope roofing solutions, including many products that would meet these proposed 2013 Standards. We have two state-of-the-art TPO roofing plants, a white coatings business, of which we are primary, we manufacture our own white coatings, to say nothing of a full line of built-up and modified Bitumen products that provide reflective light surfaces. Such is to say that the issues I'm going to raise are not self-serving, from the perspective that these Proposed Standards are not a threat to our product line, they're not.

That being said, I have several issues regarding the 2013 Standards. First, we do fully support the letter and the issues raised from the Roofing Industry Coalition. Obviously, we participate in several of those organizations. The 2013 process, and even its predecessors have to some degree and, Reed, I'll be honest, Mazi was probably referring to some of my

comments, they ignored sound rationale issues that have been raised, and for a body that solicits input, I and other stakeholders are seriously concerned that the majority of issues raised are wholly ignored. And you're right, everything has been focused on Irradiative properties and that's an issue I want to raise now.

There have been unintended consequences because of this focus on Irradiative properties and it's been undiminished, it has not let up, and some of the consequences of this very focus are coming to fruition today, much to the dismay of California building owners. It is beyond the scope of this hearing, a hearing in this format, for me to elucidate the design issues that arise by simply painting a roof white. We've all been hearing about it coming from the very top of our energy policy in this country, but changing -- it's either painting a roof white, or changing a membrane with a reflectivity of 0.25 to one with a reflectivity of 0.68, but suffice it to say that today, in San Diego, our Director of Technical Services, Mr. Bill Woodring -- and I was supposed to be there, except I'm here -- is investigating several roofs with moisture problems directly attributed to changing only the irradiative properties of the membrane. And when I mentioned problems, I'm referring to total structural deck deterioration inside of two years. The

industry has been hearing anecdotally of such problems, and it has started to investigate this phenomenon, and there's a Dregger, Phil Dregger, a very well respected roof consultant, who actually published in the February issue of *Western Roofing*, and he talks about not just membranes, but about painting roofs white and the same problems. I raise this issue as a serious point. There continues to be this focus on irradiative properties of the roof by so-called experts, who in reality know next to nothing about how a roofing system really works, nor do they take into consideration the consequences of their lack of expertise. Many in our industry have asked time and time again that the California Energy Commission, through Title 24, consider more than the irradiative properties of the roofing membrane. If we are serious about energy efficiency, we would be debating the energy efficiency of the roofing system, and we wouldn't be arguing about 0.1 or 0.8 change in reflectivity. It would seem that this is the real conversation we should be having. And shame on all of us, but our industry has been asking for this conversation and we haven't been getting it. I strongly recommend no changes to the 2008 Standards for Nonresidential Roofing, and that serious consideration be given to the myriad of concerns raised by our industry. We're a small piece of Title 24.6, but

it would help with developing a valid cost justification, addressing the concerns raised, and protecting California consumers from the onerous consequences, potential consequences, of what is being proposed. Thank you.

MR. SHIRAKH: Can I ask one question, Helene? I recall from earlier conversations in workshops, you were actually supporting the insulation tradeoff and we've provided that, and we've actually allowed people to go down to fairly dark -- now, why isn't that the viable --

MS. HARDY PIERCE: The problem is the way it's written, and Reed addressed it, the prescriptive requirement of just make it white, lead a reflective requirement is what contractors do and, in re-roofing, where you have a roofing system that's designed that is not -- does not take into consideration ventilation, it doesn't take into consideration doing thermal calculations and psychometric calculations, because the roof worked, contractors don't do that. And because that's the easiest path, they're not -- it's easier to just put a white roof on, and that's what has been happening since 2005, but you think about these roofs, the ones that are marginal, what's happening is, you know, a roof only gets re-roofed every 20 or 30 years, so now, if they were roofed two or three years ago, and all

of a sudden, when I talk about total deck destruction, I'm talking about the deck is gone, I mean, it's gone. And that's this entire conversation about the insulation tradeoff, if we really want to talk about energy efficiency of the roofing system, insulation tradeoff shouldn't be in an alternative manual, or a compliance manual, it should be in Title 24.

MR. SHIRAKH: It is in Title 24.

MS. HARDY PIERCE: But made very very easy as a prescriptive. And actually --

MR. SHIRAKH: It is, it is. I'm not lying to you, it's in there.

MS. HARDY PIERCE: Okay, all the way down to .3, but the focus off of the irradiative properties, so that it's not just the easiest path is just put on a white roof because the unintended consequences of that is, if you ask roofing contractors in the State of California, or you ask designers, they'll say, "Nope, it says right here, .65 for irradiative."

MR. SHIRAKH: No --

MS. HARDY PIERCE: Mazi, we can argue, I'm going to agree to disagree with you. Okay?

MR. SHIRAKH: No, but I just want to make a clarification that this is not in the Compliance Manual, it is right there in the Code, right below where it says

it's .65, there is another table that says you can trade down to these levels, so it is right there in the Code.

MS. HARDY PIERCE: But -- okay, go ahead.

MR. SHIRAKH: And you mentioned, you know, you have the company GAF that you work for actually has products that -- these are products that are available today and they have warranties, you know, in your opinion you --

MS. HARDY PIERCE: Well, how do you think we've been marketing products since 2008, given the current Standards? Yes, yes.

