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## 1 P R O C E E D I N G S

2 10:08 a.m.

3 MR. SHIRAKH: Good morning, we need to  
4 get started. So today is the second day of our  
5 June workshops.

6 The first day was on Wednesday where we  
7 presented the changes that affected the building  
8 standards.

9 Some of those changes have impacts on  
10 the standards and the ACM manuals. And most of  
11 those were presented on Wednesday.

12 Today is going to be focussing mostly on  
13 changes that impact the residential and non-  
14 residential ACM manuals.

15 And this afternoon we're going to be  
16 presenting what's now called a Reference Appendix.  
17 And this appendices, in 2005 we introduced the  
18 Joint Appendices.

19 And so we've expanded on that concept.  
20 We've added two more sub-groups to the Reference  
21 Appendix.

22 They were called the Residential  
23 Appendices and Non-residential Appendices. And  
24 the Joint Appendices are also there.

25 We've added quite a bit of information

1 into this document. And we'll present that this  
2 afternoon.

3 I had a brief slide presentation I'm  
4 going to go through. And then we'll get started  
5 with the revisions to the Res ACM.

6 I'm Mazi Shirakh. I'm the project  
7 manager for the 2008 Building Standards.

8 The standards has a lot of  
9 collaborators. One being the PIER Research Group  
10 here at the Commission who have contributed  
11 greatly to the research and the field  
12 investigations that we need to support the  
13 standards.

14 The utilities in California have also  
15 been a major partner in supporting the standards,  
16 the PG&E, Southern California Edison and San Diego  
17 Gas and Electric providing both expertise and  
18 money and consultants to the projects.

19 And we've also received a lot of  
20 assistance from the public at large through their  
21 participation in this workshops, e-mails, phone  
22 calls and whatever.

23 This graph and the next one basically  
24 explains the reasons why we pursue the standards.  
25 I have presented this in previous workshops. I'm

1 not going to spend a lot of time on it.

2 Basically this lower graph here is the  
3 orange is the energy per capita consumption --

4 ADVISOR PENNINGTON: Gold, the Golden  
5 State.

6 MR. SHIRAKH: The Golden State, I'm  
7 sorry represents the (laughter), the Golden  
8 State's energy per capita. And the top pink one  
9 is the states in California that do not vigorously  
10 enforce standards. Next.

11 This pretty much says the same thing.  
12 And the bottom one here is again California. And  
13 the pink here represents the states who do not  
14 enforce the standards.

15 And as you can see through the 1940s,  
16 '50s and '60s California's slope was pretty much  
17 the same as the other states. And after that you  
18 can see that California has levelled up while  
19 others have continued to go up. Next.

20 We operate under an efficiency committee  
21 that has two commissioners. Commissioner Arthur  
22 Rosenfeld who is present here to my right and  
23 Chairman Jackie Pfannenstiel.

24 The process for 2008 standards got  
25 started in October of 2005 and we had many, many

1 meetings and workshops, October 2005 through today  
2 actually represents the last set of public  
3 workshops that sponsored by the staff. Next.

4 We stopped accepting new comments for  
5 new ideas into the standards last July of 2006.  
6 And since then we've been working to finalize and  
7 work out the details of what had been proposed in  
8 those workshops.

9 And today would also be the last day  
10 that we're presenting any, the draft standards.  
11 Next

12 In fall we're going to be to the rule  
13 making phase of the standards. And again, today  
14 we'll talking about the residential and non-res  
15 manuals, the Reference Appendices and other topics  
16 that may come up during the public commenting.  
17 Next please.

18 We've posted all these documents on our  
19 website. And the convention is that the original  
20 text appears as black and this would be the 2005  
21 text. And then any revisions to the 2005 will be  
22 posted like this, in red and on their blind.

23 So you can easily tell what has been  
24 changed relative to 2005. We're not going to be  
25 presenting these documents today.

1           They're all on the web. And you're  
2 welcomed to study it on your own. And what we  
3 will be presenting today is basically a quick wrap  
4 up what has taken place.

5           Because if you want to go through these  
6 details we'll never get out of here. There's just  
7 too much material.

8           What we're going to do is we're going to  
9 start with the Residential ACM Manuals. At the  
10 end of that section after Bruce has presented the  
11 topics we'll stop and we'll take questions from  
12 you if you have any.

13           And then we'll go to Non-res ACM and  
14 then we'll stop and take questions. And we'll do  
15 that for every topic.

16           And again, we're not going to be showing  
17 any of the background information, the case  
18 initiatives that have been submitted. And all of  
19 that is on the website and it's available.

20           Next fall will be moving to the rule  
21 making, the formal part of the standards. There  
22 will probably be a meeting. And we haven't really  
23 decided, sometimes late October and November where  
24 we'll present the 45 day language.

25           And then after that hopefully we can

1 adopt the standards in January of 2008. The  
2 adoption date is going to be January of 2008.

3 The effective date we're shooting for of  
4 April of 2009. And between January of 2008 and  
5 April of 2009 we'll be developing the compliance  
6 manuals both the res and non-res.

7 And we'll be working with the software  
8 vendors to update their software for the 2008  
9 standards. And we'll have everything ready by  
10 that effective date, actually six months prior to  
11 that. Next.

12 And please don't forget to sign in.  
13 There's a sign in front table. Either sign in or  
14 it would be better to actually staple your  
15 business card to it.

16 And when you want to make a comment I'm  
17 going to ask you to come up to the podium. And  
18 for benefit, we have a court recorder here. And  
19 she needs to have your name and your affiliation  
20 every time you come up and speak so she can enter  
21 that into the record.

22 And with that, are there any questions?  
23 Okay the first topic is revisions to the  
24 residential ACM manuals and Bruce Wilcox is going  
25 to do that.

1                   MR. WILCOX: Thank you Mazi. I'm going  
2 to present a set of topics related to revisions of  
3 the Residential ACM Manual calculations.

4                   The ACM Manuals determine the what  
5 calculations are done under the performance method  
6 which is the most popular method of compliance by  
7 far in the residential standards and really sets  
8 what the standard level is.

9                   As Mazi said, this has been a long  
10 process. And we're presenting kind of the  
11 highlights of a lot of work here. There's been a  
12 lot of great work by a whole team of people in the  
13 contractors, the CEC staff and a lot of help from  
14 the industry. And I want to thank all you guys  
15 because this has been I think a very productive  
16 process.

17                   I'm not going to repeat the stuff we  
18 talked about Wednesday. Wednesday we talked about  
19 several topics. And I discussed the ACM-related  
20 changes, related to those topics on Wednesday.  
21 And unless you have questions I don't plan to go  
22 back through that again. So these are all more or  
23 less things that were not discussed on Wednesday.

24                   Okay, so one of the things that we did  
25 as part of the preparation for the 2008 project is

1 through a PIER research project we did some  
2 research on standards-related issues.

3 And Rick Chitwood did a field survey of  
4 new builder, mostly builder, production houses up  
5 in and down the Central Valley looking at  
6 primarily HVAC systems but also at ventilation and  
7 other related issues, duct design, static  
8 pressures, energy for fans and so forth.

9 And to kick off this talk this morning I  
10 decided I'd present a sort of the greatest hits of  
11 the field survey. And this is a picture of the  
12 air conditioning units at a house in Fresno which  
13 has nine and a half tons of air conditioning,  
14 three separate zones with three separate units.  
15 It's about 10 kilowatts of compressor power.

16 And we measured the furnace fans and  
17 they're 1.7 kilowatts of fans running in air  
18 conditioning mode for this house. You know  
19 that's a pretty impressive piece of electric-  
20 consuming equipment there. However that's no  
21 better than second place.

22 Because this is a house in Palm Springs  
23 which has three units with a total of 13 tons of  
24 air conditioning, two five ton units and one three  
25 ton unit. This is a 3763 square foot house so it

1        isn't even a Bill Gates mansion or anything.

2                    That's 282 square feet per ton.  And  
3        this house has 2.2 kilowatts of furnace fans so  
4        you need three-quarters of a ton of air  
5        conditioning just to make up for the furnace fans  
6        that are running on peak.

7                    So there are some big issues here in  
8        terms of all this stuff and how it plays out.  I  
9        thought we ought to get started on the right note.

10                   MR. PENNINGTON:  One other thing I'd  
11        like to add to that just for a second.  The last  
12        time we updated our compliance forms we were asked  
13        to make a place for six units for residential  
14        housing to make sure that that satisfied every  
15        situation out there.  And we were a little mind  
16        boggled.

17                   MR. SHIRAKH:  For single family.

18                   ADVISOR PENNINGTON:  For single family  
19        residential.

20                   MR. WILCOX:  These things are really out  
21        there and being done for sure.  Okay, I'm going to  
22        talk about four topics this morning.

23                   Changes to the ACM Manual related to  
24        four different areas, air tightness and  
25        ventilation, furnace fan modeling, duct leakage

1 and slab edge modeling.

2 So, ventilation, here's a picture of a  
3 bathroom exhaust fan which is the, we talked on  
4 Wednesday about the new mandatory, proposed  
5 requirements for mechanical ventilation.

6 And ASHRAE standard 62.2 sort of assumes  
7 that the basic minimum way to get this ventilation  
8 is with a good bathroom exhaust fan just like the  
9 normal ones you see only it actually has to  
10 deliver air and not be too loud.

11 And we're assuming that people could  
12 actually keep it on continuously and ventilate  
13 their houses with it if they chose to.

14 Related to the changes in ventilation  
15 standards we've done some adjustments in the air  
16 tightness assumptions and rules for how you do  
17 calculations in the ACM.

18 And the background for this is that the  
19 current default specific leakage area, this is a  
20 term that's a measure of how air tight houses are.  
21 The current one is 4.4 with sealed ducts. And  
22 that's really base on a bunch of survey work that  
23 was done in houses built in 1984 to '87.

24 So it's 20 year old data that that stuff  
25 was based on.

1           There is a growing appreciation that  
2           typical houses are getting maybe much tighter, but  
3           certainly tighter. The PIER Residential  
4           Construction Quality Survey that was done five  
5           years ago or so that fed into the 2005 standards  
6           found SLAs of 3.2 to 3.5 in houses that were built  
7           under utility programs.

8           Wilson who did a big study for Southern  
9           California Gas Company in houses built in 2002  
10          found an average SLA of 2.8 in those houses.

11          This average SLA is below the bottom  
12          limit that you're allowed to do under the current  
13          standards and claim credit for it.

14          And that's the average of new houses  
15          that he found in 76 new homes. So to respond to  
16          that and try to get ourselves in the right place  
17          with regards to the characteristics of the houses  
18          we proposing a new default and standard design of  
19          SLA of 3.8 with sealed ducts and 3.2 with no ducts  
20          in the unconditioned space for be used in all ACM  
21          calculations.

22          And so this establishes the, if you  
23          don't claim any credits for air tightness then  
24          you'll end up with your house being modelled with  
25          these as a defaults and the standard designs both.

1 And if you do claim credits then you start with  
2 these as the standard design.

3 We have a new model for the mechanical  
4 ventilation. This is based on this idea that  
5 we're going to have mandatory ASHRAE Standard 62.2  
6 requirement. So all houses will need mechanical  
7 ventilation.

8 So the default in the ACM is a  
9 continuous exhaust fan at the 62.2 rate which  
10 simply is, there's a little formula here, that  
11 gives you .01 times the conditioned floor area  
12 plus 7.5 times the number of bedrooms plus one.

13 For example this resolves to 48 CFM in  
14 our famous 1761 square foot prototype house.

15 And so that's the default and default  
16 ventilation rate and the ACM run. And if you  
17 don't say anything about ventilation it's going to  
18 be the default in your run and the standard design  
19 both.

20 The default watts per CFM is .25. And  
21 that resolves to 12 watts for the 48 CFM in the  
22 prototype. So we're not talking big energy here  
23 with the sort of lowest level systems.

24 The rule is that the standard design  
25 watts and CFM are the same. It's up to a maximum

1 of 1.2 watts per CFM.

2 So we're not trying to save, at this  
3 point anyway, in this round of the standards,  
4 we're not trying to save energy on the reasonable  
5 range of mechanical ventilation systems.

6 So as I said at the meeting the other  
7 day if you feel like you need to do a fully,  
8 ducted, balanced system with two fans and ducts to  
9 each room we think you can get that with that 1.2  
10 watts per CFM of ventilation. And it shouldn't be  
11 a constraint on that.

12 And we're making the standard design  
13 watts the same as the proposed house watts so that  
14 there isn't an incentive for putting in an  
15 inadequate ventilation system. That's just going  
16 to be a straight trade off.

17 And we're taking out the old ventilation  
18 model. The current ACM assumes that windows get  
19 opened if the air change rate gets down too low.

20 And there's actually adverse energy  
21 impacts if you have a very tight house and the  
22 ventilation rate, the model drops too low and the  
23 windows get opened too much. And below a certain  
24 level you lose energy and so forth. All that's  
25 going away. So we won't have any openable window

1 issues except for summer cooling when it's cooler  
2 outside than inside. Then you still open the  
3 windows but not for ventilation.

4 And there's been some concern about  
5 wasting energy if you go with the defaults. We  
6 did a calculation on one point on the difference  
7 between the 2005 and the 2008 standard ventilation  
8 modelling.

9 And our conclusion on the prototype  
10 house was that it was a one percent effect on the  
11 TDV energy budget.

12 We're not talking about enormous amounts  
13 of energy for these very modest ventilation  
14 levels. It is not a big effect on loads in the  
15 house. And it's also not a big effect on  
16 electricity consumption.

17 So that's it for the ventilation  
18 modeling. As Mazi said, I think we'll hold the  
19 questions until the end. And then we can take  
20 questions on all the topics at once.

21 Furnace fan issues. This one of the  
22 furnaces that we found in our field survey. And  
23 there you know is the fan. It's inside this box  
24 that's got the furnace in it. And there's the  
25 fan. And then there's a plenum there on the end.

1 The big return duct and the air comes in and goes  
2 through into this fan and gets pumped through the  
3 supply system.

4 So that's for those who have never  
5 crawled in an attic that's what a furnace fan  
6 looks like. And that's sort of in the attic.

7 So the background here is that the 2005  
8 ACM, the current ACM rules, model fans for air  
9 conditioning using a watts per CFM and CFM per ton  
10 based model. But it doesn't do that for heating.

11 For heating we're using the model that's  
12 been in there for 20 years probably. It's based  
13 on the assumptions in the AFUE tasks that the  
14 heating fan energy is .005 btus per btu of the  
15 heating output.

16 And because of this you can't get any  
17 credits for an efficient distribution system or  
18 efficient fans or any of the kinds of stuff that  
19 we're trying to get people to do for cooling.

20 Those things also make the system work  
21 better in heating. So the attempt here is to try  
22 and do the heating side of this model.

23 We didn't do it in 2005 because we  
24 didn't know very much about how typical new,  
25 house, heating systems fans worked. Nobody could

1 say what the flow rates were and the energy  
2 consumption and so forth.

3 This is part of the reason we did that  
4 field survey that I mentioned earlier. So this is  
5 the data we got in the field survey.

6 And what we have plotted here is the CFM  
7 and cooling which is the blue diamonds versus the  
8 CFM and heating which is the magenta squares. So  
9 with some few exceptions here there is a very,  
10 nice, close relationship between the two and we're  
11 using that to develop the model for the heating  
12 side.

13 Here's the watts per CFM, which is the  
14 amount of electricity it takes to move a CFM of  
15 air in heating mode and in cooling mode. Again  
16 diamonds are the cooling and the square boxes are  
17 the heating. These are all measured for these  
18 houses that we found, 60 systems in the field  
19 including those six systems I showed you in the  
20 first slides there. And again there's a pretty  
21 close relationship here and we're going to use  
22 this. It's maybe not quite as good as the one on  
23 the air flow.

24 So here is our proposed model. It's a  
25 real simple model. We don't want to make this

1 heating side a big deal. We don't want to make it  
2 a huge compliance issue or a problem for people to  
3 check or anything like that. It's basically set  
4 up so the whole thing will default based on  
5 current inputs.

6 So we're going to say that the CFM and  
7 the heating mode is equal is 93 percent of the CFM  
8 and cooling mode.

9 And we have a method for estimating the  
10 cooling mode CFM based on the calculated air  
11 conditioner size.

12 You could put in this CFM heat but I'm  
13 sure that 99 percent of the time people will  
14 default this number to 93 percent.

15 And the watts per CFM are going to be 88  
16 percent of the watts per CFM and cooling. The  
17 same reason, it's not even a number that's very  
18 easy to get to.

19 And then the capacity and the heating  
20 is going to be, it's basically a 40 degree rise.  
21 So the heating capacity becomes an issue if you  
22 know the, the capacity and heating is actually  
23 calculated based on how many CFM you have in  
24 heating. So we go down that schedule and work  
25 that way.

1           The capacity for heating is a very  
2 basically, usually unimportant variable because it  
3 only affects, it doesn't affect much of anything  
4 except the duct loss model.

5           So the number that's actually used in  
6 the ACM is the watts per BTU of heat. It's the  
7 CFM times the watts per CFM divided by the  
8 capacity. And so that's the very, simple,  
9 straight-forward model that is the change.

