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U.S. Department of Energy

Energy Conservation Test Procedures for  
Residential Furnaces

1:03 to 3:51 p.m.

Thursday, March 26, 2015

1000 Independence Avenue, S.W.

Room 8E-089

Washington, D.C. 20585

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

2 MR. BROOKMAN: Let's start. Good  
3 afternoon, everyone, and welcome. This is the  
4 Test Procedure Notice of Proposed Rulemaking for  
5 Furnaces and Boilers. Today is March 26th, 2015,  
6 here in the Forestal Building in Washington, D.C.  
7 Good to see you here this afternoon. My name is  
8 Doug Brookman, Public Solutions, Baltimore.  
9 We're going to start with welcoming remarks from  
10 Ashley Armstrong.

11 MS. ARMSTRONG: Hi, everyone. I'd just  
12 like to welcome you to the Department to talk  
13 about the proposed test methods for furnaces and  
14 boilers. Obviously, we welcome everyone today to  
15 not only hear an overview of our proposed method,  
16 but really we're here for a dialog. So we hope  
17 that you ask questions, give us comments, give us  
18 feedback on our proposal, as we really value your  
19 feedback. So thank you for taking the time to  
20 come.

21 MR. BROOKMAN: And we always start with  
22 introductions. Beginning to my immediate left

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1 and looking over there toward Frank Stanonik.

2 MR. STANONIK: Frank Stanonik, AHRI.

3 MR. BROOKMAN: Thank you.

4 And your microphone is on. And if you  
5 can get used to turning it on and off.

6 And you're next, sir.

7 MR. KLEISS: Jeff Kleiss, Lochinvar.

8 MR. BROOKMAN: Thank you.

9 MS. JENSEN: Elizabeth Jensen, Department  
10 of Justice.

11 MS. JAKOBS: Diane Jakobs, Rheem.

12 MR. KREBS: Mark Krebs, the Laclede Group.

13 MR. BROOKMAN: Thank you.

14 MR. WINNINGHAM: Dave Winningham, Allied  
15 Air.

16 MR. VERSHAW: Jim VerShaw, Ingersoll  
17 Rand.

18 MR. MATA: Ramiro Mata, CSA Group.

19 MS. COCHRANE: Rosalyn Cochrane, Natural  
20 Resources, Canada.

21 MR. BROOKMAN: Thank you.

22 MR. HUNT: Marshall Hunt, Pacific Gas and

1 Electric Company.

2 MR. STAS: Eric Stas, DOE General  
3 Counsel's Office.

4 MS. ARMSTRONG: Ashley Armstrong, DOE.

5 MR. BROOKMAN: Please, Greg.

6 MR. ROSENQUIST: Greg Rosenquist,  
7 Lawrence Berkeley National Laboratory.

8 THE COURT REPORTER: Do you have a  
9 microphone?

10 MR. BROOKMAN: No, it's okay. We'll just  
11 --

12 THE COURT REPORTER: Fill it in.

13 MR. BROOKMAN: Yes.

14 MR. FRANCO: Victor Franco, Lawrence  
15 Berkeley National Laboratory.

16 MR. DILLON: Ross Dillon, Lawrence  
17 Berkeley National Laboratory.

18 MR. DARLINGTON: Adam Darlington,  
19 Navigant Consulting.

20 MS. RIVEST: Catherine Rivest, Navigant  
21 Consulting.

22 MR. McCABE: Michael McCabe, representing

1 myself.

2 MR. YILMAZ: Ayk Yilmaz, AHRI.

3 MS. MEDEPALLI: Sarah Medepalli, ICF  
4 International, on behalf of EPA ENERGY STAR.

5 MR. MCCRUDDEN: Charlie McCrudden, Air  
6 Conditioning Contractors of America.

7 MR. WHITE: Charles White with the  
8 Plumbing Heating Cooling Contractors National  
9 Association.

10 MR. LIN: Paul Lin with the Regal Beloit  
11 Corporation.

12 MR. BROOKMAN: Okay. Thank you. Thanks  
13 to all of you. Did everyone get a chance to  
14 introduce him or herself? I guess so. Okay.

15 All of you, hopefully, received a packet  
16 of information. This packet of information has  
17 the content that we hope to go through in  
18 considerable detail this afternoon. On page 1 of  
19 the packet is the agenda. Immediately following  
20 this overview, there's an opportunity for  
21 individuals that wish to make opening remarks --  
22 we hope brief summary remarks about key issues,

1 from your perspective.

2           Moving from there, we'll have  
3 presentation and the opportunity for comment.  
4 We're going to hear about regulatory history and  
5 the rulemaking overview. Moving on from there,  
6 the proposed DOE test procedure changes related  
7 to ASHRAE 103. We'll take a break mid-afternoon  
8 round about 2:30 or so.

9           Returning from the break, other proposed  
10 test procedure changes. And then at the end of  
11 the day, whenever we get there, another  
12 opportunity for remarks, closing comments,  
13 summary statements, things you don't think have  
14 been covered sufficiently during the course of  
15 this meeting. That's the general plan for today.

16           Questions and comments about the agenda?

17           (No audible response.)

18           MR. BROOKMAN: I'd ask for your  
19 consideration. Please speak one at a time. And  
20 if you'd say your name each time you speak, as  
21 you get used to turning the microphone on and  
22 off, please say your name so that we have a

1 complete record of this meeting. There will be a  
2 transcript made available to all.