MR. SHIRAKH: And they have warranties in there, and you're not concerned about their durability?

MS. HARDY PIERCE: No.

MR. SHIRAKH: Okay, thank you.

MR. BOZORGCHAMI: Helene, one second. This is Payam with the California Energy Commission. Helene, you also have to take into consideration Bill Callahan's proposal to look at insulation below the roof deck, so we'll do that in the next few days also and get something back.

MS. HARDY PIERCE: Actually, the problem is that insulation below the roof deck is what is causing in this the ventilation -- so you're talking about above?

MR. BOZORGCHAMI: No. So currently what we did

under Section 140.3 is we have an insulation tradeoff down to .50, and then we're going to look at that and we're probably going to drop it down a little before there, too. So the insulation tradeoff will be in the prescriptive package for new construction as also it is for re-roofing.

MS. HARDY PIERCE: Down to .25 or .2?

MR. BOZORGCHAMI: We'll look into that.

MS. HARDY PIERCE: Thank you.

MR. SHIRAKH: Thank you.

MS. DICKEY: Hi, I'm Amy Dickie with the Global Cool Cities Alliance and, briefly, we're a fairly new organization that works with cities around the world to support them in their development of cool roofs and other cooling programs, and I wanted to comment on the Stanford paper that was referenced this morning with respect to each of the benefits that we believe cool roofs bring to a city, and that is the energy savings at the building level, and the Stanford paper acknowledges this benefit of cool roofs, and if you think about just the building system, then the tradeoff with insulation makes sense, and that's why it's in the Code. But the second benefit is that it reduces local air temperatures, it reduces the urban heat island effect, and here the Stanford paper also acknowledges and agrees and finds that white cool

roofs reduce local temperatures, and there's a great body of literature that also supports this, it improves the health, air quality, comfort. And the third is that there is a global cooling benefit from cool roofs. And here, the Stanford paper finds that -- their finding is that cool roofs actually have a slight warming effect, but they're modeling has a very wide range of uncertainty around this finding, and it is very dependent on the assumptions that are made, to the point where the authors basically say that "our findings are that there is an inclusive impact of cool roofs on global cooling." And we should note that this is the only paper in what is a small, but emerging body of literature on the impact of cool roofs on global cooling. There are several other papers that find that there is a cooling effect. And there is a response from the Lawrence Berkeley Lab, Heat Island Group, to the Stanford paper that gets deep into the technicalities of the model, and I would refer everyone to that. I don't want to go into it, but just to summarize, the Stanford paper basically says cool roofs are great at the building level, at the city level, and hold your horses on the global cooling side. But I just wanted to make that point of clarification. Thank you.

MR. SHIRAKH: Thank you, Amy.

MR. FERRARO: Hi. I'm John Ferraro, General Manager of the Roof Coating Manufacturers Association. RCMA is the national trade association of manufacturers of bituminous and non-bituminous roof coatings, and the suppliers of the roof coatings industry. RCMA formally restates our position that the CEC should not change the current .55 solar reflectance in this Code cycle. Our industry maintains this position because the baseline cost used for cost justification continue to not be representative of the real world cost associated with cool roofing materials, as already mentioned by several other of my colleagues. The proposed increases for 2013 continue to endorse this flawed data since the justifications for the proposed increases for .63 for alterations and .65 for new roofing are founded by the comparison against the existing requirement for .55 aged solar reflectance. The cost analysis conducted by AEC is seriously flawed. The AEC's supposed cost analysis contains very little cost data and, what little has been generated, demonstrates no proof of its accuracy. CEC is making existing Standards more stringent without going through the complete and thoughtful analysis. RCMA recommends that CEC skip this Code cycle so you can take your time forming a better, simpler rule. The direction the CEC is currently taking is dictated more by peak

energy reduction, which benefits mainly energy companies and a small segment of consumers, rather than by a desire to actually reduce energy consumption altogether. There is a clear difference between peak savings and overall energy savings. Peak energy savings means a reduction in energy use when energy companies are nearing their maximum production capacity. Energy savings, on the other hand, means the reduction of total energy consumption to heating or cooling a building year-round. RCMA reiterates our offer to work together with CEC to collect real world data. Once again, we appreciate the opportunity to comment on the proposed changes. An industry comment letter will be submitted to the docket later today.

MR. SHIRAKH: Thank you for your comments. Reed.

MR. HITCHCOCK: This is the ARMA testimony. Reed Hitchcock, Asphalt Roofing Manufacturers Association. Thanks again for the opportunity to speak. I'll try not to go on for hours again. ARMA represents the manufacturers of asphalt roofing materials, including shingles, modified bitumen, and built-up roofing systems. The products we represent are produced and applied within the State of California, and the asphalt roofing manufacturing facilities account for the majority of