10           So a change that has to do with furnace  
11 fan modeling. And we talked about this on  
12 Wednesday. It has to do with cases where you're  
13 not doing your whole house ventilation with  
14 exhaust fans.

15           If you want to use the other popular  
16 method that's being used around the country where  
17 you run your central, air-handler, furnace fan and  
18 open a damper, have a little duct to the outdoors  
19 on the return side of the furnace and let air in  
20 and then you distribute that air around the  
21 building as part of your ventilation system.

22           Or if you just run that fan periodically  
23 to make sure the air stays mixed up. So then we  
24 want to capture that and model it in the ACM.

25           So if you have one of these air

1 distribution systems and you say that's how I'm  
2 going to meet the ventilation requirement then  
3 you're going to get a central air handler, your  
4 central A/C fan is going to run on a schedule.

5 It's twenty minutes every hour minimum  
6 if it's not on for meeting the loads. And then  
7 you'll be able to input what the flow rate is in  
8 that mode.

9 And we're going to use the standard  
10 design of .58 watts per CFM which is the  
11 prescriptive standard we're proposing for furnace  
12 fans.

13 And then this is for the standard  
14 design. And the proposed house has the default  
15 fan, same as the standard design.

16 Or if you're proposing to actually meet  
17 the prescriptive standard or do better than the  
18 prescriptive standard you input what it is you're  
19 actually do here.

20 And so there's the potential of getting  
21 energy savings if you have a very efficient  
22 central distribution system.

23 Okay, so that's the fan modeling issues.  
24 In terms of duct leakage this is why nobody likes  
25 to deal with these things because it's really not

1 very nice to be up there in this attic full of  
2 ducts and insulation and old buckets that people  
3 left up there for some reason and things like  
4 that. But it's an important feature of California  
5 houses for sure.

6 So there are four topics that I want to  
7 talk about in the duct leakage area. Low-leakage  
8 air handlers, low-leakage ducts, ducts in  
9 conditioned space and the treatment of the ducts  
10 in the new ACM attic model.

11 First, leaky air handlers. So this is a  
12 new feature that we're proposing for the ACM  
13 Manual here and it's based on the understanding  
14 that the furnace air handler is actually a  
15 significant source of the distribution system air  
16 leakage. We have specifications. You have to  
17 test your duct system down to six percent of fan  
18 flow leakage and tighten it up until you meet that  
19 spec. And people have learned how to make good  
20 joints and all of the things that are involved  
21 there.

22 But the reports from people in the field  
23 are that one of the real constraints on this is  
24 how much air leaks in the furnace itself, holes in  
25 the box and things that you can't deal with.

1           You solve that problem by putting silver  
2           tape over all the openings in the furnace. And  
3           that lasts as long as, until the guy comes out to  
4           service it the first time. He has to take the  
5           doors off and tear all the tape off and so forth.

6           So there's been a reluctance to assume  
7           that if you manage to get low leakage it would  
8           actually stay low for the life of the building.

9           So we have a conservative bias built  
10          into the duct leakage facts. So you have to test  
11          under current rules you test to six percent  
12          leakage or less. And then you have tight ducts.

13          But when we do the calculations you have  
14          to calculate with eight percent leakage, two  
15          percent more leakage than your test showed.

16          Partly the reason for that is because  
17          the assumption that the duct system won't stay as  
18          tight as it starts out over time.

19          There's this specification for low-  
20          leakage air handlers. And we're proposing to  
21          actually change this situation by giving a credit  
22          for low-leakage air handlers.

23          The Florida Building Code has a  
24          definition, and I'll show it to you in a minute,  
25          for a low-leakage air handler. And so we're

1 proposing to give credit if people install an air-  
2 handler furnace that is rated as being low-  
3 leakage.

4 There's also an ASHRAE test standard  
5 under development which we hope will be  
6 significantly better than the Florida standard in  
7 many respects. And I would assume that the CEC  
8 will reference that ASHRAE standard as soon as  
9 it's available.

10 But the procedure here is that  
11 manufacturers test and certify to the Commission  
12 that they have a low-leakage air handler. And  
13 starting out we'll use the Florida spec for that.

14 And then if you install one of those  
15 low-leakage air handlers you need to get the HERS  
16 rater to verify that it's actually there. And  
17 then you also have to actually measure duct  
18 leakage until you've made that six percent duct  
19 leakage criteria.

20 So here is what a -- I'm not going to go  
21 into this in detail but the Florida has a  
22 definition for how to test an air handler to  
23 determine whether it's low-leakage or not.  
24 Frankly there are some problems with this  
25 definition but we think it's a first step in the

1 right direction and I think it's usable to get  
2 this thing started anyway.

3 Okay, so we're proposing two ACM credits  
4 connected to this. So if you install your low-  
5 leakage air handler and you do the normal, current  
6 test to six percent duct leakage criteria you will  
7 be able to use six percent leakage in your ACM  
8 calculations instead of eight percent.

9 So this is a reduction of 25 percent in  
10 the leakage for sealed and tested ducts combined  
11 with a low-leakage air handler.

12 So that's the straight-ahead change from  
13 just putting in the low-leakage air handler if  
14 you're already testing ducts.

15 And then further if you want to make  
16 really good ducts you can put in a low-leakage air  
17 handler again and then you can say, well I'm going  
18 to make really good ducts. I'm going to get four  
19 percent leakage instead of six.

20 And you specify four percent. And the  
21 contractor tests show that he made that and the  
22 first rater verifies it. And then you can do your  
23 ACM run with four percent or two percent or  
24 whatever number you think you can achieve.

25 And so this offers people who really

1 want to go, really want to do a good job or have  
2 the greatest system in the world or whatever, this  
3 is a path for getting more credit and making it a  
4 better system. And I think it will be useful in  
5 our new, Solar Homes Partnership above-code-kind-  
6 of programs in particular.

7 So that was stuff related to low-leakage  
8 air handlers. Now one of the other issues, we've  
9 been talking about ducts in conditioned space for  
10 many years, trying to get ducts out of the attic  
11 and putting them in someplace that's got a less-  
12 onerous environment.

13 One of the problems with the current  
14 standards and it's been a problem since we started  
15 specifying duct leakage in terms of this issue, is  
16 that if you do a perfect job of putting all your  
17 ducts in conditioned space we don't give you  
18 enough credit in the ACM.

19 Because we have these conservative  
20 assumptions about design and to make sure that we  
21 don't have loopholes here. So if you were to make  
22 perfect ducts and put them all in the conditioned  
23 space currently you would still have to assume  
24 that there was duct leakage to outdoors because  
25 that's the ways the rules are written. In

1 traditional houses there are all kinds of leakage  
2 paths through interior void spaces and things so  
3 it was thought that you couldn't actually  
4 demonstrate that you really had all the duct  
5 leakage in the house.

6           What we're going to do here is define a  
7 method to prove that your ducts are really in the  
8 conditioned space and then let you take credit for  
9 that. You know, have the conduction loss to zero  
10 and also the leakage loss.

11           So here's the approach. If you want to  
12 demonstrate that you have your ducts in  
13 conditioned space and have no leakage to outdoors  
14 then you use the test method that's already in,  
15 I'm not sure whether it's still the same name or  
16 not, but the residential appendix that has the  
17 rules for how to test ducts.

18           There's a methodology for testing  
19 leakage to outside from fan pressurization of  
20 ducts. So this is a different flavor of a duct  
21 test. It's not simply a duct blaster test. You  
22 actually have to do a duct blaster test to figure  
23 out how much of a leakage goes outdoors.

24           I don't want to go into the details of  
25 how to do that. But it's a known technology.

1                   MR. McHUGH: Bruce just briefly, is this  
2 where you use a --

3                   MR. SHIRAKH: Mr. McHugh.

4                   MR. McHUGH: I'm sorry.

5                   MR. SHIRAKH: You know the routine.

6                   MR. WILCOX: No, just tell him he has to  
7 shut up until later (Laughter)

8                   ADVISOR PENNINGTON: Was there anything  
9 else you had, Jon? (Laughter) I'm sorry.

10                  MR. McHUGH: Jon McHugh on behalf of  
11 PG&E. Is this the test where you use a blower  
12 door in conjunction with a duct blaster?

13                  MR. WILCOX: Yes.

14                  MR. McHUGH: Okay.

15                  MR. WILCOX: And there are other ways to  
16 do it too but that's the primary one probably.

17                  So the proposed test in the field is  
18 that you would have to show 25 CFM of leakage  
19 outdoors or less. And then if you showed less  
20 than 25 we would say it was zero.

21                  The reason for the 25 is that's to allow  
22 for measurement accuracy in these tests. Even if  
23 you had zero you still might measure positive 25.  
24 And we're allowing you to have that much slop to  
25 do that.

1           You'd have to have a HERS verification  
2           to get this credit. And you have to actually  
3           combine it with the verified ducts and conditioned  
4           space measure which already is there. Which means  
5           that somebody, you have to show that all the ducts  
6           are really going to be in the conditioned space.  
7           And that has to be verified.

8           So as I said there were three things  
9           there that we changed with regard to leakage of  
10          air handlers and how duct leakage is done and how  
11          duct leakage is done if you want to put all your  
12          ducts in conditioned space. All of those are  
13          designed to give people credits for doing better  
14          systems than we've been doing and make it possible  
15          to improve the houses.

16          There's another small change that  
17          relates to our new attic model. This attic model  
18          actually is an integrated attic zone and duct  
19          system model. The ducts in the attic are actually  
20          simulated simultaneously and all the heat  
21          transfers between them are taken into account.

22          So we're not using seasonal efficiency  
23          factors anymore. We're actually calculating this  
24          on the fly in that model.

25          And so one of the things you need to

1 know is you have to know what this supply CFM is  
2 for each zone. It's either one zone or two zones.  
3 And you have to know the supply CFM so the duct  
4 model knows how to do that calculation.

5 And the defaults and the standard design  
6 are based on the calculated air conditioner  
7 capacity. It defaults to 300 CFM per ton. The  
8 standard design is 350 CFM per ton which is our  
9 prescriptive rule set.

10 And if you're going to propose to better  
11 than 350 you can put in the number you're  
12 proposing to do. If you're going to do really  
13 high-end, cooling, high-efficiency systems and you  
14 want to do 400 CFM per ton, you can say I'm going  
15 to do 400 CFM per ton and then you use that number  
16 and you verify it with a field measurement later.

17 So this is a pretty small change. All  
18 the other duct efficiency inputs are the same as  
19 they are under the current method. And we wanted  
20 to make sure that everyone knew that this was a  
21 new added input.

22 So the final thing I wanted to talk  
23 about is slab heat flow. And this is a very  
24 exciting and thrilling topic that I put last so  
25 that it would wake everyone up (laughter).

1                   We've had a model in the ACMS for  
2                   basically the same model for a long time, 25 years  
3                   probably that's very simple, very simplistic model  
4                   of how heat transfer happens between the floor  
5                   slab in the house and the outdoors.

6                   The real situation is complicated, heat  
7                   flow in the ground and heat flow to the outdoor  
8                   air and a bunch of stuff.

9                   We got a number of complaints from  
10                  people that this model didn't give the right  
11                  answer. It didn't give enough credit for people  
12                  who use slab edge insulation. And it gives way  
13                  too much credit for heat transfer in cooling  
14                  season and not enough in heating.

15                  The current model is very simple and  
16                  nice but it doesn't actually give you the right  
17                  answer.

18                  So what we're proposing is to adopt this  
19                  model which is. I'm not going to go into the  
20                  details of. It's a model that has instead of just  
21                  one conductance to outdoor air temperature it's  
22                  got actually five conductances to different  
23                  estimated temperatures.

24                  It's actually a model that was developed  
25                  for the CEC by Joe Wong and friends and LBNL about

1 seven years ago. And it's a very simple, five  
2 model as these models go. It uses regression of  
3 detailed model results and it maintains the  
4 carpeted, hard-surface split and so forth. It was  
5 implemented in DOE-2, in a prototype DOE-2  
6 program.

7 And so for the residential ACM we keep  
8 all the current slab inputs. And we're going to  
9 adapt the model so that it works in the  
10 residential calculation context applying the  
11 losses to the bottom of the slab.

12 And the user is going to select an input  
13 for the type of slab edge insulation, is it on the  
14 outside of the slab, is it inside the foundation  
15 wall, those kind of type issues.

16 The R value of the insulation and the  
17 depth. And we're going to include in particular  
18 shallow insulation that's for floating slabs where  
19 there is no footing and you build a slab right on  
20 the ground and insulate the edge of that. That's  
21 something that's never been much in the develop  
22 methods.

23 So this is pretty straight forward.  
24 Since 99.9 percent of the houses don't have slab  
25 edge insulation this is not going to affect

1 anything that you do. All the stuff will default  
2 if you don't have slab edge insulation.

3 But for the guys that are trying to  
4 develop slab edge insulation and sell it this is a  
5 big deal. And it may turn out to be a big deal  
6 for energy in the future. That's it.

7 Questions?

8 MR. SHIRAKH: Questions for Bruce?

9 MR. WILCOX: Great.

10 MR. SHIRAKH: Okay.

11 MR. WILCOX: Too late Mike, sorry.

12 MR. BACHAND: I was just compiling my  
13 long list.

14 ADVISOR PENNINGTON: Did you have  
15 something else, Mike?

16 MR. BACHAND: No, it's the same old  
17 crap. Mike Bachand from CalcERTS. I thank the  
18 Energy Commission for the opportunity to speak  
19 again. I spoke about this a little bit on  
20 Wednesday but I want to get additional  
21 clarification.

22 On the duct leakage test right now we  
23 are saying that we have to do a percentage leakage  
24 of fan flow per ton of cooling capacity. And this  
25 is still a disconnect in my mind.

1           The analogy that I think of is trying to  
2 find out how much my plumbing is leaking and base  
3 it on the size of the heat exchanger in my water  
4 heater.

5           The air flow is from the FAU. So the  
6 percent of leakage should be based on the size of  
7 the air handler or the presumed flow of the air  
8 handler.

9           It shouldn't be based on the tons of  
10 cooling capacity of the condenser which is outside  
11 which has no contact with air flow. It doesn't  
12 equate to me. And so I just raised that issue.  
13 And I have a couple of other questions.

14           The HERS verification of the low-leakage  
15 FAU, is that basically a label-type verification  
16 that we have to look to see that the seal is on  
17 the unit applied by the manufacturer. Or is it an  
18 actual test?

19           MR. WILCOX: It's no test. It may be a  
20 look up in a catalogue.

21           MR. BACHAND: Yes, okay.

22           MR. WILCOX: My understanding is we may  
23 not get these labelled although they might be. I  
24 don't know. We're not proposing a requirement to  
25 label them. We're proposing a requirement to have

1       them certified to the Commission.  So they would  
2       be in the furnace record.

3               MR. BACHAND:  Okay so that certification  
4       would be accessible by a HERS rater somewhere  
5       along the line.

6               MR. WILCOX:  Yes.

7               MR. BACHAND:  Okay.  And I don't know if  
8       this is the proper place.  Will we be talking  
9       about air infiltration, house air infiltration  
10       later?

11              MR. WILCOX:  No.

12              MR. BACHAND:  Is it appropriate to raise  
13       an issue about that now?

14              MR. WILCOX:  Yes.

15              MR. BACHAND:  I wanted to know if  
16       anything had been done with the language about  
17       sampling for air infiltration.

18                        Currently there's a lot of confusion in  
19       the field for HERS raters.  There is no one  
20       subcontractor in charge of sealing the house.

21                        So there's really no way to sample that.  
22       It's basically a 100 percent testing with what's  
23       required.  Because you do the CF-6R-type sampling.

24

25                        The HERS rater does the initial test on

1       behalf of the builder, fills out the form which is  
2       the CF-6R form at that point then fills out his  
3       own CF-4R HERS rater form. So I wondered if  
4       language could be clarified in the standards  
5       regarding how that process works.

6                There's a lot of variation out in the  
7       field. We teach the proper method but that  
8       doesn't necessarily happen. It's kind of  
9       confusing.

10               ADVISOR PENNINGTON: So what was  
11       anticipated when that credit was created was that  
12       the builder would hire someone that would do that  
13       confirmation. And that person would have  
14       responsibility. That might be an employee of the  
15       builder that would do that.

16               It wouldn't necessarily be any current  
17       trade that would do it necessarily. So that it  
18       would get done and the CF-6R would get done by  
19       someone who was hired to do that by the builder.

20               And then you could sample that just like  
21       you could sample anything else.

22               Now the solution that seems to have  
23       emerged here is that the most convenient thing for  
24       all concerned is to have the HERS rater do the CF-  
25       6R test. Then you're into a 100 percent testing

1 regime.

2 And I don't see what's broken. I'm not  
3 hearing what's broken.

4 MR. BACHAND: Maybe nothing in the  
5 language. Just maybe we need a little bit better  
6 oversight on the process and field verification,  
7 QA maybe from the raters, from the providers.  
8 Thank you very much. That's the end of my  
9 comments for now. I'd reserve the right to come  
10 back up.

11 MR. WILCOX: I'd just like to respond to  
12 what Mike said earlier. I think that we have to  
13 do some thinking about the issue about what the  
14 basis for the duct leakage test is.

15 Because depending on what you use as the  
16 basis you may get a 50 percent difference in the  
17 criteria for passing the duct leakage test.

18 So it's not trivial. And we need to, if  
19 we're going to make any changes in that we need to  
20 make it for do what he said.

21 What Mike has suggested I think gives  
22 you the loosest criteria possible. So it's not  
23 clear that's the right one.

24 MR. HODGSON: Mike Hodgson, CBIA.  
25 Following up on Bill's comment to Mike Bachand,

1 the issue on air infiltration testing is currently  
2 there's no subcontractor that does that. We  
3 understand that.

4 It's not being implemented or enforced  
5 well in the field. And there probably is a more  
6 practical way to get the same resolution.

7 And that is to have a HERS rater do a  
8 one-in-seven type test but have a subcontractor  
9 who may be the insulation subcontractor who's  
10 putting down the ceiling, the caulking, the  
11 whatever to fill out some quick checklist.

12 Those people do not have blower doors.  
13 So what you're triggering is a 100 percent  
14 inspection that's it's a different time that  
15 you'll be doing a duct blast. So now you're  
16 requiring another trip.

17 And for that credit it's not a valuable  
18 thing to do. So I think there's, we're trying to  
19 go after low air infiltration and use it as a  
20 credit, there's probably a way to do that and have  
21 a sampling by a HERS rater satisfy the actual  
22 verification that SLA is below whatever number is  
23 being claimed in the energy calculations.

24 And we'd like to work with your staff on  
25 how to figure that out. And I think the HERS

1 industry providers would be very eager to do that.  
2 Because right now whatever the intent was is not  
3 being followed in the field.

4 ADVISOR PENNINGTON: Okay. You can  
5 imagine that it would be difficult to specify a  
6 prescriptive criteria that would be valid relative  
7 to achieving the air tightness that you're looking  
8 at.

9 And so you can imagine the potential for  
10 ending up with a problem with an installer  
11 thinking they did all the things and then the HERS  
12 rater finding that, no there was some bypass  
13 somewhere that was missed.

14 And so you've got an issue. One  
15 possibility might be to use the Q-2 checklist  
16 maybe focussing really hard at the ceiling plane  
17 and use some criteria like that as your  
18 prescriptive criteria.

19 And maybe that would be reasonably  
20 valid.

21 MR. HODGSON: I think the Q-2 is a good  
22 place to start. And there's probably four or five  
23 things that you could list. And they all don't  
24 have to be mandatory but someone acknowledges, I'm  
25 going to wrap the house with one-coat stucco. I'm

1 going to be caulking and sealing all exterior  
2 penetrations. I'm going to be doing my sole  
3 plate, my top plate with some type of roll out  
4 band seal.

5 They check those three boxes and then  
6 that leads them to say, I have to be less than x  
7 air infiltration. The HERS rater is going to know  
8 it or since it's a yes or no answer when you go  
9 out and do your blower door.

10 So once that happens it's just like in  
11 duct blasting. Once you get them to actually do  
12 the correct caulking or direct mask stick and  
13 application of the ducts then you get the  
14 subcontractor kind of in the appropriate  
15 installation application. And you don't have to  
16 check 100 percent.

17 So we would like to work to make that  
18 one more practical implementation.

19 MR. WILCOX: Mike, do you have some  
20 records of you guys, both Mikes of the  
21 verifications you've been doing and what levels  
22 you actually achieved.

23 MR. HODGSON: We have a few, yes.

24 MR. WILCOX: So you could actually sort  
25 of back up with data the assertion that you don't

1 have to check them all. That's what I --

2 MR. HODGSON: Correct and --

3 MR. WILCOX: -- and what the standard  
4 deviation is and so forth.

5 MR. HODGSON: We'd be happy to share  
6 some of that anonymously as long as we don't link  
7 them to addresses and builders. We're of course  
8 open to that data.

9 MR. WILCOX: I think that would be very  
10 useful in trying to work that out actually.

11 MR. HODGSON: Yes, as our market goes to  
12 one-coat stucco which seems to be something that  
13 we're doing in a greater majority of homes  
14 throughout the Central Valley, it's already a  
15 predominant case in southern California and in  
16 Sacramento which is kind of an island of one-coat  
17 stucco right now.

18 This is a technique that could have a  
19 significant energy savings. And it could be  
20 improving the wall insulation quality because  
21 we're going from two by four to two by four plus  
22 one inch foam which is a huge impact on the home  
23 and its energy savings.

24 So it's a good draw. But no one can  
25 take the SLA credit if they're actually trying to

1 follow the rules.

2 ADVISOR PENNINGTON: So the air barrier  
3 is critical. And so that's just one piece of the  
4 air barrier and in fact the driving forces are  
5 greatest at the ceiling plane.

6 So maybe that's one aspect of a  
7 criteria. But I think it has to be more rigorous  
8 than that or you're going find --

9 MR. HODGSON: I don't think it has to be  
10 very, I mean there's really only four or five  
11 things that people are doing.

12 I mean you're checking your  
13 penetrations. You really cannot check the ceiling  
14 to the windows to the wall. That's very difficult  
15 to do. But it'll come out in the actual test for  
16 your blower door test.

17 But if you wrap the house with  
18 something, I'm not saying it's a Tyvek, it could  
19 be a foam. And you do the rest of the ceilings  
20 and the top and bottom plates and any  
21 penetrations, you should meet a low SLA.

22 And we can correlate that to some data.  
23 So I would say whoever is doing those things which  
24 could be your insulator, check those boxes and  
25 then have the HERS rater do your SLA test one in

1 seven.

2 And if it doesn't pass the first time  
3 that's a big credit. You're going to have to fix  
4 something. But once it passes they're going to  
5 know what they're going to have to do.

6 And we literally have a few thousand  
7 homes of data, probably more than a few thousand  
8 homes of data that say that in general SLA is  
9 lower than what I think the Energy Commission  
10 anticipates.

11 And the reason for that predominantly is  
12 one-coat stucco. So do we want to encourage R-19  
13 walls. I think it's a good idea. R-21 walls,  
14 that would be an additional pull in the market to  
15 get that to work.

16 It's a credit right now that doesn't  
17 function in the market.

18 MR. WILCOX: Thank you Mike.

19 MR. DODD: Martyn Dodd with Energy Soft.  
20 I've only had about an hour to look over the ACM  
21 stuff that you guys put together. But I did  
22 identify a few issues that I want to bring up  
23 here.

24 In section 4.2.3 we talk about cool  
25 roofs. And what we basically say there is cool

1 roofs will be modeled with the ACM model. Does  
2 the ACM model deal with the cathedral ceiling?

3 So if the cathedral ceiling is not  
4 connected at all to the attic, it still connects  
5 to the ACM model?

6 MR. WILCOX: We actually worked really  
7 hard to make the ACM model a nice, simple,  
8 compliance, kind of tool where there wasn't a lot  
9 of complicated things to verify.

10 So when you use that model on a house  
11 you get one attic. It's got all the pieces of the  
12 roof that you've got. And there's a lot of  
13 different conditions that are in there but they're  
14 all in this one model.

15 And so the part that is cathedral and  
16 the part that's not, typically those are connected  
17 together but they're not always. But we're  
18 basically putting them all together in one thing.

19 MR. DODD: So if I have heat gain  
20 through the cathedral ceiling that's going to be  
21 connected into the attic?

22 MR. WILCOX: Well the ceiling that is  
23 underneath the cathedral is going to be part of  
24 the attic, right.

25 MR. DODD: No the ceilings underneath

1 the cathedral open to my living room.

2 MR. WILCOX: Well so is the ceiling  
3 under the attic. It's open to your living room.  
4 It's just --

5 MR. DODD: But is the ceiling, is the  
6 heat gain from the roof that comes through the  
7 cathedral ceiling, that's going to go straight  
8 into my house right?

9 MR. WILCOX: It's going to go through  
10 the attic into your house.

11 MR. DODD: It's going to go through the  
12 attic into the house?

13 MR. WILCOX: Yes.

14 MR. ELEY: There is no attic in a  
15 cathedral ceiling.

16 MR. DODD: There's no attic.

17 MR. WILCOX: Well there's an inch in  
18 most cathedral ceilings as a ventilation space.  
19 You have to ventilate that space. It's not  
20 always, but mostly.

21 I've been working in a house that has a  
22 very large cathedral ceiling over a living room  
23 that in fact that one inch ventilation space  
24 connects to the attic.

25 All that hot air goes right up into the

1 attic --

2 MR. DODD: And my ducts are in that one  
3 inch ventilation space?

4 MR. WILCOX: Well, are they?

5 MR. DODD: Right, but that's what we're  
6 modeling.

7 MR. WILCOX: Well if, you know you're  
8 allowed to specify the duct situation pretty well.  
9 And so if your ducts are not in that space then  
10 they're somewhere else. And the model can handle  
11 that.

12 MR. DODD: But let's say my ducts are in  
13 the attic. All the heat gain that's in that  
14 cathedral ceiling which would normally be going  
15 into the house is now going into that attic and  
16 heating up my ducts.

17 MR. WILCOX: Yes.

18 MR. DODD: Okay.

19 MR. WILCOX: I don't think we should  
20 argue about this but think about the complexity of  
21 having some HERS rater come out and measure the  
22 area of your cathedral ceiling and separate it  
23 from the rest of the roof.

24 We're not doing that. This is a  
25 compliance level thing. The important stuff is

1 the performance of the roof and how it relates to  
2 the house. And I think we've captured it.

3 MR. DODD: Second question. The ACM  
4 model requires to model the building as one zone,  
5 okay.

6 MR. WILCOX: Two zones.

7 MR. DODD: Okay, you can do two zones if  
8 you've got a two zone system.

9 MR. WILCOX: Right.

10 MR. DODD: Okay, in other words you're  
11 taking the zonal control credit. Okay, what about  
12 buildings --

13 MR. WILCOX: I don't think you have to  
14 take the zonal control credit.

15 MR. DODD: So I can use the two zone  
16 model when I'm not taking zonal control credit?

17 MR. WILCOX: I would think you could.  
18 Anyway, two zones are available.

19 MR. DODD: Okay.

20 MR. ELEY: Two zones plus the attic.

21 MR. WILCOX: Yes. Two condition zones.

22 MR. DODD: Okay that's important because  
23 we have situations where people have two types of  
24 heating systems. So we need to be able to model  
25 the two different types of heating systems.

1                   MR. WILCOX: Yes, so that's part of the  
2 reason for that.

3                   MR. DODD: Okay, so we can make sure the  
4 ACM language is clarified to say we can do two  
5 zones there.

6                   MR. WILCOX: My understanding is that  
7 you're currently allowed to do an infinite number  
8 of zones some people think.

9                   MR. DODD: Right, well you are. If you  
10 read section 3.6.1 it says divide the building  
11 into zones.

12                   MR. WILCOX: Yes, we need to clarify  
13 that.

14                   MR. DODD: What does the ACM model do if  
15 I have a building that has a ducted air  
16 conditioning system and radiant floor? How does  
17 it handle that?

18                   MR. WILCOX: There's a separate input  
19 for heat flow and cooling and CFM heating and CFM  
20 cooling are separate.

21                   MR. DODD: So the ducted system will  
22 just react to the cooling and no heating, okay. I  
23 didn't have enough time to look into the technical  
24 aspect of that.

25                   How does the ACM model interact with

1 ventilation air. One of the things that you had  
2 put a slide up about was this situation of  
3 modeling the system running it twenty minutes out  
4 of the hour for ventilation.

5 All that air is going to be running  
6 through the attic. Is ACM going to be addressing  
7 that?

8 MR. WILCOX: Uh-hmm.

9 MR. DODD: Okay.

10 MR. WILCOX: You get the gains and  
11 losses you get. And that's one of the reasons  
12 that, I think that's an important of the energy  
13 balance on the system.

14 MR. DODD: Well the reason I asked is I  
15 thought the ACM model only had three modes. I  
16 thought it had a heating, cooling and then a non-  
17 operational mode. It's got a ventilation mode?

18 MR. WILCOX: We haven't done a lot of  
19 beating on the ventilation side but the original  
20 design I think was to cover the ventilation case  
21 for HER.

22 MR. DODD: Okay, okay.

23 MR. SHIRAKH: So Martyn, once you have a  
24 better chance to look at this ACM we can have more  
25 dialogue about your concerns.

1                   MR. DODD: Yes, that would be good. I  
2 really haven't had a lot of time to go through it  
3 Mazi.

4                   MR. SHIRAKH: Yes, so we can have some  
5 more discussion on that then.

6                   MR. DODD: Okay.

7                   MR. SHIRAKH: Any, sir.

8                   MR. BLUM: My name is Helmut Blum and  
9 I'm with European Rolling Shutters. And I just  
10 want to say something. You know I'm a man of the  
11 practice.

12                   And what I realize, and many, many  
13 situations proved that in the house you normally  
14 have the max about 90 degrees even it's 110, 120  
15 but that's about it.

16                   And then I learned when I was in Europe  
17 I had my house and I thought to be very smart and  
18 I used bricks with very high insulating good  
19 stuff, about 25 percent better.

20                   Compared with other people I had a  
21 problem in the summer time to cool my house. You  
22 see it's a given fact here as well as over there  
23 that about 50, 40, 50 percent of energy comes  
24 through windows and doors.

25                   And as I do exterior shading my mission

1 is to avoid that heat that comes in the house and  
2 it comes through the whole envelope and 50/50  
3 basically.

4 So if you do something like make a  
5 better slab, more insulation or seal the house  
6 better. You see this is a give and take. You  
7 have cooling and also you have some air coming in  
8 and getting out.

9 So if you do something, touch it and  
10 change something, you have to be aware that you  
11 might create something which you are not right now  
12 knowing about what it will do. So I learned this.  
13 I only wanted to give you a little experience.

14 For me the 90 degrees is a winner  
15 because my exterior shading has the potential of  
16 reducing the in-house temperature 10 to 40  
17 degrees. I always win.

18 That does not mean I wanted to say  
19 anything about air conditioning but as an example,  
20 you know, put for my son-in-law air conditioning  
21 in. Then I put shutters up, unfortunately and  
22 made air conditioning in his house obsolete.

23 Okay, thank you.

24 MR. WILCOX: Thank you.

25 MR. SHIRAKH: Thank you. Any other

1 questions for Bruce?

2 Rob Hudler wants to give us an update on  
3 the water heating side of the --

4 MR. HUDLER: And a few other topics.

5 Rob Hudler, California Energy Commission. There  
6 are a couple of additional changes in the  
7 residential ACM.

8 Within water heating there have been  
9 changes to the distribution multipliers. There  
10 have been two new multipliers added, one for pipes  
11 below grade uninsulated and nonprotected and one  
12 for pipes that have been insulated and protected.  
13 We have also changed the multiplier for demand  
14 recirc to .95. The original proposal was for one  
15 but we had additional comments and strong support  
16 for moving that multiplier.

17 We have also changed the formula for  
18 large storage water heaters. Federal test  
19 procedures no longer test for pile energy, pile  
20 and standby are treated as a single value so the  
21 formula has been modified to deal with that  
22 particular situation.

23 We have also made some changes in the  
24 water heating calculation method to deal with  
25 supplemental storage tanks. There has been a

1 number of systems coming forward where small  
2 storage water heaters or systems have been  
3 installed with supplemental storage tanks so we  
4 wanted to be sure that the additional small tanks  
5 could be captured in the calculation.

6 We still have an outstanding issue on  
7 the distance between the manifold between the  
8 water heater as far as the length. Right now we  
9 were looking at about 15 feet. Steve and I had  
10 requested some conversation with that but we have  
11 not had final information. I think we are now at  
12 a point where we can sit down and show you the  
13 data that we have on that.

14 There are a couple of additional changes  
15 in the res ACM. We've included a new appendix  
16 with specific language for each of the special  
17 features and HERS that ACM providers will have to  
18 include rather than having variations in language.  
19 We have also included a requirement that all  
20 windows be modeled individually and you can no  
21 longer model glass, a single pane of glass by  
22 orientation.

23 A final change is in order to support  
24 the database for the Solar Homes Program we are  
25 requiring a format of the certificate of

1 compliance that is in a readable format so that it  
2 can be downloaded into a database. And that is  
3 the end of the additional changes.

4 MR. HODGSON: Rob, Mike Hodgson, CBIA.  
5 Just a quick question. I don't understand your  
6 last comment. Do you just need a .pdf file or --

7 MR. HUDLER: Well basically what happens  
8 is that what we're trying to do is for the  
9 certificate of compliance we are trying to get it  
10 reported in a format so as a datafile it can  
11 basically be read into a database file and it can  
12 be read, you know, from any of the programs rather  
13 than having to have a special program to strip  
14 information from each of the vendor programs.

15 MR. HODGSON: Okay.

16 MR. MAEDA: It's basically -- Bruce  
17 Maeda, Energy Commission. It's basically what  
18 some HERS providers get currently from the  
19 programs.