roofing manufacturing facilities in the state. To say we're disappointed with the 45-day language for low slope nonresidential roofing would be a gross understatement. We support the comments of the Roofing Industry Coalition read into the record and would like to add some of the following thoughts and comments and concerns to the language that has been presented. I'd like to start by reminding CEC staff of discussions we had leading up to the 2008 Code cycle, it was during that process that the staff acknowledged the 2002 report from Berkeley was flawed, which served as the baseline assumptions for both the 2005 and 2008 Code -- listen, I wrote this before I knew what we were going to talk about. Despite that acknowledgement, it was the position of the staff that the Commission could not go backwards in terms of the requirements for solar reflectance. We acquiesced, despite our better judgment, but advised the staff that our industry was willing, able, and ready to work closely with the staff moving forward on future versions of the Code to ensure a thoughtful and balanced Code to the extent that would be possible without going backwards. Periodically over the past few years, representatives from the roofing industry, and as Bill Callahan pointed out earlier, having inquired of the staff as to thoughts or directions that could be shared related to the process

for developing the 2013 Code. On numerous occasions, the response coming from CEC staff was that we don't think we're going to be making a change this cycle, we don't see changing it, we may do some work with the exceptions. It wasn't until that summer that we learned otherwise.

Building on the same bad science from that 2002 report, CEC staff and consultants came up with a recommendation of .70 aged solar reflectance, an increase of .15, which in terms of solar reflectance is a pretty dramatic leap. The roofing industry questioned the science, reminded the staff of previous discussions that had taken place regarding the Berkeley report, and the bad science serving as the baseline for the current proposed Code. The staff and consultants went back to work and came back with proposal .67 aged solar reflectance, still without a new cost justification.

Our industry once again responded in unison and strongly recommended that the current requirements be maintained, flawed as they are, and that the CEC spend the next cycle undertaking a thorough, thoughtful, and sound cost analysis, looking at real world costs and premiums for roofing systems in the California market. Our industry also collectively offered to assist with that process to whatever extent possible in collecting cost information and market data to help build the robust

report needed in this situation, to ensure that California consumers and building owners are able to purchase the right roofing system for their home or building, that they can achieve cost savings, that the requirements under Title 24, Part 6, promise them, and that they retain the aesthetic choice for the roofing system that best suits their application, and that any premium cost for a cool roof under the requirements of Title 24 is outweighed by the energy savings of that system.

Instead of that thoughtful analysis, the decision was made to rush a quick and dirty analysis through the consultants who had previously failed to deliver any defensible proposals for increases in 2013. The consultants experienced exactly what we feared and expected they would; cost data that is extremely difficult and time consuming to gather, and the time between the October 2011 CEC Workshop and now, they were able to collect just 12 sample responses to their surveys, not even covering all of the roofing systems sold in the California market, and certainly not enough to implement Code that would take solid, reliable, California-produced products off the market, even at the current proposed solar reflectance levels of .65 for new construction and .63 for re-roofing, which represent

decreases of 29 and 22 percent, respectively, of available products in California, according to the CRRC database.

MR. SHIRAKH: Could you --

MR. HITCHCOCK: So basically, at .65 --

MR. SHIRAKH: Yes.

MR. HITCHCOCK: -- you've got a reduction of 29 percent of available products, according to CRRC.

MR. SHIRAKH: This is on reflectance so long as there is a reduction of about 30 percent?

MR. HITCHCOCK: Yeah.

MR. SHIRAKH: So there's 70 percent of products in there that meet that requirement without any insulation tradeoffs?

MR. HITCHCOCK: You're still taking off 30 percent of the products available to the market.

MR. SHIRAKH: But not if there is an insulation tradeoff. They can put insulation in exchange for --

MR. HITCHCOCK: I'm going to get to that in a minute.

MR. SHIRAKH: Okay.

MR. HITCHCOCK: As a reminder, there are 19 asphalt roofing plants in California which produce the majority of the 250 million square feet of asphalt roofing sold in California in 2010, which was widely

considered a down year for non-residential construction. That varied approach is also a concern to ARMA and to others. Without belaboring the point, different requirements for different situations serve very little real world purpose in terms of energy savings. And we're talking about .202 percent, but will surely result in confusion in an already confused marketplace trying to understand what the CEC is attempting to accomplish. Commission staff argues that there are energy tradeoffs in the Code that will make it easier to make those products available to Californians, but there are a few problems with that concept. First, we can't see all those tradeoffs, as many of them move to the ACMs, as opposed to being part of the Code considered. Forgiving our skepticism, but to go along with the restrictive Code of this nature with the faith that the tradeoff alternatives in the compliance manuals will be satisfactory is a leap we cannot support, much less endorse.

Beyond that, it's been the experience of our industry that, particularly in light of the complete lack of enforcement for the Codes heretofore, the existing requirements, and certainly any increased requirement encouraged cheating of the system by unscrupulous business people, and also that regardless of what is in

the Code, what the marketplace sees and hears, especially considering the convoluted means of trading off that have been typical, is the reflectance number, plain and simple. Why not instead offer the cool roof as an alternative compliance against the insulation code? As several have testified previously, insulation works in all climates, not just the hot ones.

Let me be clear, our organization is not anti-cool roof, we have cool roof solutions available, as Helen said, just as our other roofing industry colleagues do. And we do believe that there are situations where cool roofing is the best approach to save energy. That said, a cool roof is not the right solution for every building, nor every climate in this diverse state. Once again, we implore the Commission to leave the requirement for low slope nonresidential roofing at the current .55 and take our industry up on the offer to work in collaboration over the next Code revision cycle, to truly and responsibly examine the cost benefits of cool roof in an effort to determine what solar reflectance, if any, makes sense for the people, businesses, and utilities in the State of California.