20 MR. DODD: Rob, where did you guys have  
21 the language for the each window modeling? I must  
22 have missed it.

23 MR. HUDLER: It should be both in  
24 Chapter 2 and -- yeah. I know it's in Chapter 2.

25 MR. DODD: Okay, okay.

1 MR. HUDLER: Right.

2 MR. DODD: One other suggestion on the  
3 HERS file format that you guys came up with.

4 MR. HUDLER: Um-hmm.

5 MR. DODD: What you've got there is  
6 fine, it's easy to do.

7 MR. HUDLER: Okay.

8 MR. DODD: It's pretty straightforward.  
9 But what you might want to think towards is maybe  
10 some sort of .xml format because that tends to be  
11 a little bit more universal.

12 MR. HUDLER: Okay. Well, I mean --

13 MR. DODD: Just a thought.

14 MR. HUDLER: And ideally for that what  
15 I'd like to do is to sit down with the vendors and  
16 be sure that we come up with something that's most  
17 compatible for everybody.

18 MR. SHIRAKH: Any other questions for  
19 Rob?

20 MR. BACHAND: Mike Bachand, CalcERTS.  
21 Your comment about sitting down with the vendors.  
22 If at some time during that discussion it is also  
23 appropriate I'd like to consider having the  
24 providers in that same loop of discussions.  
25 Because we're the receiving entity on that so it

1 would be nice if we could all go together on that.

2 MR. HODGSON: Quit whining. (Laughter)

3 MR. SHIRAKH: Any other questions for  
4 Rob?

5 ADVISOR PENNINGTON: I have a question  
6 for Rob.

7 MR. HUDLER: Oh-oh.

8 ADVISOR PENNINGTON: Just for clarity.  
9 The underslab insulation, what is the standard  
10 design for that? The underslab.

11 MR. HUDLER: That basically requires  
12 that the pipe have the R-4 minimal insulation  
13 requirement plus that it be sheathed and  
14 protected.

15 ADVISOR PENNINGTON: Okay. And do you  
16 have a feel for what the difference in factor is  
17 there, distribution factor?

18 MR. HUDLER: I can't recall right off  
19 the top of my head, no.

20 ADVISOR PENNINGTON: Okay. But it's  
21 noticeable?

22 MR. HUDLER: It's a noticeable  
23 difference, yes.

24 MR. SHIRAKH: There was a chapter in the  
25 res ACM that described the HERS verification

1 requirements. We moved that from res ACM and we  
2 put it in the new residential appendix RA-7. I  
3 was wondering if --

4 MR. ELEY: RA-2.

5 MR. SHIRAKH: RA-2. I was wondering if  
6 Jeff or Rob could also provide a summary of some  
7 of the changes.

8 ADVISOR PENNINGTON: Could you do that,  
9 Jeff? Sorry, sorry for the -- this is completely  
10 easy for just think of it in that vantage point.

11 MR. MILLER: He just started swaying, I  
12 saw him.

13 MR. MILLER: Jeff Miller, Commission  
14 staff.

15 ADVISOR PENNINGTON: Jeff Miller, new  
16 staff person at the Commission. He's done a great  
17 job on this. So sorry for the entr,.

18 MR. MILLER: Generally the changes are  
19 to provide more detail on the language to clarify  
20 the procedures so that there is less  
21 interpretation required from staff. Additionally  
22 we are putting more emphasis on the CF-6R as an  
23 opportunity for enforcement so we're asking that  
24 it be submitted to the building departments.

25 Also given to the HERS rater and the

1 HERS provider and we'll try to archive the  
2 information that that represents. Both CF-6R and  
3 CF-1R will be hopefully archived. It can, I  
4 think, be the basis of better enforcement.

5 If there was one strong characteristic  
6 of the new language it would be that we are  
7 positioning ourselves to do a better job of  
8 enforcing and perhaps the procedures will be a  
9 little easier to negotiate.

10 MR. SHIRAKH: Charles will have more on  
11 this this afternoon when he goes through the  
12 reference appendices.

13 ADVISOR PENNINGTON: Okay. One of the  
14 things about this, we are very interested in  
15 getting feedback from the building industry and we  
16 intend to be talking to building officials about  
17 it. We spent quite a bit of time up to this point  
18 prior to the workshop trying to vet these changes  
19 with the building industry and with the HERS  
20 providers. So we've got in -- We've got 50 hours  
21 of review in or something like that at this point.  
22 But we're interested in getting further comment.  
23 We think this is important to do.

24 MR. SHIRAKH: Okay, so now we're going  
25 to move to changes to the nonresidential ACM

1 manuals and Charles will do that.

2 MR. ELEY: I put together some things on  
3 the residential manual that I knew Bruce Wilcox  
4 didn't have in his presentation. But I think Rob  
5 Hudler covered some of them so let's just run  
6 through these and make sure everything is,  
7 everything is covered.

8 You covered the water heating. I don't  
9 know if you mentioned the tankless water heaters  
10 but there's a credit that degrades the performance  
11 of tankless water heaters to account for the  
12 losses during cycling. So that's another change  
13 to the ACM appendix, residential ACM appendix on  
14 water heating.

15 This was covered Wednesday, refrigerant  
16 charge, watt draw was covered Wednesday. IEQ  
17 covered Wednesday. There are some rules that have  
18 been added to the, to the ACM to give credit for  
19 evaporatively-cooled condensing units. This was  
20 actually a compliance option that was approved  
21 through a previous proceeding but now it's been  
22 formally added to the, to the residential ACM.

23 The same thing with thermal storage.  
24 There was a, there was a compliance option that  
25 went through the, went through the proceedings for

1 direct expansion of air conditioning thermal  
2 storage. And this was, this was approved and it's  
3 been, it's been added to the ACM as a, as a  
4 compliance option.

5 So these are both compliance options,  
6 the evaporatively cooled condensing units and the  
7 thermal energy storage. And I think that's it on  
8 the -- oh. That was covered, this was covered.  
9 So just those, just those few things, tankless  
10 water heaters, evaporatively cooled condensers and  
11 the direct expansion air conditioning thermal  
12 storage systems.

13 MR. HODGSON: Charles.

14 MR. ELEY: So moving on to  
15 nonresidential, which is my primary charge.

16 MR. HODGSON: Mr. Eley?

17 MR. ELEY: Sorry.

18 MR. HODGSON: Mike Hodgson, CBIA. I  
19 have not noticed the tankless study on the -- is  
20 it on the, is it referenced on the web?

21 MR. ELEY: Where is Rob Hudler?

22 MR. HUDLER: Yes, yes it is.

23 MR. HODGSON: It is on the web. We'd  
24 like to look at that because tankless is becoming  
25 a more and more increasing option.

1           MR. ELEY: Yes I know, it's an important  
2 energy efficiency measure these days.

3           MR. HODGSON: Great, okay.

4           MR. ELEY: And the thinking here is it's  
5 been getting a little bit more credit than it  
6 deserves just because of the test procedure, the  
7 DOE test procedure probably doesn't treat them  
8 fairly.

9           MR. HODGSON: I won't comment on that  
10 but I just would like the study reference and it's  
11 on the web.

12          MR. ELEY: Okay.

13          MR. HODGSON: Thanks.

14          MR. ELEY: This is the Jim Lutz and  
15 Davis Energy study, right? Okay. Moving on to my  
16 primary charge here this morning was to cover the  
17 changes to the nonresidential software manual,  
18 which we also call the ACM manual.

19                 There are some changes to chapter 5 of  
20 the ACM that modify the way we evaluate software  
21 as it relates to the reference method. It used to  
22 be that if all the tests failed you were okay but  
23 now it's been changed so that the results of the  
24 candidate's software, compliance software have to,  
25 they have to produce results that are within 15

1 percent of the reference method, either one way or  
2 the other.

3 Also in DOE-2 there's the fixed  
4 weighting factors and the custom weighting  
5 factors, there's two ways to model the mass  
6 associated with furnishings and general, general  
7 thermal lag within the building.

8 And this was a little ambiguous before  
9 so it has been changed now so that the custom  
10 weighting factors are clearly specified and are a  
11 part of the, are a part of the calculations.

12 One other thing that is going to be a  
13 little bit different now, I understand that the  
14 Commission is actually going to provide the DOE-2  
15 input files for these tests which have been  
16 missing in the past.

17 There's also some changes in the way  
18 that demising walls are modeled. Demising walls  
19 are walls that separate different occupancies or  
20 they may separate a building for which you're  
21 getting your permit from an adjacent building that  
22 is already existing or planned for the future.  
23 And in the past demising walls have been  
24 essentially ignored in the model. That is they  
25 have been considered adiabatic surfaces. An

1       adiabatic surface is one where there is no heat  
2       transfer one way or the other.

3               The modeling rules have been changed so  
4       that they are now considered in the model and they  
5       can be considered in one of two ways. They can be  
6       considered as a shaded exterior partition, so it  
7       will be an exterior partition that does have heat  
8       transfer to the outdoors but no solar gains, or  
9       they could be explicitly modeled if there is an  
10      unconditioned space that they're next to and  
11      that's a part of the model.

12              The mandatory measures for demising  
13      walls are still the same at R-13.

14              The modeling rules for lighting controls  
15      have changed. Prior to this update all lighting  
16      controls were included, were considered by making  
17      an adjustment to the lighting power through the  
18      power adjustment factors. As we move to time  
19      dependant valued energy this method produces some  
20      inaccuracies, especially with daylighting, but  
21      other measures as well.

22              Because the power adjustment factor  
23      worked okay if you assumed that the time of use  
24      doesn't matter. But when time of use is a factor,  
25      as it is with TDV, it's important to deal with it

1 a little bit more explicitly.

2 So what's happened in the manual is that  
3 there are now, there are now alternate schedules  
4 for each qualifying automatic control. Those  
5 schedules produce about the same result in terms  
6 of kilowatt hours as the power adjustment factors  
7 but in terms of TDV they are more accurate because  
8 they'll count for time of use.

9 And there are equations in there for  
10 combining different controls and different spaces  
11 and there's different rules for splitting out the  
12 lighting load for each type of control and so  
13 forth. So the, so the way that we are modeling  
14 automatic lighting controls which qualify for  
15 credits has changed quite a bit.

16 Also for side lighting we're still using  
17 the power adjustment factors as a way to credit  
18 daylighting. But for skylights the DOE-2 skylight  
19 model is actually going to be used. So the ACM  
20 now specifies the rules, the constraints, the  
21 fixed assumptions, the restricted assumptions  
22 associated with how you, how you model daylighting  
23 under skylights.

24 So this is quite a, quite a significant  
25 change. I think this is all in Chapter 2, I

1 believe, right John, of the nonresidential ACM.

2 There's credit for fault detection  
3 diagnostics. This was actually covered Wednesday  
4 so I won't repeat it here. The same for fault  
5 detection diagnostic for air handling units and  
6 VAV boxes. This also was covered Wednesday.

7 There's modeling rules added or modified  
8 to give credit for under floor air distribution  
9 systems. These are popular systems, especially in  
10 buildings that try to go beyond code minimum. And  
11 there have been some peer-supported research on  
12 this from the Center for the Built Environment in  
13 Berkeley, Fred Bauman and Tom Webster. And their  
14 recommendations have been incorporated into the,  
15 into the ACM manual so that there are, so that  
16 there's more fair credits now for under floor air  
17 distribution systems.

18 This is a compliance option, it is not a  
19 prescriptive requirement so it doesn't, it doesn't  
20 affect the overall stringency of the standard in  
21 any way but it will give, it will give credit for  
22 this type of air distribution in buildings.

23 Also there's credit now offered for  
24 thermal energy storage systems. There's two kinds  
25 of thermal energy storage systems which are

1 recognized in the ACM as compliance options. The  
2 first type is one that can be explicitly modeled  
3 in plain vanilla DOE-2 engines. This is basically  
4 the CALMAC-type ice storage coupled with chilled  
5 water plants or chilled water systems coupled with  
6 chilled water plants. This was, this was the  
7 result of -- I think that, Martyn, this was a PG&E  
8 supported effort?

9 MR. DODD: Yes.

10 MR. ELEY: So Martyn did the research on  
11 that. So those rules have been added into, into  
12 the ACM manual. There is another type of ice  
13 storage system that has also been added in as a  
14 compliance option and this is the Ice Bear type  
15 system, which is a piece of equipment that fits  
16 between the condensing unit and the evaporator  
17 unit in split system air conditioning equipment  
18 and provides the same thermal function as the, as  
19 the CALMAC type thing but it works with, it works  
20 with direct, direct expansion air conditioning  
21 equipment in particular split system types.

22 So these have both been vetted in other  
23 proceedings so basically all we have done here is  
24 taken those modeling rules and added them to the,  
25 to the ACM manual so they are explicitly

1 identified.

2           There's also some changes that have been  
3 made with regard to fan power. There's two things  
4 here. For standard design systems three and four,  
5 which are VAV systems, there's a -- the fan power  
6 index, which is the watts per CFM, this has been  
7 modified to cap it at a minimum of .8 watts per  
8 CFM for the, for the standard design. So this  
9 will begin to give a little bit of credit for  
10 systems that can get below that.

11           Then there's also some changes that have  
12 been made to provide a modest credit for natural  
13 ventilation. This is the result of a study, again  
14 that Martyn Dodd did, called Natural Ventilation  
15 for Cooling and this is posted at the Energy  
16 Commission website. So these two changes have  
17 been made to the, to the fan power side of things.

18           Basically the natural ventilation credit  
19 shows up just as a reduction in fan power or fan  
20 energy. You still have the default air  
21 conditioner that comes in. And you'll see, even  
22 if you don't have an air conditioner you may see  
23 some air conditioning compressor energy in both  
24 the standard design and the proposed design.

25           So this is kind of a modest credit to

1 encourage hybrid type -- Or actually no. In this  
2 case you can't have any, any -- I think one of the  
3 restrictions is you can't have any installed air  
4 conditioning at all in the space in order to take  
5 this credit. So it's not a hybrid system.

6 And I believe that's it, Mazi, for the  
7 nonres. I guess we'll take questions.

8 MR. SHIRAKH: Any questions for Charles  
9 on nonres ACM changes?

10 MR. DODD: Martyn Dodd, Energy Soft.  
11 Jon and I had a quick discussion on this earlier.  
12 The lighting controls credit stuff that's gone in  
13 there, it's probably not quite where it's supposed  
14 to be I don't think. In table N2-4 what you have  
15 listed there are all these different spaces where  
16 I can take lighting control credits, okay, and the  
17 type of credits I can take.

18 I would suggest right away that that  
19 probably should be something that is not in there  
20 because the standards already specify in Section  
21 146 where I can take the appropriate control  
22 credits. That's just a suggestion. And the  
23 reason I say that is because I don't think you  
24 have really coordinated it well with some of the  
25 typical occurrences.

1           For instance, I look down here at, let's  
2 see, retail, and it says I can't take any control  
3 credits in retail. A perfect example, I'm doing a  
4 Home Depot and I want to put in some more advanced  
5 daylighting controls or something like that. Well  
6 the way the ACM is written right now I can't take  
7 any credit for it that way. And there are no  
8 schedules in there.

9           MR. MCHUGH (FROM THE AUDIENCE): Those  
10 are schedules so --

11          MR. DODD: There's no schedules in the  
12 table for retail.

13          MR. MCHUGH: For retail --

14          MR. ELEY: For Home Depot you would  
15 model the skylights, the daylighting control  
16 explicitly and you could take it.

17          MR. DODD: Do we have modeling  
18 procedures for modeling the?

19          MR. ELEY: No.

20          MR. DODD: Okay, so we can use that for  
21 the retail.

22          MR. MCHUGH (FROM THE AUDIENCE): Both  
23 side lighting and the skylighting.

24          MR. SHIRAKH: We need to capture your  
25 comments because we're going to go through

1 transcripts.

2 MR. McHUGH: For the record you can  
3 model both side lighting and top lighting for  
4 retail occupancies. The side lighting is treated  
5 as a power adjustment factor like we're used to,  
6 top lighting is this new modeling method that  
7 Charles is describing using the DOE-2 modeling  
8 that's inside of the DOE-2 kernel.

9 In addition the demand response control  
10 is also a power adjustment factor it is not a  
11 schedule. So there's two power adjustment  
12 factors. One has to do with the demand responsive  
13 control and the side lighting control.

14 MR. DODD: And the demand responsive  
15 control appears in the --

16 MR. McHUGH: As a power adjustment  
17 factor.

18 MR. MAEDA: So you only change the light  
19 watts entry into the --

20 MR. McHUGH: Yeah.

21 MR. DODD: Okay, okay, okay. I was a  
22 little confused by that. Because what it leads  
23 off by saying here in this section is, it leads  
24 off by saying that -- sorry to be technical but I  
25 have to eventually program this.

1                   "When lighting control  
2                   credits are used the following  
3                   lighting power must be entered  
4                   for each space. The default  
5                   control schedule given in the  
6                   space shall be assigned to the  
7                   default controlled lighting  
8                   for the space."

9                   So it sort of implies that when you're taking any  
10                   control credits you've got to go through the  
11                   schedule approach.

12                   MR. McHUGH: Right.

13                   MR. DODD: So you could also do the PAF  
14                   adjustment.

15                   MR. McHUGH: Right.

16                   MR. DODD: Okay, okay.

17                   MR. McHUGH: For a limited number.

18                   MR. DODD: So what we might want to do  
19                   is just to --

20                   MR. McHUGH: Amend this.

21                   MR. DODD: Just to add that language  
22                   that they can do the PAFs. Okay, that was the  
23                   only question I had, thanks.

24                   MR. MAEDA: Jon, I had a question too.  
25                   I should look at it but I haven't had a chance

1 yet. On the top lighting modeling rules, how do  
2 they correspond to those proposed by Jeff Hirsch  
3 as per his daylighting option about two or three  
4 years ago that I hope I sent to you? I think I  
5 did.

6 MR. McHUGH: Well if you hadn't Jeff had  
7 sent me a draft version of it. This is a lot less  
8 complex. How it's modeled is a non-geometric  
9 model so I think it prevents potential gaming by  
10 sort of fiddling with the geometry of the space.

11 And also issues associated with  
12 partitions and those sorts of things that might  
13 end up finding results that are not really, not --  
14 In terms of how partitions might be modeled inside  
15 the space you might end up with situations that  
16 aren't reflecting the ratio of skylights to the  
17 daylit zone. So it's trying to essentially keep a  
18 very simple model so it's very different from what  
19 Jeff had proposed.

20 MR. MAEDA: Also one of our concerns in  
21 the past has always been -- daylight modeling  
22 capabilities have been in DOE-2 for quite a while  
23 now and we have always rejected anybody trying to  
24 do it because of enforceability and reliability of  
25 systems. How enforceable are the proposals you've

1 done?

2 MR. McHUGH: Good question. We  
3 consciously try to make the model very simple and  
4 it's essentially asking for the same kind of  
5 information that would be asked if you were  
6 filling this out prescriptively. So it's asking  
7 the kinds of questions of, you know, what is your  
8 skylit zone, what is the total amount of skylight  
9 area and the visible transmittance of the  
10 skylights and questions about the well efficiency.

11 MR. MAEDA: For example, do you have to  
12 draw the skylit zone? Do you have to have a  
13 picture of it or not?

14 MR. McHUGH: The standards require that  
15 you have on the plans a picture of the skylit  
16 zone. Thanks.

17 MR. SHIRAKH: How many people plan to  
18 speak at the public comment period? We're a  
19 little bit ahead of schedule here. We have an  
20 option of continuing and trying to wrap this up  
21 maybe by 12:30 or 1. That means you'll be a  
22 little bit more hungry then but we can finish this  
23 or take a break, you know. How many people want  
24 to have a lunch break and then come back? How  
25 many people want to continue? I think the ayes

1 win it.

2           Okay, the next topic is going to be the  
3 revisions to the reference appendices. This is a  
4 relatively new document. It is an expansion of  
5 what we introduced in 2005. In 2005 we introduced  
6 joint appendices that had only four chapters. We  
7 have revised that and now we call it the reference  
8 appendices.

9           What we have done is we went through  
10 both the nonres ACM and res ACM and we pulled all  
11 the appendices that were not really specific to  
12 compliance software and certification. And we  
13 pulled those into these reference appendices and  
14 we have also introduced some new chapters that  
15 didn't exist before. So now this document has  
16 gone from four chapters to something about 25  
17 chapters now.

18           What it has done is allowed the res and  
19 non res ACM manuals to be what they were meant to  
20 be, and that's for compliance software, and not a  
21 place for everything that we didn't have a place  
22 for.

23           So Charles is going to go through this.  
24 This document has three subsections, joint  
25 appendices, res appendix and nonres appendix. And

1 Rob.

2 MR. HUDLER: Yes, I just wanted to make  
3 one addition related to the nonres ACM in water  
4 heating modeling. We've added gas water heater as  
5 the reference both in the prescriptive standard  
6 and in performance as a tradeoff measure. And we  
7 set a calculation up that will allow modeling for  
8 various types of water heating systems with two  
9 different referents of water heaters depending on  
10 the building type.

11 We have also moved hotels and motels  
12 over to the residential modeling assumptions as  
13 far as dealing with the water heating budget.

14 MR. SHIRAKH: Comments for Rob?

15 MR. MAEDA: Rob, why don't you tell them  
16 what the standard design is for hotels and motels.

17 MR. HUDLER: So the standard design for  
18 hotels and motels will essentially be a central  
19 boiler with a central recirc system as a set  
20 reference. The reason for doing that, because we  
21 know that the industry uses electric strip heating  
22 in many applications and we wanted to be able to  
23 provide them some reasonable tradeoff. So we're  
24 providing them the energy and the distribution  
25 recirc as that tradeoff feature.

1                   MR. MAEDA: Also hotels and motels  
2 demand fairly instantaneous hot water in their  
3 rooms and that's just part of their process need.

4                   MR. DODD: Martyn Dodd. Rob, is there  
5 any reason why you don't just use the reference  
6 that is already defined in the residential manual  
7 for that?

8                   MR. HUDLER: Well the only difference in  
9 the res is that, you know, you have the situation  
10 that if individual water heaters are used in the  
11 building then you have individual water heaters.  
12 And our concern was that if we didn't put in the  
13 recirc system there would be an automatic penalty  
14 if you used electric strip heating at point of  
15 use.

16                   MR. DODD: That's okay.

17                   MR. HUDLER: Okay.

18                   MR. DODD: I'm okay with it. Okay.  
19 Where have you written down the reference for the  
20 commercial water heater? I couldn't find it.

21                   MR. HUDLER: That's all in chapter two.

22                   MR. DODD: That's in chapter two?

23                   MR. HUDLER: Yes, at the very end of the  
24 chapter.

25                   MR. DODD: Okay, okay, thanks.

1                   MR. SHIRAKH: Any other questions for  
2 Rob? Okay, moving on to the Reference Appendices.

3                   MR. ELEY: Okay. The first group of  
4 reference appendices are the Joint Reference  
5 Appendices. And these were, these were added with  
6 the 2005 update. At least the first four were and  
7 we've added a few to it.

8                   Joint Appendix 1 is a glossary of terms  
9 and so this was a consolidation of three or four  
10 different glossaries that used to exist before  
11 2005. Joint Appendix 2 is all of the design data  
12 for sizing equipment, HVAC calculations. Three is  
13 time dependant valuation. Four is standard data  
14 on U-factor, C-factors, thermal mass, et cetera.

15                   And then 5, 6, 7 and 8 are all new Joint  
16 Appendices. Basically all four of those set  
17 specifications for PCTs that qualify as meeting  
18 the requirements. Charge indicator lights that  
19 qualify as meeting the requirements. There is  
20 also specifications for spray urethane foam  
21 insulation. And there's a placeholder here for  
22 LEDs. If a national standard develops then we'll  
23 probably drop that one.

24                   So for the glossary there weren't too  
25 many changes but there were some terms added to

1 the standard. Those of course have been added to  
2 the glossary and a few other little tweaks here  
3 and there. But any changes here are related to  
4 measures that you've already heard where we needed  
5 to add terms or modify terms to deal with the,  
6 with the measures that have been added.

7           There are very few changes that are  
8 being made to the climate data. One of the issues  
9 that was brought up here is the ASHRAE Region 9  
10 data, which is the basis of this, had some holes  
11 in it with regard to latitude and longitude.  
12 Since that is data that is now used by the PV  
13 calculator and the New Solar Homes Partnership  
14 then we're going to try to fill those holes in  
15 some way. But there's not going to be any  
16 significant changes to this other than just  
17 filling in some blanks that are missing.

18           Joint Appendix 3, the graphs and summary  
19 tables here. Joint Appendix 3 of course doesn't  
20 include the actual data because the data itself is  
21 pretty big. There's roughly 9,000 records times  
22 16 climate zones times two occupancies. It's  
23 about 100,000 numbers or something. So if you  
24 wanted to actually see the data there's websites  
25 you go to and get it.

1           What Joint Appendix 3 does is it  
2 summarizes the data. So there's some graphs and  
3 summary tables in Joint Appendix 3 and those have  
4 been updated to be consistent with the new data.

5           Another thing that was actually produced  
6 when the TDV numbers were generated is there's  
7 hourly estimated emission data for carbon dioxide  
8 particles, PM10, and SOx and sulfur dioxide. Those  
9 are, they're not actually broken out by -- it's  
10 more Northern California and Southern California  
11 breakdown, it's not broken down by climate zones  
12 the way the other things are.

13           But we've included some summary tables  
14 in Joint Appendix 3 that give you the average --  
15 the average, the minimum and the maximum CO2  
16 emissions per kilowatt hour, for instance. And it  
17 give it to you for both Northern California and  
18 Southern California climate zones. The same for  
19 PM10 and sulfur dioxide.

20           Joint Appendix 4 has had a lot of  
21 tweaking to it and we're probably still not done  
22 yet. There have been, there have been some data  
23 added for rigid board polyiso urethane insulation  
24 and spray foam insulation.

25           There's some other things. Both the

1 attic model, the UMZ attic model and the slab  
2 model are going to probably trigger some changes  
3 or adjustments that we haven't quite worked out  
4 yet. We got the documentation on the UMZ and the  
5 slab model too late to circle back and make  
6 possible adjustments to Joint Appendix 4.

7           But for instance the tables in Joint  
8 Appendix 4 for slabs give several insulation  
9 depths and several R values and so forth and we  
10 have to make sure those are covered in the slab  
11 model. And for the attic model the inputs to the  
12 new attic model, it's no longer U-factor, there's  
13 ventilation and various other things.

14           So the Joint Appendix 4 for attics in  
15 its current state will still be used for the  
16 nonresidential software but we'll modify it or  
17 adapt it in some way so it could be used with the  
18 new unconditioned zone model.

19           For walls there have been a number, a  
20 number of little tweaks and changes. There's a  
21 new table for foamed in place panels where you've  
22 got insulated metal panels and polyurethane foam  
23 between those, between those panels. This is kind  
24 of a production line unit that's used for some  
25 types of buildings.

1           The spandrel panels and curtain wall  
2 tables have been updated. The insulation options  
3 have been added for steel framed walls. We're  
4 still trying to kind of work this out but there  
5 were, the steel framed wall tables in there were  
6 based on a gauge of steel that's I guess heavier  
7 than what's typically used in some residential  
8 applications so we're trying to kind of work  
9 through, work through that issue.

10           Right now there's actually two separate  
11 tables in there for steel framed walls. there's  
12 one for steel framed walls in nonresidential  
13 applications, which assume a thicker gauge, and  
14 then there's another table for steel framed walls  
15 for residential applications which assume a  
16 lighter gauge and more knockouts. So that's how  
17 it exists now.

18           There is a new -- let me see. There's a  
19 few other, a few other little tweaks to the tables  
20 in Joint Appendix 4 but this has been a, this has  
21 been one of Payam's projects for the last eight  
22 months or so and other people here at the  
23 Commission. So that's Joint Appendix 4.

24           Joint Appendix 5 is a, lays out the  
25 specifications for programmable communicating

1 thermostats, which are now required in Section  
2 112. This will probably evolve a little bit over  
3 time. Right now it kind of references some other  
4 documents.

5 MR. SHIRAKH: There is a reference  
6 design document that exists. It is very long,  
7 it's almost 100 pages. That was one of the  
8 reasons why we decided not to put it in the Joint  
9 Appendix. Put it on LBNL's website and then  
10 provide a reference to it. Otherwise it would  
11 make the printed document very bulky.

12 MR. ELEY: Bruce mentioned Wednesday in  
13 his presentation that a charge indicator light  
14 would be, would become an alternative compliance  
15 option for refrigerant charge testing. And so  
16 Joint Appendix 6 has been added and it provides a  
17 specification for this kind of indicator light.

18 So this is -- And the reason it's in  
19 Joint Appendix -- The reason it's in the Joint  
20 Appendix as opposed to the residential appendices  
21 is the intent is that this would apply to any kind  
22 of system, no matter -- any kind of split system,  
23 no matter whether it's used in a residential  
24 application or a nonresidential application.

25 Joint Appendix 7.

1 MR. SHIRAKH: Mike has a question.

2 MR. ELEY: Sorry Mike.

3 MR. HODGSON: Just a quick question that  
4 I forgot to ask on Wednesday on the charge  
5 indicator lights. This is kind of a relatively  
6 new widget that we haven't seen in the industry so  
7 I was just wondering. We know nothing about cost  
8 or availability or manufacturers. Is there some  
9 reference material that exists or is it just a  
10 concept to say, this is a nice idea instead of the  
11 TXV. Which is eventually --

12 I'm just kind of concerned about the  
13 practical application of a charge indicator light.  
14 It sounds like a great idea, I just never have  
15 seen one, unfortunately. And we do look at  
16 mechanical equipment on a daily basis.

17 MR. WILCOX: Mike, I've never seen one  
18 either but I'm not the expert on this. John  
19 Proctor worked on this a bunch and he is out of  
20 the country and couldn't be at the meeting so I'm  
21 not able to answer the question. I'm sure that  
22 John can answer it when he gets back.

23 MR. HODGSON: Okay.

24 MR. WILCOX: If you want to talk about  
25 this. But to some fairly large extent it is kind

1 of a concept I'd say.

2 MR. HODGSON: All right.

3 MR. ELEY: It's also an alternative. I  
4 mean, it doesn't really change anything.

5 MR. WILCOX: Yes.

6 MR. ELEY: It just gives you another  
7 compliance option.

8 MR. HODGSON: Well it's an option but  
9 how practical is it? I mean, I think it's --

10 MR. WILCOX: This is based on I think a  
11 fair amount of activity in the manufacturing  
12 community and some third party guys who -- I think  
13 the understanding is that these things are  
14 actually quite feasible, you know. And if there  
15 was a reason to have them they would probably  
16 appear.

17 MR. HODGSON: But if we look up the  
18 technical sheets from Carrier, Trane, BDP --

19 MR. WILCOX: I don't think you'll see  
20 them now.

21 MR. HODGSON: We don't see them now in  
22 the market.

23 MR. WILCOX: Yes.

24 MR. HODGSON: Okay, that's what we need  
25 to know. We can encourage them but --

1                   MR. SHIRAKH:  When John comes back can  
2                   we meet?

3                   MR. WILCOX:  Yes, we could have a  
4                   discussion about this.

5                   ADVISOR PENNINGTON:  I think there is a  
6                   possibility here that this would stimulate  
7                   something pretty quick from the market.

8                   MR. HODGSON:  Okay.  That's what we'd  
9                   like to know is, you know, whose buttons do we  
10                  need to push to stimulate.

11                  MR. WILCOX:  I'm going to be at the  
12                  ASHRAE meeting next week and I will follow-up even  
13                  in John's absence and find out what's known.

14                  MR. HODGSON:  Because this is the  
15                  alternative to the refrigerant charge.

16                  MR. WILCOX:  Absolutely.

17                  MR. HODGSON:  And there's issues with  
18                  refrigerant charge that we discussed a little bit  
19                  on Wednesday and in other discussions that we  
20                  really want to avoid, avoiding any tapping into  
21                  things that are voiding warranties or pushing the  
22                  warranties from the mechanical subcontractor to  
23                  the HERS industry or to the builder.  Thanks.

24                  MR. ELEY:  Anyway, that's the reason for  
25                  this Joint Appendix is to try to pin down what the

1 requirements are for this device.

2 Joint Appendix 7 deals with the spray  
3 foam insulation, the installation of spray foam  
4 insulation. This would, this would apply to all  
5 building types. Again, the reason it's in a Joint  
6 Appendix. So this is Icynene-type products what  
7 we're really talking about here. And Joint  
8 Appendix --

9 MR. HODGSON: Charles, quick question.

10 MR. ELEY: Oh.

11 MR. HODGSON: I'm sorry. This is the  
12 first time we've seen some of this and I  
13 appreciate the summary. It says medium and high  
14 density, closed cell. Does that exclude half-  
15 pound open cell? I'm just reading this for the  
16 first time and I'm just wondering. For example,  
17 Icynene, and we don't care what spray foam you  
18 use, but Icynene is an open cell foam. So do we  
19 not have --

20 ADVISOR PENNINGTON: Can Rob or Payam  
21 respond to this?

22 MR. HODGSON: -- insulation installation  
23 procedures for open cell foams?

24 ADVISOR PENNINGTON: Alan?

25 MR. MARSHALL: Alan Marshall of the CEC.

1                   ADVISOR PENNINGTON: Can you lower the  
2 microphone?

3                   MR. HODGSON: I sure can.

4                   MR. MARSHALL: This procedure is for  
5 medium and high density polyurethane foam. The  
6 low density or the .5 pound, that's covered by --  
7 we don't have all the criteria, the installation  
8 criteria for that. Right now it just says fill  
9 the cavity and scrape it off and it's done. This  
10 has 15 pages of criteria and new forms we're going  
11 to be building.

12                  MR. HODGSON: So does that mean there is  
13 no insulation quality installation credit for a  
14 half-pound open cell foam at this time, since  
15 there is no criteria?

16                  MR. MARSHALL: I don't believe so. It's  
17 just a matter of putting it in, filling the cavity  
18 and you get the credit.

19                  ADVISOR PENNINGTON: I don't know, maybe  
20 we need to answer you off-line. But I thought  
21 that the open cell stuff we were, we were looking  
22 at a less rigorous criteria for them.

23                  MR. HODGSON: Just as an --

24                  ADVISOR PENNINGTON: That's what I  
25 thought.

1                   MR. HODGSON: As an example, I have not  
2                   been to many foam, homes that have been foamed,  
3                   all right. We went to a demonstration about three  
4                   weeks ago in the Central Valley and it was a  
5                   lightweight application, a half-pound application.  
6                   And we were kind of thinking, you fill it up, you  
7                   scrape it off and you walk away. And it's kind of  
8                   neat stuff.