MR. SHIRAKH: Thank you, Reed. Again, to reiterate, the insulation tradeoff is not in the ACM Manual, it is in the Code Standards, it's currently on

the 45-day language for existing buildings, and we're going to have that same thing for new buildings, again in the Standards --

MR. HITCHCOCK: But when does that become official language?

MR. SHIRAKH: When we publish the 15-day language, you'll see it on that. And we'll run it by you so you're comfortable with the range in numbers, but it will be in the Standards as an alternative to the cool roof requirements, not in the ACM Manuals, not in the Compliance Manuals. I wanted to make that very clear. Thank you.

MS. BROOK: One question I would have, Reed, is there any other technology that typically your members do tradeoff for the cool roof requirement, other than insulation?

MR. HITCHCOCK: I would defer to Helene on that.

MS. BROOK: So for low slope, then, I mean, that was our understanding also, that it really was about insulation and that's why we didn't think it was a big deal to get rid of the problematic overall envelope approach, since we are providing the insulation tradeoff for the cool roof requirements.

MR. HITCHCOCK: I think part of the concern is,

again, we're being -- we're here to talk about what we know today and, you know, statements that it's coming are hard to swallow until it's already there, and the turnaround times are very difficult. You know, I tell anybody that will listen, I have to be in Miami tomorrow morning because I had a previous scheduled meeting, this came up very quickly; all of the meetings that we've participated in related to this cycle have been very quick, we have very little time to review this language before coming to these things. I mean, this is information that would have been really helpful eight months ago. But it doesn't get at some of the other root issues that we have with the Code. You know, I appreciate that you guys are looking for solutions --

MS. BROOK: Uh huh.

MR. HITCHCOCK: You know, I still think and our industry still thinks that there's a flaw with the proposed levels.

MR. SHIRAKH: Just one last point. I think I heard you, like you said, the products that are under cool roof, currently 71 percent meets our reflectance requirement without any insulation tradeoffs. Correct?

MR. HITCHCOCK: According to the CRRC database.

MR. SHIRAKH: Without any insulation --

MR. HITCHCOCK: Understand that many of the

listings in the CRRC database are duplicative. Some products are represented five, six times, depending on product labeling.

MR. SHIRAKH: Fair to assume that, with insulation tradeoffs, even more products would be the requirement --

MR. HITCHCOCK: It would depend on the tradeoff.

MR. SHIRAKH: Okay.

MR. HITCHCOCK: But you're still selling bad science, Mazi.

MR. SHIRAKH: Thank you.

MR. HITCHCOCK: You're welcome.

MR. CALLAHAN: It's me again, Bill Callahan. I just wanted to reinforce again how much this process from our point of view looks anti-collaborative. Yes, there have been changes made since the initial proposal in June, but frankly, it's been a case of whack a mole, and the June proposal, I've got it right in front of me, was .70, and thermal emittance of .75. Into the black box we go, everybody screams and yells, and says, "Hey, wait a minute, we need to look at this closer." So then we get to October and, yes, the thermal is brought down to .67 on the reflectance, but the emittance is pushed up to .85. So you hit one mole, another one pops up, and now

we've got to figure out, what does that do to our market? How do these two things play together? Now, eventually we're where we are today is .67 and .63, and we're finally at the point of discussing do those make sense, but we're doing it in the context where we have very little time to do it, or to have a discussion, and there was an interesting reference that was made before to Phil Dregger's paper, and I like this because my commercial contractors are pretty good, they're very big, they work for very important clients, that they understand that when they put insulation below a roof deck, they have to be careful about where they might be moving the dew point and what might happen with moisture. I'm not a technical expert in those things, but I know Phil has, he's published several papers and he wants to come talk to my members, but that's a discussion we should be having in the context of all of this, instead of waiting for roofs to fail, to find out about it and doing something about it later; it would be nice if we all could sit down and actually talk about how do the different components of the roof work together and how can we save energy in a way that's productive, instead of, "Well, this number is too high, so we'll lower it, but we'll raise this other one." And that's not collaboration, that's whack a mole.

MS. BROOK: Bill, I'm confused now because I

thought one of the earlier times you came up today you were asking us to add insulation tradeoffs for below the deck.

MR. CALLAHAN: Sure am.

MS. BROOK: And that seems contradictory to what you just said --

MR. CALLAHAN: Oh, no, I'm just saying you have to be careful about it and you have to know what you're doing.

MS. BROOK: Well, that's the problem that we're going to have setting a general requirement without, you know, the necessary studies that would tell us that it is or isn't a problem with the moisture under the roof deck.

MR. CALLAHAN: Well, we also have problems with the Fire Codes and other parts of the Building Code that have been raised in different venues as these cycles have gone through, and I've been told, and I forget who told me, but the response I got here, you know, three or four or five years ago was, "Well, you know, the fire part, that's part of the Building Code. That’s another part of Title 24. We don't worry about that." Here, we worry about the Energy Code, and that's something that --

MS. BROOK: Our State Fire Marshal has to actually review and approve our Energy Code, so we do have to worry about it.

MR. CALLAHAN: Well, that's nice.