9                   ADVISOR PENNINGTON: Yes.

10                  MR. HODGSON: You don't, you don't fill  
11                  the entire cavity. You fill up to the R-value  
12                  that you want, which is an art form more than a  
13                  technical science, in our non-professional  
14                  opinion. I mean, it was an interesting, a very  
15                  good visual.

16                  ADVISOR PENNINGTON: It has to look  
17                  good, huh?

18                  MR. HODGSON: No. I mean, for example,  
19                  if you're in a two-by-six, two-story -- a two-  
20                  story application, double wall, you're going to be  
21                  using two-by-six framing that are closer than 16  
22                  inch on center just so can either do a corner or  
23                  bracing or a support structure. When they did  
24                  that they filled it with about three inches of  
25                  foam. So the logical question we have is, where's

1 the other three inches, right?

2 MR. MARSHALL: They're supposed to fill  
3 it.

4 MR. HODGSON: They don't. And the  
5 reason they don't is because the Title 24 work  
6 calls for R-13 in the walls. And they get R-13  
7 with their three or four inches.

8 ADVISOR PENNINGTON: We're in discussion  
9 with the industry on --

10 MR. HODGSON: Okay.

11 ADVISOR PENNINGTON: -- what this  
12 criteria should be. And this is really trying to  
13 anticipate that we're going to come to closure on  
14 that discussion here shortly. And we want to have  
15 it in the 2008 standards stuff.

16 MR. HODGSON: I fully support that,  
17 Bill.

18 ADVISOR PENNINGTON: Right.

19 MR. HODGSON: Just by looking at the  
20 language we don't see a lot of close cell  
21 polyurethane foams in the residential side.

22 ADVISOR PENNINGTON: Right.

23 MR. HODGSON: And I understand this is a  
24 Joint Appendices and it's doing the commercial  
25 side also.

1           ADVISOR PENNINGTON: Right.

2           MR. HODGSON: But if there is going to  
3 be -- And I think the spray foam applications  
4 resolve a lot of the quality installation  
5 insulation issues --

6           ADVISOR PENNINGTON: I understand.

7           MR. HODGSON: -- we're trying to get to.

8           ADVISOR PENNINGTON: Right.

9           MR. HODGSON: I would like to encourage  
10 that section of the industry to do it. So we can  
11 stimulate them to make sure that they're part of  
12 that discussion.

13           ADVISOR PENNINGTON: And the open cell  
14 is the solution you see, or the potential solution  
15 you see to the Q-2 stuff.

16           MR. HODGSON: We see it more in the  
17 market than anybody else in the residential side  
18 so I just want to make sure that they are being  
19 addressed. That's the point. And I will urge  
20 them to contact Alan and yourself or whomever.  
21 Okay?

22           MR. MARSHALL: Yes.

23           MR. HODGSON: Thanks.

24           ADVISOR PENNINGTON: Very good, thanks.

25           MR. SHIRAKH: Mike.

1                   MR. BACHAND: Mike Bachand, CalcERTS. I  
2           just wanted, I saw the HERS application up there  
3           so I just wanted to -- I haven't unfortunately had  
4           the opportunity to read everything but I don't see  
5           anything in any of the appendices yet that talk  
6           about how a HERS inspection would be done that. I  
7           presume that is being worked out or would be  
8           worked out in the future. That was, I guess, a  
9           question mark.

10                  MR. HUDLER: Yes, as part of the  
11           compliance documentation all that stuff has been  
12           covered with the industry so that's all there.  
13           Just to sort of make the clarification of where  
14           we're at, when the spray foam industry first came  
15           forward on this their primary concern were for the  
16           medium and high density foams because they  
17           obviously do not fill cavities with that. So that  
18           has been the focus of the compliance option, to  
19           make sure those were covered.

20                  In the initial meetings industry agreed  
21           that for the low density foams they would simply  
22           fill cavities, period, and they did not ask for  
23           anything related to quality installation on those  
24           particular products.

25                  MR. BACHAND: Okay.

1           MR. HUDLER: But that is something to  
2 consider, yes.

3           MR. BACHAND: Okay. And if that applies  
4 to the residential and the nonresidential side is  
5 not clear here either so is it anticipating that  
6 that would be used in, since it's a Joint Appendix  
7 that it might be a nonres application of a HERS  
8 verification or a field inspection?

9           MR. HUDLER: Right now the way the  
10 compliance option is written up it's basically an  
11 installation requirement on non-res but it is a  
12 potential credit on the res side.

13          MR. BACHAND: Thank you.

14          MR. SHIRAKH: Any other questions on  
15 JA7?

16          MR. ELEY: So Joint Appendix 8 provides  
17 test methods for determining the wattage and the  
18 efficacy for LED lighting systems or solid state  
19 lighting systems. As I mentioned earlier this is,  
20 this is one that there is no test procedure right  
21 now so we need one. So it's going to be put into  
22 here. And if there is a test procedure developed  
23 at the national level this would probably be  
24 dropped and that's one of the reasons it's the  
25 last appendix. So if it is dropped there won't be

1 any holes in the numbering system. Any questions  
2 about this one? Okay, all right.

3 Moving on to the nonresidential  
4 appendices. The first five there have really been  
5 no changes to other than just renumbering them.  
6 These all existed, NA-1 used to be Chapter 7 of  
7 the nonresidential manual. This is all the HERS  
8 raters things. NA-2 and NA-3 were also in  
9 appendices to the nonresidential manual. NA-2  
10 specifies IES illuminance categories for use with  
11 the tailored method and it also specifies lighting  
12 power for different ballast combinations. So  
13 those existed already in the ACM manual, they have  
14 just been renumbered.

15 And NA-3 the same thing, it existed in  
16 the nonresidential ACM manual so it has been moved  
17 here and called NA-3. NA-4 the same thing. These  
18 were the compliance procedures for relocatable  
19 school buildings. So this deals with the whole  
20 pre-check procedure at the Division of the State  
21 Architect and how they, how they do the pre-check  
22 for pre-manufactured, relocatable school buildings  
23 and how that works into the energy compliance  
24 procedures.

25 NA-5 is essentially the same. It's the

1 residential duct procedure but it's the  
2 nonresidential version of that, which is limited  
3 to essentially nonresidential buildings that have  
4 attic-like spaces and single-zone systems. So  
5 they look like residences if you're an HVAC  
6 engineer.

7           But 6 and 7 there have been some changes  
8 to and I'll spend a little bit more time with  
9 those. NA-6 has fenestration performance  
10 defaults,U-factors and solar heat gain  
11 coefficients. These are used with site-built  
12 fenestration in buildings where there's less than  
13 10,000 square feet of site-built fenestration.

14           Another term for site-built fenestration  
15 are curtain walls or storefronts. It's a  
16 fenestration system where the glazing contractor  
17 comes to the job site with various components and  
18 it's put together at the site. So you'd have  
19 aluminum extrusions from Conair, maybe you'd have  
20 insulating glass panels from Viracon or one of the  
21 other manufacturers. And these would be assembled  
22 at the site.

23           For larger buildings where the site-  
24 built fenestration is more than 10,000 square feet  
25 the glazing contractor is expected to go through

1 the NFRC certificate label procedure for those.  
2 In the long-term we hope that NFRC is going to  
3 move to a more component based approach for site-  
4 built fenestration and when they do we can  
5 probably reduce this 10,000 square foot number or  
6 maybe eliminate it altogether and just require the  
7 NFRC procedure.

8 But right now, right now the NFRC  
9 procedure for site-built is fairly cumbersome so  
10 it's restricted in the Title 24 standards to  
11 buildings that have really a lot of curtain wall  
12 or storefront. Probably just curtain wall. I  
13 can't imagine a building that would have more than  
14 10,000 square feet of storefront. That would be  
15 pretty big strip mall, wouldn't it? But anyway.

16 The procedure here, it has some  
17 equations. Basically the input to the equations  
18 for U-factor is the center-of-glass U-factor. So  
19 what you do is you go off to manufacturer's  
20 literature and they will publish the center-of-  
21 glass U-factor. You then, you then take that  
22 center-of-glass U-factor and you plug it into the  
23 equation that is provided in NA-6. And there's  
24 different coefficients to the equation depending  
25 on whether the frame has a thermal break or not a

1 thermal break and things like that, and comes an  
2 estimate for compliance purposes of the  
3 fenestration product U-factor. And that can be  
4 used instead of NFRC ratings for site-built  
5 systems and for skylights.

6 There is a similar procedure for solar  
7 heat gain coefficients. Again you would go to the  
8 manufacturer's literature and you would get the  
9 solar heat gain coefficient for the center of the  
10 glass. You would plug that into the equation and  
11 you would get the fenestration product, the solar  
12 heat gain coefficient.

13 This reference appendix also has a  
14 series of compliance and enforcement rules in  
15 there. It has obligations for the compliance  
16 author, it has obligations for the glazing  
17 contractor, the plan checker and the field  
18 inspector. So it has kind of a checklist of  
19 things they're expected to do to ensure  
20 compliance. So that is NA-6. Any questions about  
21 that?

22 MR. SHIRAKH: I actually have one  
23 comment before going to questions. When we were  
24 working on this appendix we worked with Martyn,  
25 maybe Ken, other people, and we came up with some

1 tables, default tables. But Charles has proposed  
2 to replace those tables with equations and I was  
3 just going to put that on the table and see what  
4 kind of reaction --

5 MR. ELEY: Yes. The reason, the reason,  
6 if you take the center-of-glass numbers and the  
7 fenestration product numbers in the table and you  
8 put them on a graph they're a straight line with  
9 an R-square of about .99999. So it didn't really  
10 make sense to have a table. And plus the SHGC  
11 conversion was already an equation. So it just  
12 made more sense and made the thing simpler just to  
13 express them both as equations. It doesn't change  
14 anything it just makes it simpler in my opinion.

15 MR. DODD: No, I think it's good. That  
16 was my question because there's two tables,  
17 there's two NA-6s on the website. There's an NA-6  
18 with curves, then there's an NA-6 revision eight.  
19 And the revision eight has the table.

20 So if we go with just the curves that's  
21 great. I think if you go with both I'm a little  
22 concerned because the curve better match the  
23 table.

24 MR. ELEY: I didn't know there were two  
25 versions on the website.

1 MR. DODD: Yes there are.

2 MR. SHIRAKH: There was a bit of a  
3 confusion yesterday and we ended up with the  
4 equations and with the tables. That's why I'm  
5 asking the question.

6 MR. DODD: I support the equations  
7 absolutely.

8 MR. SHIRAKH: Do you have an opinion,  
9 Ken?

10 MR. NITTLER: No. Ken Nittler with  
11 Enercomp.

12 ADVISOR PENNINGTON: Your a table kind  
13 of guy, right? I'm sorry

14 MR. NITTLER: One of my business  
15 interests is I operate a NFRC simulation lab and  
16 been around NFRC for awhile. And I'll again make  
17 the comment that as long as the Commission is  
18 going to support exclusions like this that apply  
19 to a large fraction of the market you're pretty  
20 much assuring that people, manufacturers, will  
21 never get NFRC ratings and I think you need to  
22 think about what the implication of that is over  
23 time.

24 With regards to the proposal here.

25 Last, I think it was in July there was a workshop

1 or something. Does this change also pull out of  
2 the standards then the equation for solar heat  
3 gain and moves it just to this appendix? Was that  
4 concept captured?

5 MR. ELEY: I believe so.

6 MR. NITTLER: The standards language --

7 MR. ELEY: Is that solar heat gain  
8 equation still in the standard? It's just here,  
9 right?

10 MR. SHIRAKH: I think so but I am not  
11 positive.

12 MR. NITTLER: Yes. I thought one great  
13 improvement in efficiency is just to get  
14 everything about these sort of exceptions in one  
15 place was a good idea.

16 And then as far as going with an  
17 equation. I think that's actually an improvement.  
18 I mean, there is no question that the relationship  
19 is largely linear for a given frame type with the  
20 center-of-glass properties so that part of it is a  
21 good idea.

22 ADVISOR PENNINGTON: So Ken, just to  
23 react to your thing. We're kind of trying to hold  
24 NFRC's feet to the fire here. They have a big  
25 opportunity if they deliver on what they are

1       trying to deliver to move away from this in the  
2       future. And as soon as they do that and show us  
3       that they are ready to do that then we're going to  
4       reward that. But at this point we don't think  
5       we're ready to do that.

6               MR. NITTLER: You know, the fallacy is  
7       that the reason nobody does NFRC ratings is  
8       because nobody makes them. The commercial  
9       building industry collectively has not been  
10      following the standards. You can argue about the  
11      date. But when I go back and look at the  
12      language, really since about 1993 with regards to  
13      having certified product. And it is accurate  
14      certainly to say that getting a rated number costs  
15      some money and takes some time. I'm not saying  
16      that's not true.

17             MR. ELEY: A lot of money and a long  
18      time is what we're told.

19             MR. NITTLER: But as long as -- I'm  
20      sorry, what?

21             MR. ELEY: A lot of money and a lot of  
22      time.

23             MR. SHIRAKH: Yes, but that will change  
24      with the new CMA approach.

25             MR. NITTLER: You now, but that whole

1 argument is a red herring --

2 ADVISOR PENNINGTON: We're really trying  
3 to be supportive of this.

4 MR. NITTLER: And maybe we should have  
5 this on-line because you're not hearing what the  
6 reality is. On the NFRC side of the equation --  
7 And I'm not an NFRC board member, I'm just saying  
8 this from my perspective.

9 NFRC is being asked to make a tremendous  
10 investment and has a very hard time pulling the  
11 trigger on that investment when the single biggest  
12 user of the state with the longest history of  
13 using the stuff allows defaults that don't require  
14 the use of their numbers. Because the way many in  
15 the NFRC feel is like we need to have, you know,  
16 an initial user, I can't think of the right phrase  
17 here, to make it viable to in fact implement the  
18 system that you're talking about that has more  
19 component modeling in it.

20 The timing issues, Charles, for the  
21 record, on the initial product rating, the  
22 component approach that is being proposed by NFRC  
23 really isn't any different. I mean, they still  
24 have to get simulations done, they still have to  
25 go get the testing done. Where the efficiencies

1 can come in is when you start looking at different  
2 glazing options. So there's no significant  
3 difference in the cost of getting a rating under  
4 either system. Where the efficiency comes in is  
5 as you look at different glass options.

6 MR. SHIRAKH: Thank you, Ken. Any other  
7 questions on NA-6?

8 MR. DODD: Just to go back to a previous  
9 one, Charles. You were talking about Joint  
10 Appendix 4. There were two things I wanted to say  
11 about that. On the slabs, the slab table, there  
12 is no 16 inch slab insulation depth in the table  
13 but Section 151 requires that you have to have  
14 slab edge insulation down to 16 inches. So a lot  
15 of people always ask me, what do I do? So if  
16 you're going to revise that table maybe it would  
17 make sense to do a 16 inch in there.

18 And the other thing is, on the metal  
19 walls, the residential and commercial. I would  
20 encourage the combination of those so that we have  
21 a single table.

22 MR. ELEY: We're trying to figure out a  
23 way to do that.

24 MR. SHIRAKH: Any other questions?

25 Okay, NA-7 is next.

1           MR. ELEY: NA-7 we basically talked  
2 about on Wednesday. This is where, this used to  
3 be ACM Appendix NJ I think, right, which had all  
4 the acceptance requirements. It's now been moved  
5 into NA-7. We talked about the revisions to the  
6 acceptance requirements for indoor lighting on  
7 Wednesday so I won't review that. Let's see.

8           Also the other changes to the acceptance  
9 testings with regard to HVAC were covered at the  
10 February workshop so really I think there's  
11 nothing new to present today other than just note  
12 that it's been renumbered.

13          MR. SHIRAKH: Questions on  
14 nonresidential appendices? Okay, we're going to  
15 move to residential appendices.

16          MR. ELEY: Okay. This is mostly a  
17 renumbering job too. Most of these, most of these  
18 appendices existed previously somewhere in the ACM  
19 manual. The HVAC sizing was an appendix, was a  
20 residential appendix RA-2. The HERS rating  
21 system, that used to be chapter 7 of the  
22 residential ACM manual. The RA-3, which is the  
23 interior mass capacity numbers, that used to be, I  
24 don't remember the number but that was a  
25 residential ACM appendix as well.

1           The air distribution system field  
2 verification and diagnostic testing procedures,  
3 that was also an ACM appendix. Bruce talked about  
4 some of that this morning. The refrigerant charge  
5 was also an ACM appendix, that's just been  
6 renumbered RA-5. And the field verification and  
7 diagnostic testing for air flow and air handlers  
8 was also a previous ACM appendix so that's been  
9 renumbered to RA-6.

10           And the TXV verification is now RA-7.  
11 The insulation quality HERS procedures is now  
12 RA-8. And RA-9 is new though. These are the  
13 field verification and diagnostic testing for PV  
14 systems. Bruce talked about that on Wednesday as  
15 a part of the New Solar Homes Partnership thing.  
16 This is, this is the procedure where the HERS  
17 rater verifies that the shading conditions that  
18 were used in the energy production estimate are  
19 reasonably consistent, are consistent with field  
20 conditions. Verifies that the collectors that  
21 were specified and the inverter that were  
22 specified are actually on the job site.