MR. SHIRAKH: And that actually --

MR. CALLAHAN: It's important, but I'm just saying I'm not taking back that I think below deck insulation is important, it's important to my members. I don't think a nuclear power plant, or a refinery is going to hire some guy off the street, they're going to hire a big commercial company that knows what they're doing, that's bonded, insured, that's got trained folks, and they're going to do the calculation to figure out can this option work, am I going to be moving the dew point to a place where I'm going to undermine the roof?

MS. BROOK: So you're telling us not to worry about it?

MR. CALLAHAN: I'm saying it's a concern that's worth discussing, but we've never had that discussion. We don't have discussions, we have testimony, is what we have. And that's our problem. We have workshops and we have testimony, but we don't have discussion.

MS. BROOK: Well, we consider our staff workshops to be places where we have discussion, so, I mean, hopefully you can participate in those.

MR. CALLAHAN: Well, again, there seems to me to be little industry involvement in developing the proposal, where we're involved is in reacting to what

comes out of the black box. Whack this mole, whack that mole --

MS. BROOK: I think that we really have tried to engage you to the extent possible; we asked your members for help with the cost information and I think Payam got help from Reed's group with actually conducting the surveys, or at least getting the surveys out to the members. So, I mean, we are attempting to --

MR. CALLAHAN: I have no knowledge directly of what you've done with ARMA. All I know is the offers that I've made over the years, none of which have been followed-up on, other than calls I've made to CEC staff, nobody has ever actually called me. Let me take that back, one of your consultants called me about six months ago because they were concerned about the exception about the gravel surface grooves, and what would happen if that was removed, and wanted a referral maybe for cost basis, specifically to a Southern California-based commercial roofing contractor who did that kind of work. I made the referral. That's the only contact I've had with anybody in the last year, easily. We have to do better than this, we really do. Thanks.

MS. HARDY PIERCE: Helene Hardy Pierce, and just a couple of points. To the issue that Bill was just raising, it's not the large nuclear power plant, or Cal

Steel that's not going to hire a contractor who might understand vapor calculations, but it's the apartment building in Compton that is going to hire whomever, and so because this applies everywhere, that conversation should take place, and I wholly agree with what you were saying. The other point is that, when we talk about these insulation tradeoffs, I just want to raise the question that, when we talked about insulation tradeoffs in Hearing Room B, Mazi, six months ago, there were a lot of questions raised about the values in the insulation tradeoffs, and so I think that is still an open discussion item, it wasn't ever really resolved, and I can remember specifically Tim Kersey from SiPlast, now Supreme, being very vocal about the values that were in that table, and it kind of seemed to be a one-way conversation, so I just want to make sure that we haven't seen it, you say it's coming, that's great, but --

MR. SHIRAKH: We had it on the slide this morning.

MS. HARDY PIERCE: -- in the new -- but down to 25 percent reflect -- the numbers were -- I am going to speak for the people that were in that meeting -- we were looking at those insulation values and there was the appearance of a very strong penalty to use insulation vs. a white membrane. And, Mazi, without looking at it, and

you saying it's going to be added to new construction, I think that still will need to be looked at by the people who --

MR. SHIRAKH: I agree with that --

MS. HARDY PIERCE: Is that fair?

MR. SHIRAKH: I agree. And I was actually concerned myself about the initial R-Values that was coming out. John or Dimitri, any of you familiar with how the R-Values are calculated? But I do agree with you that --

MS. HARDY PIERCE: And maybe it's not appropriate today to take everyone's time, but I am saying that, when you say we're going to have it and we'll get it out, that we reserve the right to look at those R-Values.

MR. SHIRAKH: I still want a response --

MS. HARDY PIERCE: I don't want anybody to say, "Well, you agreed when we were in Hearing Room B that these were good" because I can remember specifically --

MR. SHIRAKH: Yeah, we agreed that insulation tradeoff was good, but we did not agree on the numbers.

MS. HARDY PIERCE: On the numbers. Thank you.

MR. ARENT: John Arent, CEC. Yes, I won't speak at length about the numbers, but in terms of how they were developed, we basically started, say, for new

construction with the prescriptive standards and used simulations to predict the energy use for that case, and then that serves as the baseline or a reference for comparison. So the tradeoffs that you have are based on regressions of simulations that show that you will -- basically to achieve the equivalent TDV energy use, Time Dependent Valuation. And it's done similarly for Alterations, and currently the table has tradeoffs down to an aged reflectance of .25. And for the Alterations, since we're assuming a starting point of less insulation below the roof, it requires less insulation as a tradeoff than the new construction.

Now, when you get down to those levels, .25, .3, there is a lot of insulation required, it is definitely a penalty, there's no doubt about it, but that’s the basis for that calculation. And I would like to also comment on one of the gentlemen from the Roof Coating Manufacturers Association, just to get at the cost. For coatings, we got some cost data from contractors, but that data didn't seem that robust in terms of being able to distinguish different products, so we worked with a Coatings Manufacturer to develop, well, not to develop, but I mean he provided us with solid cost data for several product lines that are used in California, so that was the basis for the coatings aspect

of the cost study.