23           But one of the big parts of this is to,  
24 is to actually measure the solar intensity and the  
25 outdoor temperature. And the PV calculator

1 produces a table that projects production for that  
2 combination of temperature and solar installation.  
3 And the verifier would look at the output, which  
4 would be one of the indicators on the inverter and  
5 verify that it's within an acceptable range of  
6 what's expected. So that's one of the big things.

7 RA-10 is also a, this is a new appendix  
8 but the material in it is not new. If you look  
9 back at the old ACM appendix there were, there  
10 were for compliance options in particular, for  
11 control vent crawl space for instance for --

12 ADVISOR PENNINGTON: Radiant barriers.

13 MR. ELEY: For radiant barriers. The  
14 dual zone, dual zone HVAC systems. There was a  
15 whole bunch of eligibility criteria that were kind  
16 of buried in the ACM manual. And since we're  
17 trying to kind of make the ACM manual more of a  
18 document that's used by software vendors and less  
19 of a document that's used by people trying to  
20 understand the standard and comply with it we  
21 pulled all of those things out. Those eligibility  
22 criteria for all of those various measures now  
23 reside in Residential Reference Appendix 10.

24 Like I say, the appendix is new, the  
25 organization is new but the material that's there

1 is not new. And we're not finished with that job  
2 I don't think. I think there are some other,  
3 there are some other measures that need to go in  
4 there like the DX thermal storage and a few  
5 things. But that's the goal, is to pull all of  
6 those eligibility criterias that are kind of  
7 scattered around in different places and tuck them  
8 into RA-10.

9 RA-11 is an appendix that specifies the  
10 requirements for indoor air quality. Right now  
11 it's basically one sentence. It says, see  
12 Standard 62.2-04. There were some drafts where we  
13 were making adjustments to that. I guess those  
14 have been abandoned now and we're just going to  
15 make a reference to 62.2.

16 So I think that's basically it. Do you  
17 have anything more to add to the residence?

18 MR. WILCOX: It should say Standard  
19 62.2-2007.

20 MR. ELEY: Okay, '07, not '04.

21 MR. WILCOX: Just to make sure it's on  
22 the record right.

23 MR. ELEY: Okay, sorry.

24 ADVISOR PENNINGTON: A question about  
25 that.

1                   MR. ELEY: So 62.2-07, not '04 like I  
2 said in error.

3                   ADVISOR PENNINGTON: So are there  
4 portions of 62.2 that we are not proposing to  
5 adopt? So all of the --

6                   MR. WILCOX: There are various things in  
7 62.2 that are, you know, which refer to climates  
8 and things like that. We could delete the heating  
9 degree days that don't apply to California.

10                  MR. ELEY: Those were basically the  
11 edits that we made. There are certain exceptions,  
12 for instance, that are based on heating degree  
13 days. And if you translated those into California  
14 climate zones some of them the requirement  
15 basically didn't apply anywhere in California so  
16 you can just take it out. So there were some  
17 opportunities to kind of simplify it within the  
18 context of California.

19                  ADVISOR PENNINGTON: I think we're  
20 going to need to be clear about what doesn't  
21 apply.

22                  MR. WILCOX: Well the standard is clear  
23 I think, what applies and what doesn't.

24                  ADVISOR PENNINGTON: So heating degree  
25 day tables you don't think creates any confusion?

1                   MR. WILCOX: I don't think so. I mean,  
2 we can talk about it if there are some issues  
3 there but there maybe needs to be an explanation  
4 in the design manual.

5                   MR. SHIRAKH: Mike.

6                   MR. BACHAND: Mike Bachand. With  
7 respect to RA-2. The term special inspectors in  
8 that first chapter, the first paragraph of RA-2,  
9 refers to providers and raters and that a building  
10 department can determine whether or not they  
11 accept that person or that entity's work or  
12 product? So I wondered if the Energy Commission  
13 intended for providers to be allowed or disallowed  
14 by various jurisdictions across the state?

15                   ADVISOR PENNINGTON: Is that a change?  
16 Did we change something?

17                   MR. BACHAND: No, as a matter of fact  
18 it's not, which is ultimately scary. I think  
19 it's --

20                   ADVISOR PENNINGTON: So I don't know if  
21 we're willing to discuss this with you. We're  
22 trying to be consistent with Title 24 part two's  
23 treatment of special inspectors.

24                   MR. BACHAND: Right.

25                   ADVISOR PENNINGTON: And we're trying to

1 not be disruptive to the building department's  
2 jurisdiction.

3 MR. BACHAND: Yes. I'm thinking based  
4 on the rigorous approval process that providers go  
5 through versus what raters go through it's a sort  
6 of a different level.

7 ADVISOR PENNINGTON: That's an  
8 interesting point, let's talk about that.

9 MR. BACHAND: Okay. The second comment.  
10 On the solar home verification does that -- I may  
11 have asked this before but does that follow the  
12 same first model on the sampling procedures where  
13 you have to do one model first, regardless of  
14 other features? Is it subject to all of that same  
15 criteria?

16 ADVISOR PENNINGTON: Yes.

17 MR. BACHAND: Okay, thank you.

18 MR. ARENT: John Arent, Architectural  
19 Energy. Just a point for completeness sake.  
20 There also is a new residential ACM software  
21 manual appendix on algorithms for calculating PV  
22 production. So this is in addition to the field  
23 verification procedures that are in the  
24 residential appendices.

25 This is mainly rules for interfacing

1 with a software calculation module which is  
2 publicly available algorithms for estimating  
3 annual electricity production of the photovoltaic  
4 system, both in kilowatt hours and in TDV. It  
5 implements rules such as shading. Also those  
6 rules are contained in the New Solar Homes  
7 Partnership Guidebook but there is a new appendix  
8 on that. So I just thought I'd like to mention  
9 that.

10 MR. SHIRAKH: Ken.

11 MR. NITTLER: Ken Nittler with Enercomp.  
12 I like the organization, the concept of moving all  
13 these various appendices so that they're not  
14 specifically attached to the ACM manual, I think  
15 that's a great idea. I would just urge one small  
16 piece of caution. That often those appendices in  
17 fact contain information that is needed to program  
18 it correctly in the ACM.

19 So either some effort has to be made to  
20 find those things and move them back to the ACM or  
21 we need to make sure that things like that don't  
22 get deleted in future revisions. Because somebody  
23 will look at it and say, hey, that's not an  
24 eligibility criteria. And they'll zap it there  
25 and then suddenly we won't have it maintained in

1 the ACM.

2 ADVISOR PENNINGTON: Would it be  
3 possible for you to identify those places?

4 MR. NITTLER: Over time, sure. They're  
5 spread throughout is my point.

6 On the PV I just want to ask one  
7 question to make sure I continue to understand  
8 this correctly. There is no requirement that the  
9 ACM do those PV calculations and there is no  
10 requirement that the compliance documents  
11 generated by the ACM has to report that  
12 information.

13 MR. ELEY: The New Solar Homes  
14 Partnership capabilities are an optional  
15 capability for ACMS. That's where they reside  
16 right now. That means that you don't have to do  
17 it. It's just like any of the other optional  
18 capabilities.

19 MR. NITTLER: Okay.

20 ADVISOR PENNINGTON: We'll work with  
21 you, though.

22 MR. ELEY: I think we'd like for you to  
23 do it.

24 MR. STEVENS: Don Stevens, Panasonic. I  
25 just wanted to mention, several comments were made

1 about 62.2 and I wanted to reiterate what was said  
2 by Bruce, that the 2007 version is now the  
3 official version. It just was printed so it's  
4 fresh. And for those of you that are trying to  
5 figure out what this means to some extent, there  
6 is a 62.2 users manual that ASHRAE published, I'm  
7 one of the authors of it, and it is available  
8 through ASHRAE.

9 One piece I should mention too. As  
10 often happens when a standard is referenced in  
11 another standard such as this, this is a \$45  
12 document. This is ASHRAE 62.2. So I would  
13 suggest that as you look forward to these things  
14 that you figure out a way to be able to provide  
15 the information to the people without them having  
16 to go out and buy this necessarily. Certainly the  
17 raters or the folks doing simulation work ought to  
18 do it but the builders are not going to want to go  
19 spend 45 bucks for it.

20 MR. SHIRAKH: Provide discount coupons.

21 ADVISOR PENNINGTON: I thought you were  
22 going to say the opposite so that's very  
23 interesting.

24 MR. WILCOX: He's going to be expelled  
25 from ASHRAE at the meeting next week.

1                   MR. STEVENS: You can't copy it. I know  
2 Bruce will figure out a way.

3                   MR. BACHAND: I'm almost done, I  
4 promise. Ken Nittler's point brought up a  
5 question in my mind. As I understand it right now  
6 the ACM is a ruling document. So is moving these  
7 out of that, is that going to change the authority  
8 or the rulingness of these? These are standards  
9 level also?

10                  MR. ELEY: These are part of the  
11 rulemaking just like the ACM.

12                  MR. BACHAND: Okay.

13                  ADVISOR PENNINGTON: Very good.

14                  MR. BACHAND: Thank you.

15                  MR. SHIRAKH: Any other? Martyn.

16                  MR. DODD: I'll make it very quick. I  
17 guess you guys came out with residential appendix  
18 RC which is required descriptives and references.  
19 And what you're saying in there is, whenever  
20 somebody takes credit for a special feature here  
21 is the descriptor, here is the message that has to  
22 appear on the certificate of compliance.

23                  MR. ELEY: Right.

24                  MR. DODD: That's a good thing, I like  
25 it and we should standardize across all the

1 software that we all use the same messages. That  
2 way building departments see the same things.

3 And I'd like to encourage that we do the  
4 same thing on the nonresidential, pull all that  
5 stuff out of the nonresidential and do an appendix  
6 and have the same thing. And that way all those  
7 sort of tools we put the same messages.

8 Sorry to add work to your load here.

9 ADVISOR PENNINGTON: I don't quite  
10 understand, Martyn. What are you speaking of?

11 MR. DODD: This is Appendix RC. So what  
12 we've got here, it's called Special Features. It  
13 lists required descriptors and references to  
14 document the CF-1R special features. So what  
15 we're all doing, Ken and I are using similar  
16 messages right now on our residential software  
17 tools to document when somebody has taken  
18 advantage of a special feature, to list that for  
19 the building department.

20 And the nonresidential manual is a  
21 little bit more vague about that it. It says,  
22 well if somebody has put in the SHGC less than .4  
23 then you need to note that on the, on the  
24 certificate of compliance. So I'd like to see the  
25 same format brought into the nonresidential ACM

1 manual so that we have the specific requirements  
2 on what needs to be said on the certificates.

3 MR. SHIRAKH: Any other questions?  
4 Mike.

5 MR. HODGSON: Mike Hodgson, CBIA. I was  
6 just making my list, I apologize, it took me  
7 awhile. I request is that we have had a series of  
8 residential appendices placed on the website I  
9 think every day for the last five days. And at  
10 the bottom -- and the way you're tracking changes  
11 is in red, which I appreciate, but I can't tell  
12 the difference between June 11, June 12, June 13  
13 and June 15. And if there are any because we  
14 can't tell, because --

15 MR. SHIRAKH: We weren't really changing  
16 the documents, we were just adding more chapters.

17 MR. HODGSON: Okay. But when there is a  
18 date change if you could just put a footer on one  
19 of these to say, this is the version of the 11th.  
20 And then when we change -- I know you can't track  
21 changes in different colors because, you know,  
22 we've got 45 different changes on 45 different  
23 versions. But I printed things on Sunday/Monday  
24 and I'm out of date on Friday and I'm not sure  
25 where I'm out of date. But just in general, it

1 would be very helpful if we could date these as  
2 they occur.

3 MR. ELEY: I don't think we actually  
4 changed the documents.

5 MR. SHIRAKH: We didn't change the  
6 documents.

7 MR. HODGSON: Okay.

8 MR. ELEY: But some of the ones that  
9 went up later weren't there before.

10 MR. HODGSON: Okay. But then --

11 MR. SHIRAKH: The documents that we  
12 posted stayed the same.

13 MR. HODGSON: Okay.

14 MR. SHIRAKH: But there were some that  
15 we were still working on and later they were  
16 added. But the ones that were --

17 MR. HODGSON: But there's upload dates  
18 on for example HVAC sizing, of June 15.

19 MR. SHIRAKH: You have to look at  
20 there's a rev number after. When you look on the  
21 web there's a --

22 MR. HODGSON: Yes.

23 MR. SHIRAKH: If the rev number doesn't  
24 change it means the document hasn't changed.

25 MR. HODGSON: Regardless of the date.

1 MR. SHIRAKH: Right.

2 MR. HODGSON: Okay. I'll try to --

3 MR. SHIRAKH: So I think what happened  
4 was --

5 MR. HODGSON: I'll try to pay more  
6 attention, I apologize.

7 MR. SHIRAKH: -- as we were giving them  
8 more documents they updated the date but it  
9 doesn't really mean that the documents were  
10 changed.

11 MR. HODGSON: Okay. Then maybe in a  
12 footnote put the rev number.

13 MR. SHIRAKH: Okay.

14 MR. HODGSON: Just so that we can track  
15 them, that's all.

16 MR. SHIRAKH: The rev numbers are on the  
17 web. The link that we have --

18 MR. HODGSON: I've seen that, Mazi.  
19 Just once you print it you kind of lose that  
20 linkage, that's all.

21 MR. SHIRAKH: Maybe we can put it, okay.

22 MR. HODGSON: And some of us are still  
23 in the paper age and others of us are electronic.

24 MR. SHIRAKH: Okay.

25 MR. HODGSON: So just a comment. We've

1 made these comments before but just so we make  
2 sure they're on the record and I'm sure we're  
3 working towards resolution. In RA-1 on maximum,  
4 on HVAC sizing, we really would like to work with  
5 the Commission and staff and consultants on  
6 figuring out maximum cooling capacity. The one  
7 percent design reference on RA-1 2.3 indoor  
8 design. Excuse me, .4, outdoor design conditions,  
9 make this very impractical.

10 A simple example is in Sacramento the  
11 one percent design temperature is 98 degrees.  
12 There is no HVAC subcontractor that we're aware of  
13 that designs in Sacramento to 98 degrees that is  
14 still in business. If you went to the .1 percent  
15 you would be at 105 which is our design  
16 temperature, 105, 106, depending upon where you  
17 are in Sacramento, it's a local condition.

18 I am not sure what the resolution to  
19 this is. For example, not referencing a column at  
20 all and let the mechanical engineer choose that.  
21 And then that can be triggered somehow in the  
22 sizing calculation so then you can figure out what  
23 maximum capacity is. So we would like to make  
24 sure that issue is continually discussed and work  
25 with you.

1           On RA-2 on the home energy rating  
2 verification. We have had a series of  
3 conversations, and there's been a lot of language  
4 brought up on how the CF-6R and CF-4R will be  
5 eventually tracked and recorded. I am not sure  
6 that we have a good resolution to that. We have  
7 some language that we have been working on, we are  
8 not sure how practical it will be, especially  
9 since CF-6Rs and CF-4Rs are currently not very  
10 well used in the field.

11           So we just want to bring that issue up  
12 and work with the Energy Commission. We really  
13 think we need to bring CALBO into this discussion.  
14 They just were engaged on Wednesday but they  
15 really will be probably the key to the enforcement  
16 issue. And what we heard on Wednesday is what we  
17 all know, simple is better, and we're getting more  
18 complex. So we're going to have to figure that  
19 out and we want to do that.

20           On those lines there is also an issue  
21 that I don't think has been raised but has to do  
22 with rating verification. We have had some  
23 informal discussions. And that is that we have a  
24 series of raters filling out CF-6Rs, not signing  
25 them and having the builders sign them. And we

1 think in general as an industry what we want is  
2 the subcontractors to take responsibility for  
3 their own installations.

4 So we'd like to avoid having CF-6Rs  
5 being filled out by the HERS rating industry. And  
6 I think we've talked to the providers in general  
7 terms and they're in agreement with this. So that  
8 the responsibility, for example, for putting in  
9 tight ducts should be a subcontractor  
10 responsibility and the HERS verification  
11 responsibility is a third party verification, not  
12 both.

13 And we think that's a bit of a conflict  
14 and we would like to work on RA-2-8.1 builder  
15 responsibilities with the Commission and staff for  
16 clarification. Thank you.

17 MR. SHIRAKH: Thank you, Mike.

18 ADVISOR PENNINGTON: Thanks for your  
19 help, Mike.

20 MR. SHIRAKH: We'll be continuing to  
21 work on all of these appendices and documents  
22 through the rulemaking. And we know there's a lot  
23 of work that still needs to be done. Any other  
24 questions or comments related to --

25 MR. BLUM: What I have to say does not

1 exactly fit in here and what you're doing is  
2 wonderful. But I am also a mechanical engineer  
3 and I built one house, it was my own house. I did  
4 the calculations. I looked into energy, you know.  
5 As in Europe I had to specify the rating under  
6 each window, you know, and then coming out with a  
7 furnace. I had also here in my business ASHRAE  
8 and I paid \$88,000, came out with a program how  
9 you can calculate it. It was a good program but  
10 it was not quite right. It proved in practice it  
11 was not workable, you know.

12           What I simply found out has nothing to  
13 do with this but for my practice. Here in  
14 California any house in the morning when you wake  
15 up, summer as winter, it is mostly around 50  
16 degrees. Even if you open the window. Maybe not  
17 in the winter time. In the evening your house  
18 will be -- that's where I came with that 90.  
19 Ninety degrees, that's what I also found out So  
20 we look at a solar heat gain of 40 degrees.

21           When you consider 50 percent goes  
22 through windows and sliders and you cut that off,  
23 you cut your 40 degrees in half. That means 50  
24 plus 20 is 70. And that's very simple and works  
25 all the time. And when you have no exterior

1 shading, which is something which is not subject  
2 here and is not anything you can do about it, I  
3 see that. But that has a potential of 10 to 40  
4 degrees.

5           And here is another factor which is a  
6 given thing. We start to suffer at least from 80  
7 on but not more than up to 90 but we cannot live  
8 in that vicinity. So we only dealing practically  
9 with just ten degrees. And ten degrees with  
10 exterior shading or maybe better windows or  
11 whatever, you know, or having a tree, having a  
12 bamboo shade. Everything is possible if you work  
13 on this energy coming into the house.

14           And the easiest thing is to work on the  
15 windows, you know. There is already a handle  
16 there. You know they are on the market. You have  
17 the awning, you have the sunscreens, we have the  
18 rolling shutters, and here is something new. A  
19 rolling shutter is a brand new one on the market  
20 which allows that 60 percent of the exterior light  
21 is coming in as well the visibility and you can  
22 shut it down to pitch dark. That's a very tiny  
23 slit in rolled form.

24           I do not want to go into the technique  
25 but I am the only one, I think, here in this

1 country who has a sample. So if somebody wants to  
2 see it you have to come and visit me in San Jose.  
3 Okay, thank you.

4 MR. SHIRAKH: Thank you so much. Any  
5 other comments before?

6 MR. MCKINNEY: Max McKinney with Energy  
7 Analysis and Comfort Solutions. In regards to  
8 Mike's comment earlier about raters helping  
9 contractors fill out CF-6Rs. A small  
10 clarification.

11 The difference between new construction  
12 and retrofit is a very large difference. There's  
13 some really good HVAC contractors, they just don't  
14 know how to fill out paperwork correctly. And a  
15 HERS rater doing a 100 percent testing with them  
16 should be able to coach, help and get them filled  
17 out correctly so that the information that  
18 eventually comes to the state is correct.

19 I have seen thousands upon thousands of  
20 documents that were just disasters and I had to go  
21 back and help the contractors redo them correctly  
22 so that the information provided to the providers  
23 was correct and accurate. So new construction/  
24 retros, two different worlds but there's really no  
25 way to get contractors to know and understand

1 unless a rater actually holds their hand and walks  
2 them through the process.

3 MR. SHIRAKH: Thank you for that  
4 clarification. So now we're going to move to the  
5 public commenting. And we have one and he has  
6 promised to be brief because we're all hungry.  
7 It's Jon McHugh.

8 MR. MCHUGH: This happened to me last  
9 time when I was the last person to talk.

10 I'm just going to briefly talk about the  
11 issue associated with SEER and EER. Basically the  
12 primary crux of the issue is that taking a look at  
13 both the ARI database and the California Energy  
14 Commission database there is a tiny fraction of  
15 models that have -- this doesn't seem to be  
16 working very well. A tiny fraction of models that  
17 have EERs that are less than 11 and the default is  
18 to use EER 10.

19 So here's a table looking at just that  
20 information, the EERs for SEER 13 air  
21 conditioners. So what you see is that, for  
22 instance, that in the CEC database and also in the  
23 ARI database about ten percent of listed units  
24 have EERs that are less than 11. So what that is  
25 saying is that for 90 percent of the models on the

1 market they are getting about a ten percent, a ten  
2 percent or more credit in terms of EER.

3 This seems to be excessive and I think  
4 it would make a lot more sense if we consider  
5 changing the equations in both the residential and  
6 nonresidential ACM. So the current equation  
7 basically draws a straight line and then at 11.5  
8 SEER it says that everything above SEER 11 is an  
9 EER 10.

10 You could do one of two things. One is  
11 that you could just keep that same equation and --  
12 I'm sorry. Okay. One way of dealing with this --  
13 I lost the equation. There we go. One way to  
14 deal with this is just to keep that straight line  
15 and limit the EER to where it hits SEER 13, which  
16 is at 11.25 essentially. Then that would put the  
17 results more in line with what the data is from  
18 the manufacturers.

19 ADVISOR PENNINGTON: I don't understand  
20 that.

21 MR. McHUGH: Okay, this equation --  
22 Actually I'm going to show, why don't I just show  
23 the picture of the data. So this is the first  
24 proposal that says, essentially right now what  
25 happens is we have a particular curve that as the

1 SEER increases the EER increases until you get to  
2 11.5 and then it maxes out at 10. that's the  
3 current default. So one proposal is to say, okay,  
4 I'm going to keep that same slope, go up to SEER  
5 13 and then limit the EER to 11.25. So that's one  
6 proposal.

7 ADVISOR PENNINGTON: Could I just  
8 comment on your drawing?

9 MR. McHUGH: Sure.

10 ADVISOR PENNINGTON: It looks like to me  
11 that there is, well. There's a whole bunch of  
12 models at SEER 13 that it's unpredictable what the  
13 EER will be from this information and the EER  
14 could be a wide range of differences.

15 A premise you might make is that the low  
16 cost models are the low EER models for given  
17 SEERs. And that in the absence of other things  
18 that the low cost models would tend to be the  
19 quote/unquote builder models and would tend to get  
20 high sales in the marketplace.

21 So if that premise is correct then I  
22 think what you're arguing is that you would not  
23 give any energy efficiency improvement for  
24 improving above the builders market, the builders  
25 model baseline but you'd have to go up to where

1 you're showing the green line.

2 MR. McHUGH: That's correct. We  
3 wouldn't ding anybody for having a lower EER, it's  
4 just that the credit doesn't apply.

5 ADVISOR PENNINGTON: And so that could  
6 actually reflect a lot of sales and it could  
7 reflect a lot of energy lost, savings lost, by not  
8 having an incentive for moving from the base  
9 builders model up to your green line. And so my  
10 concern is that unless you have information about  
11 sales you really don't know what the consequence  
12 is of what you're proposing. And that having data  
13 just based on models is not -- I don't feel like  
14 we have enough information to make a decision on  
15 it is my view.

16 MR. McHUGH: Right. So there's a couple  
17 of different ways you could look at this. One is  
18 that we might not be giving, is that there might  
19 be some systems that are having low market share.  
20 You know, the things on the bottom are essentially  
21 providing most of the market share. And that we  
22 should be giving credit to things that are, that  
23 we're getting some real savings out of.

24 So one way of looking at this is that,  
25 well, we don't give any credit to any SEER 13

1 piece of equipment and say we give credit to SEER  
2 14 and above. That's where you give the credit.  
3 That's one way of dealing with it.

4 Another way is -- I have some feelers  
5 out to people who have survey information.  
6 Actually this comes back to the question I had  
7 earlier which is this survey of air conditioners  
8 that Rick Chitwood -- I understand that -- Bruce,  
9 was this the kind of information that was  
10 collected as part of this building survey and are  
11 these buildings somehow special that they're high  
12 efficiency buildings?

13 MR. WILCOX: No, these were intended to  
14 be typical buildings that are not high efficiency  
15 at all. We do have the model numbers of the air  
16 conditioning units but we have not looked up the  
17 EERs or anything.

18 MR. McHUGH: Okay.

19 MR. WILCOX: And we are -- In particular  
20 the survey is not a random sample so it does not  
21 provide -- It's not intended to be a statistically  
22 valid sample.

23 MR. McHUGH: But potentially it's maybe  
24 something that we could make use of unless you're  
25 looking for some higher level of accuracy.

1           ADVISOR PENNINGTON: Well I'm worried  
2           that the distribution for sales is way different  
3           than the distribution for models. I might be  
4           wrong. I've been worried about this for a long  
5           time and, you know, no one cares. But, you know,  
6           until we get the data I'm concerned about it.

7           MR. WILCOX: Can PG&E supply data on  
8           sales by model or instances by model in their  
9           rebate programs or something? Who else is going  
10          to be able to supply that data?

11          MR. McHUGH: I guess that's the same  
12          issue as the rebate programs are incentivizing  
13          higher EER equipment. So that's probably not that  
14          useful, is it?

15          MR. WILCOX: I don't know.

16          MR. McHUGH: Anyway, we'll do some more  
17          work looking, try to work with the M&B teams and  
18          see if we can find something. And it's great that  
19          you have made this comment. And I believe you've  
20          made the same comment via e-mail so I'll try to  
21          circulate that to the interested parties and see  
22          if we can get some resolution.

23          MR. WILCOX: Jon, can I ask you a  
24          question? The loophole you're talking about here  
25          is you think there's too much credit for the

1 higher EER units. Is that what you're trying to  
2 say?

3 MR. MCHUGH: Exactly, yes. So if, you  
4 know, if model number is even reasonably  
5 associated with or model values are reasonably  
6 associated with the amount of products that are  
7 sold we're giving a disproportionate amount of  
8 credit for something that is already just sort of  
9 the standard condition. This was actually brought  
10 up to me by Jeff Hirsch early on. He said, you  
11 know, that a lot of these --

12 ADVISOR PENNINGTON: Yes, I've had a  
13 discussion with Jeff about that.

14 MR. MCHUGH: The same thing. So we're  
15 trying to follow up on that comment and make sure  
16 that we're not just, you know. For instance, let  
17 me just show the other proposal. Which instead of  
18 going up to 11.25 says we essentially changed the  
19 slope of the curve slightly. Here's a big, thick  
20 image. And the proposal would be to limit that to  
21 EER 11. So if you have an 11.5 unit you still get  
22 a five percent. But we're not giving 15 percent  
23 credit for having a unit that's the upper half or  
24 the top 20 percentile unit. Thank you.

25 MR. SHIRAKH: Any questions for Jon?

1 Mike, you have a --

2 MR. BACHAND: No, I don't have a  
3 question for Jon, I have a comment.

4 MR. SHIRAKH: Okay.

5 MR. BACHAND: Mike Bachand again. In  
6 the alterations market we've got options one, two  
7 and three on the --

8 ADVISOR PENNINGTON: Are you talking  
9 about this?

10 MR. BACHAND: No, I'm not talking about  
11 this, this is off topic.

12 ADVISOR PENNINGTON: Okay, before you go  
13 to that. I wonder, Mike, if you have any views  
14 about this comment, this suggestion that Jon is  
15 making? Maybe you don't.

16 MR. HODGSON: Which one?

17 ADVISOR PENNINGTON: I wonder if you  
18 didn't -- What Jon was recommending, he's made a  
19 proposal here.

20 MR. BACHAND: Are you talking to Mike  
21 Hodgson?

22 ADVISOR PENNINGTON: Yes I am.

23 MR. HODGSON: Okay.

24 ADVISOR PENNINGTON: Sorry, I'm sorry.

25 MR. HODGSON: That's what we were

1 asking, which Mike?

2 ADVISOR PENNINGTON: Which Mike, okay,  
3 got you. Sorry.

4 MR. BACHAND: We happen to be in line at  
5 the moment. One of the few times.

6 ADVISOR PENNINGTON: You know, one of  
7 the things I'm concerned about is what is the  
8 builders model, quote/unquote, you know. What is  
9 the market share of products at the low end of the  
10 EER range. Is there value in trying to incent  
11 models that are between 10 and 11 EER because  
12 that's an attractive realm to be in, if you  
13 understand. That might be a low cost purchase of  
14 energy efficiency in that range. And it kind of  
15 depends on where, you know, what's the baseline  
16 condition that's going on for builders.

17 MR. HODGSON: Well in our design  
18 experience what we try to do is get large builders  
19 who have national contracts to specify, we never  
20 call them the low end of the market, it's the good  
21 end of the market.

22 ADVISOR PENNINGTON: Sure.

23 MR. HODGSON: To purchase 13 SEERs, 11  
24 EERs, from large manufacturers who have good  
25 warranties. We can look, we can take a look at

1       our design data and I would say the production  
2       builders building 80 percent of the market and  
3       that share is growing right now because of how the  
4       market dynamics are working. So I would think  
5       that obviously drives the volume of those units.

6               Now do all production builders specify  
7       carefully 11 EERs and take advantage of that in  
8       their compliance work, I think the answer is no.  
9       So I don't think the majority of equipment out  
10      there has the, let's say higher 11 EER value to it  
11      but I honestly don't know. What we could do is do  
12      a survey of our work in the last year or other  
13      large mechanical subcontractors and see what's  
14      specified.

15              There's a lot of units that are not 11  
16      EER that are in the market and we try to pull them  
17      up to the 11 EER or greater. We find that the  
18      incremental cost increases substantially above 11  
19      and so that's where it gets a little bit more  
20      interesting. And what we want to do is get them  
21      from the 10s to the 11s.

22              I don't know if there are any 10.0s out  
23      there, honestly, but we do see 10.2s, 10.3s,  
24      10.5s, 10.7s all the time. I just don't know what  
25      market share they have. But we could -- I think

1 if you did four or five large HVAC design firms  
2 you could get a fairly representative sample.

3 I wasn't -- I apologize, I wasn't paying  
4 100 percent attention as to whether or not that  
5 credit would go away in this proposal.

6 MR. WILCOX: Yes, that is the issue.

7 MR. HODGSON: Yes. And I think you're  
8 probably a little premature to have that happen  
9 until the market hits 11. And if you had a 90, 80  
10 percent saturation on 11 then okay, then let's go  
11 to 12. But I think the question is, what is the  
12 market. Off the top of my head I can't give you  
13 an answer but we could look.

14 MR. SHIRAKH: Can you look and let us  
15 know then?

16 MR. HODGSON: Sure. I think you would  
17 probably want to, we could work real quickly on  
18 doing a quick survey for, you know, five or six  
19 big HVAC -- you know, some C-20s and some  
20 mechanical design firms. Just send the question  
21 out to them then you'd have to multiply it.

22 Bill, I think your point is you'd need  
23 to multiply it by volume of purchase. Because  
24 this I think was a representation of  
25 manufacturers' data, right? And that really

1 doesn't reflect market. Okay. I'd be happy to  
2 help on that.

3 ADVISOR PENNINGTON: Thank you.

4 MR. SHIRAKH: Mike.

5 MR. HODGSON: Pay more attention.

6 MR. BACHAND: He was asleep during that.  
7 Okay. This is off topic but I wanted to find out.  
8 I don't know if the options one, two and three  
9 that are famously known in the alterations market  
10 as Table 8-3, they are in the res manual but is  
11 that part of standards or part of ACM? A, that's  
12 the first question. And the second --

13 ADVISOR PENNINGTON: What? Say it  
14 again.

15 MR. BACHAND: The options, the duct  
16 exemption options where we put in a .92 furnace in  
17 Sacramento.

18 MR. SHIRAKH: We have tradeoffs against  
19 higher efficiency equipment.

20 MR. BACHAND: Those are tradeoffs.

21 MR. SHIRAKH: That's just strictly  
22 something in the residential compliance manual.

23 MR. BACHAND: It's not an appropriate --

24 MR. SHIRAKH: It's not in the standards.  
25 That's something we put in the manual afterwards.

1                   MR. BACHAND: Okay. So are those issues  
2 being addressed --

3                   ADVISOR PENNINGTON: So those tradeoffs  
4 are no longer relevant because we're changing  
5 the --

6                   MR. SHIRAKH: Baseline.

7                   ADVISOR PENNINGTON: -- the baseline.  
8 So those, you know, if you were going to have such  
9 things you'd have to reconfigure them, redetermine  
10 them.

11                  MR. SHIRAKH: Chances are the table will  
12 be gone from the 2008 standards.

13                  MR. BACHAND: I'll put up a little yay.

14                  MR. SHIRAKH: Okay.

15                  MR. BACHAND: Thank you.

16                  MR. SHIRAKH: Any other public comment?

17                  ADVISOR PENNINGTON: We had two little  
18 yays back there somewhere.

19                  MR. SHIRAKH: Okay.

20                  MR. ELEY: Usually everybody cheers.

21                  MR. NITTLER (FROM THE AUDIENCE): Don't  
22 they have to (inaudible)?

23                  ADVISOR PENNINGTON: Yes.

24                  MR. SHIRAKH: There are no other  
25 comments on the workshop today, I guess.

1                   It's one o'clock and we'll close the  
2       workshop. Thank you for coming.

3                   (Whereupon, at 1:01 p.m., the  
4       Committee Workshop was adjourned.)

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## CERTIFICATE OF REPORTER

I, RAMONA COTA, an Electronic Reporter, do hereby certify that I am a disinterested person herein; that I recorded the foregoing California Energy Committee Workshop; that it was thereafter transcribed into typewriting.

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

IN WITNESS WHEREOF, I have hereunto set my hand this 29th day of June, 2007.