And finally, I know this is probably obvious to most people in the room, so forgive me for saying the obvious, but we talk about eliminating products from the market by raising the standard, but it's actually -- a number mentioned was about 30 percent of products, but these products aren't completely eliminated by any means, since we do not have a mandatory requirement, they can always use either the tradeoff approach which is within the proscriptive table, or the performance standards, so there are options. Now, I understand people will look at the proscriptive standards and use this as the basis, possibly, for selections so that, you know, obviously some products that have a less efficiency might be at a disadvantage. But the products aren't eliminated from market, as such. Thanks.

MR. SHIRAKH: And I think what we've heard is about 80 percent of the new construction nonresidential uses performance path anyways. Sir.

MR. HART: Good afternoon. My name is Peter Hart. I'm an attorney here on behalf of the Asphalt Roofing Manufacturers Association. I just wanted to make sure I heard a couple of things correctly. Is May 3rd the date when the final tradeoff calculations and approaches will be made public?

MS. BROOK: No, that's a status update for the compliance software.

MR. HART: Okay --

MS. BROOK: And we're not expecting to have the compliance software done until the end of the calendar year, it takes a long time to implement the performance standard into the software. So we actually, if there is going to be any change to what we're proposing here as far as eliminating the overall envelope approach, and instead having this insulation tradeoffs, you know, if it's done within the performance software, it's not going to be done and ready to talk about on May 3rd.

MR. HART: So when will that language be available to stakeholders? When will those calculations be available?

MS. BROOK: So, I mean, we can make any -- we're not -- we can address any changes -- we're going to make any changes that we need to make by 15-day language, but I don't -- the performance compliance approach isn't part of this rulemaking, it's a compliance approach that implements the standards that we're talking about today.

MR. HART: Okay.

MS. BROOK: And that's why, I mean, I think it's a challenge to talk about the overall envelope approach in terms of this rulemaking because we're

basically proposing that we don't have that approach for this --

MR. SHIRAKH: Well, let me explain it this way, maybe. Anything that goes into the prescriptive standards will be part of the 15-day language. That includes the insulation tradeoffs that we mentioned. We have some of it already in the language; what you heard today, we want to expand it to more insulation types. The one kind that we have right now is the continuous insulation. We heard that people want to consider like batt insulation, so we can perhaps provide that, and that will be in the 15-day language. We've also heard that, you know, we're not going down far enough in the range, you know, currently for new construction we're going down to .50, we've heard other numbers, maybe .30 --

MR. HART: Right.

MR. SHIRAKH: -- so whatever we agree with them will be in the 15-day language. This will not be reflected in the compliance software by then. As Martha said, that's developed even after adoption, but what compliance software does is they use the prescriptive standard as the baseline for establishing the standard budget. So whatever goes into that prescriptive standard will become the basis for compliance with the compliance software.

MR. HART: Okay, thank you.

MR. FERRARO: Hi, John Ferraro, Roof Coatings Manufacturers Association. We have a Board member, Steve Heinje, from United Coatings, that has been trying to get in online, but he has been unable to. He made some changes to Table 110.8(B) that he will submit in writing. Steve, I don't know if you're on the line right now if you want to --

MR. HEINJE: Can they hear me?

MR. SHIRAKH: Yes, we can, loud and clear.

MR. HEINJE: What do you know? Hey. Well, is this a handoff, Mr. Ferraro?

MS. BROOK: Yes.

MR. SHIRAKH: Go ahead, please.

MR. HEINJE: I'm just going to, just to get this verbally on the record, you know, I sent a Powerpoint to Mazi and Martha?

MS. BROOK: Yes, I received it, I saw it at lunchtime. Uh huh.

MR. HEINJE: I'm just going to step through it in a very general level. You've heard a lot of comments from the industry coalition, and I just want to say I do support our coalition and our concerns. But before I get into this, I also just want to make a comment. You know, Helene Hardy Pierce is one of the most respected

engineers in the industry; if she says she might be having moisture problems, I would listen to her. And last time, she commented on something that hasn't come up today, but I think it's still relevant, you know, there is a number of bodies that regulate, there's VOCs, there's this, of course, issue of reflectivity that we're discussing today, you know, there's tradeoffs in insulation, there's the building envelope in the engineering involved in a building, all of these come into play on these roofs. And you know, I am concerned, actually, about coatings, and I mentioned this last time, in the winter and in places like Lake Tahoe, and prescriptive standards getting in the way of providing a good serviceable frame.

Anyway, but I want to focus in on something very narrow, which is my segment, which is white roof coatings, I'm a white roof coatings guy here. And Table 118(B), now called Table 110.8-B, has what I refer to as a nested standard, it looks a little like an ASTM Standard buried in the Code. And if you look at it, my Powerpoint outlines this, it's essentially a derivative of a standard for cool roof coatings called ASTMD 6083. I attend this task group, on this task group at ASTM, I'm heavily involved in coating standards for the industry. And it -- some problems and I have a suggestion, okay?

So it has a number of tests that are put forward, but because it is not ASTMD 6083, how the test is run is not defined. And this provides that, to me as a coatings person who wants quality, adequate foam thickness membranes applied in the field, I don't want to see white roof on roofs and this standard does not set some things in place, and because of the way it was written. So I go through this thing in steps since we can't do this, because we're not going through it as a group, you know, nobody can see this, even though I'm looking at it as I comment to you, and I basically show essentially you have a standard here that is so open, I can get lots of things to pass it, that you do not want going on roofs in the State of California. And furthermore, that's number one problem, is that it's really too open because it's really written -- does not have all the necessary parameters defined. But number two, there's no requirement for any kind of third party or approved testing labs involved, and the combination of no third-party test lab and a poorly written protocol is really risky. So I look at it, if you were looking at the Powerpoint, Martha, or Mazi, you'll see I've got some grays, I've got a darker gray, and one particularly worrisome line, and I get down and I say this, what you really should do is rewrite this table to basically say it's ASTMD 6083, run as per ASTMD

6083 protocol, but with the following changes, that you should define some way to establish a third -- I'm jumping ahead because I know the entertainment value of this presentation has to be excessive. If you merely lower your flexibility standard and your initial [inaudible], but basically make it a round ASTMD 6083, I offered some language, I think you will obtain the benefits intended by this table, and you will have a more useful Code going forward because I believe we need to have some kind of third-party if you're going to write a standard like this Table 110.8-B, somebody needs to say this was really run right. I don't think self-certification really is what the State of California should be looking for. And then, in the process that provides discipline into how those products are rated, and what you're going to end up doing does go back to my first comments, if you provide a more credible system, if you -- you will end up pushing a business towards those companies that have the most invested, who have laboratories, who have engineers, who have chemists like myself working on these things, and you're going to get better products in the marketplace. I think Table 118(B) as it was written in the last Code language was a dangerous precedent, I did not like it. So, as a consequence, a simplified and improved table, and I hope

that that would be considered. Thank you so much.

MR. SHIRAKH: Thank you. We'll look at your comments --

MR. HEINJE: [Inaudible] Products, LLC, we changed our name, we made Hydrastop (ph.) United Coatings Brand Products. I am, as Mr. Ferraro said, Vice President of the RCMA, I'm also in Government Affairs of RRCI, Reflective Roof Coating Institute, I am an ASTM Task Group member who is deeply involved with this area in the industry. Thank you so much.

MR. SHIRAKH: Thank you. We'll look at your comments. I appreciate your comments. Just wanted to mention that this table, 110.8(B) has nothing proposed to change, there's no proposed changes for this round of standards, actually it's been like that for a couple of cycles, but that doesn't mean we can't look at your comments. Thank you. Any other comments? John.

MR. MCHUGH: I'll try to be brief. This is Jon McHugh with McHugh Energy. I'm here to speak in favor of the current proposal for cool roofs. We've heard today, you know, there's some controversy around the proposal. I've been aware of many of the conversations back and forth, there's been a back and forth and negotiations around the requirements, there's been multiple, you know, I think staff has been trying to address the concerns,

and when I first looked at this and originally .7 was proposed, it was I thought a very comprehensive letter from the industry that I believe was from Firestone, that identified the manufacturers and, as I think someone in this audience already mentioned, that there's basically products that are re-labeled, and so in that letter they identified essentially who are the primary manufacturers, and how they're relabeled under a variety of different places, and identified essentially the issues. And now that you're finding that you're kind of running up against the edge of the issues that were brought up in that letter, which described that at .7, you know, there's certain products that you can't hit any -- that don't actually have product in those reflectance's. But I feel that you have addressed those issues.

What I like about Bill Callahan's comments is that he's suggesting, you know, a solution rather than, "Oh, we don't have enough data, let's wait until the next Code cycle," you know, frankly if the roofing industry feels like there isn't enough data, I feel that the burden of proof is on them to identify what they feel the costs are, and what they feel the energy savings are. You know, we started out with this a number of months ago, you know, there's been, I would say, a few rocks thrown at AEC at this meeting and, as I remember, the

roofing industry had an analysis that was based on a correlation associated with warehouses, and was trying to use that to apply to nonresidential buildings. And you know, Dr. Dejolais admitted that this probably wasn't the appropriate type of tool. So let's keep in mind the -- I actually think the excellent analysis done by AEC using advanced tools, and the very concept of reducing the amount of absorbed radiation is huge in terms of energy savings. And as is shown in the case study, we're looking at around 200 gigawatt hours per year associated with the change, that's a huge energy impact from a single measure. And you know, the present value of those buildings from one year's new construction and retrofits is around a billion dollars. I mean, that's a huge impact on our economy, so when you start talking about job issues and issues associated with the wealth of the state, I think that there needs to be some reevaluation of what's important.

That being said, I think there's been a couple of comments that have been brought up and I'm hopeful that the roofing industry actually looks -- and the folks that are here aren't representing the whole industry, they're the ones who are most exercised, but that portion of the industry that is here, that they try to work out an accommodation with this proposal, try to ask -- Bill

has brought up -- are there some additional off ramps that are needed for the flexibility that he needs. Anyway, those are my comments. Thanks.

MS. BROOK: Thanks, Jon.

MR. SHIRAKH: Thank you, Jon.

MR. HITCHCOCK: I just had two clarifications, 1) I don't know what study you're alluding to in terms of trying to sneak things in under warehouses, or what have you, that's certainly not something our organization are involved in.

MR. MCHUGH: So, as I remember, the beginning of these workshops there was a study that used the -- it was a consultant that was hired, they performed this study --

MR. HITCHCOCK: That's not my organization. And it shouldn't be characterized as the whole industry, that's number one. Number two, a few times comments have been made about the industry with the survey, and we did not -- we did offer AEC a survey instrument that we used as part of the 2008 process, which was a very complex document and really got into a lot of detail in terms of trying to get the best information that could be gotten, but to the point, because there wasn't the time spent, that was not something that was pursued with us in terms of collecting any real data. So I just wanted to correct

that misperception because I heard that a couple times on the record, as well.

MS. BROOK: So, for the record, is that you didn't help us get cost data?

MR. HITCHCOCK: We offered to help you get cost data with the understanding, with the detailed discussion, that we knew it was going to take more than the time between when that process started and when you wanted to have 45-day language.

MS. BROOK: Thanks.

MR. SHIRAKH: This was several months ago --

MR. HITCHCOCK: It was in the October timeframe and then there was a change, well, if you go back, there was a change in contractor after June, or at least the designated person at AEC that was working on it. And that was a backstab, and then when Jon took it over, and we got to talking about the October cycle, we shared the survey instrument, I believe it was either directly with Jon or through Payam, I don't recall. But that was after CEC had already determined that you wanted to do your own cost gathering and do it quickly.

MR. SHIRAKH: It wasn't supposed to be -- we were hoping to do it to augment your effort.

MR. HITCHCOCK: Show me where you asked me for that because I offered. Thank you.

MS. BROOK: Thank you.

MR. KLEIN: Good afternoon. It's Gary Klein and I'm not going to talk about roofing.

MS. BROOK: Let's guess what you're going to talk about.

MR. KLEIN: Hot water.

MS. BROOK: Yay.

MR. KLEIN: What a surprise. Sorry, I would like to talk about Section 120.3, Table A, 120.3-A, Pipe Insulation Thickness. I see that the Commission has revised the table from what it used to be to more closely align with what I believe is an ASHRAE 90.1 at the moment?

MS. BROOK: Uh huh.

MR. KLEIN: I would note that, if my records are correct, there's a couple of minor items incorrect in the bottom line of the table. And I can either read them into the record now, or just talk with you afterwards and point them out, which I think is more effective.

MR. SHIRAKH: Now is --

MR. KLEIN: There appears to be a couple things that weren't caught quite correctly. Other than that, the table is in line.

MS. BROOK: All right. Thank you for reviewing that, it's important. Thanks.

MR. SHIRAKH: Dimitri.

MR. CONTOYANNIS: Dimitri Contoyannis with AEC. I'd just like to respond to a couple comments about the analysis, the procedure used for the cool roofs analysis. I've heard it characterized as "quick and dirty," and also "bad science" during some comments made, and I'd just like to describe the process that was used. First off, we followed the procedure that all of the case projects have followed, and this was a process put in place at the beginning of the Code cycle. The cool roofs project, we put together the reports, the documentation, and everything in alignment with the procedures set forth in the case process. Namely, we used the leading building physics simulation tool that's available, that accurately captures heat transfer through every layer of the material, it's a tool supported by the Department of Energy, it's widely considered to be the most robust analysis tool available, and that is the leading building science analysis tool, EnergyPlus.

Now, when we put the proposal together on the cool roof reflective requirements, and it was deemed to be cutting out eventually some products that are available on the market, we used the same analysis tool to determine the insulation tradeoff method, so it's an equitable comparison between the reflectivity and the

tradeoffs for insulation. So, again, this is a very rigorous analysis using industry-leading tools, following the case procedures and, in fact, I'll also go on to say that these tools are used for just about any Code development procedure, whether it's in California or elsewhere, the National Laboratories use the same set of tools and a very similar process to put forth requirements in other states, as well as for ASHRAE, which is a national standard, ASHRAE 90.1, ASHRAE 189, the Green Building Standard at ASHRAE follow a very similar procedure for quantifying the savings for various efficiency measures that are proposed during each Code cycle. So to categorize this as "bad science," I believe is a falsehood.

And I'd also like to point to the numbers that Mr. McHugh called out, the energy savings, as well as the dollar savings that can be attributed to this measure. Thanks.

MR. BROOK: Dimitri. Do we have any other comments in the room or online? Nothing online. Going once, going twice.

COMMISSIONER DOUGLAS: All right, if there are no other comments, I'd like to thank everybody for being here today. We'll definitely look closely at your comments, both comments we've heard and comments we'll

receive in writing. So appreciate your being here. And with that, I guess we will resume tomorrow.

MS. BROOK: Yeah, we'll do residential tomorrow and that should take care of the 45-day language.

COMMISSIONER DOUGLAS: Great. Well, thank you everyone, again. And we're adjourned.

MS. BROOK: Thanks.

(Adjourned at 3:31 p.m.)

REPORTER'S CERTIFICATE

I do hereby certify that the testimony in the foregoing hearing was taken at the time and place therein stated; that the testimony of said witnesses were reported by me, a certified electronic court reporter and a disinterested person, and was under my supervision thereafter transcribed into typewriting.

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

IN WITNESS WHEREOF,

I have hereunto set my hand this 21st day of March, 2012.

Kent Odell

Kent Odell
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