3 If you could limit sidebar conversations  
4 and turn your cell phones on mute, that would be  
5 helpful. And we welcome everyone joining us via  
6 the Web. How many folks via the Web, about?

7 EMILY: Twenty-five.

8 MR. BROOKMAN: Twenty-five via the Web.  
9 That's a lot of saved airfare.

10 (Laughter.)

11 MR. BROOKMAN: That's wonderful. The  
12 Department of Energy is trying hard to make sure  
13 that these meetings are totally accessible to all  
14 via the Web. If all of you joining via the Web  
15 could keep your telephones on mute, and if you  
16 raise your hand via the software provided, we can  
17 un-mute you and we ought to be able to hear you  
18 in the room, so you can participate in this  
19 conversation along with everyone else.

20 And finally, one more thing. The  
21 Department of Energy encourages all, in addition  
22 to your responses, your comments here today, to

1 submit written comments. And I'm saying that  
2 specifically because that applies to those  
3 joining us via the Web as well. Please make  
4 certain, if you're joining us via the Web, that  
5 you submit your comments. And Ashley Armstrong  
6 will be describing how that gets done as we  
7 proceed.

8           So now we're going to go to the next  
9 slides, the purpose of public meetings.

10           MS. ARMSTRONG: I'm just going to skip  
11 some, because you kind of already said them.

12           The purpose of the public meetings  
13 generally is for us to describe our proposed  
14 methods, at least at a high-level overview. But  
15 really, we're looking for your feedback, both  
16 questions and comments. Whether there are  
17 ambiguities or you have certain concerns, please  
18 feel free to speak up during any part of the  
19 presentation today.

20           You will notice that there are certain  
21 comment boxes throughout today's presentation,  
22 where we specifically are seeking your comment on

1 certain issues, as we have teed them up  
2 throughout the presentation, as well as we have  
3 teed them up in the notice itself. But  
4 obviously, your comments are welcome on any part  
5 of the proposal, as well as any part during the  
6 day of the presentation. They're not limited to  
7 those here.

8           So at this time, I'm going to turn it  
9 back to you in case anybody wants to make opening  
10 remarks. You're welcome to do so at this time.

11           MR. BROOKMAN: Remarks here at the  
12 outset?

13           (No audible response.)

14           MR. BROOKMAN: No? No comments here at  
15 the outset?

16           (No audible response.)

17           MR. BROOKMAN: Okay. Then we're going to  
18 go straight into the content in the packet.

19           MS. ARMSTRONG: All right. Moving right  
20 along. So, just a brief overview of history,  
21 kind of how we got there. The statute authorizes  
22 or created the program, the Energy Standards

1 Program, as well as the Test Procedure Program,  
2 and it includes furnaces and boilers. It directs  
3 DOE to not only establish, but to consider  
4 revisions and updates to its test procedures over  
5 a certain period of time.

6 EISA 2007 was amended, directed DOE to  
7 incorporate standby and off mode. And we did  
8 develop a test procedure that did just that back  
9 in September of 2009. So this just gives a  
10 little bit of overview of the history of how we  
11 got here.

12 In 1997, DOE established a final rule  
13 that adapted generally ASHRAE Standard 103-1993  
14 as the test procedure for furnaces and boilers.  
15 Over the years, DOE has made subsequent  
16 amendments, you can see them on the slides,  
17 through different final rules, some being for  
18 standby and off, others being clarifications of  
19 certain methods that were in the Department's  
20 test procedure.

21 We officially kicked this rulemaking off  
22 with a request for information back in January

1 2013. Many of the proposals you're going to see  
2 and hear about today are in response to some of  
3 the comments that we got and the key issues that  
4 were raised by stakeholders in response to that  
5 request for information.

6           And then, I just want to note that DOE is  
7 conducting this rulemaking to satisfy its  
8 requirements under the seven-year look-back that  
9 requires DOE to revise -- review and potentially  
10 revise its test procedures once every seven  
11 years. So that will satisfy this provision.

12           So with that, some key dates you might be  
13 wondering about. Right now, we're at the  
14 proposed rule stage. As I noted, we kicked the  
15 rule off with a request for information. Today  
16 is the public meeting, and the comment period  
17 closes on May 26th. We do expect to issue a  
18 final rule sometime later this year, probably  
19 towards the end of this year. Consider it a  
20 holiday present for you guys. And we look  
21 forward to getting your comments toward the end  
22 of May. So, yep.

1 MR. BROOKMAN: Frank Stanonik.

2 MR. STANONIK: Frank Stanonik, AHRI.

3 All right. Two questions and, well, one  
4 specifically related to this last side. But let  
5 me first ask. Okay, so the amendments that were  
6 in July 2013, I just want to confirm this.  
7 Obviously, all of that was not something that was  
8 in ASHRAE 103. So it is, those amendments are  
9 being repeated in the NOPR here, right?

10 MS. ARMSTRONG: Correct.

11 MR. STANONIK: I just wanted to confirm.  
12 Okay.

13 And then the other question, on the  
14 schedule here, again, maybe asking an obvious  
15 question. But so, with this schedule, having the  
16 final rule finished by the end of the year, this  
17 would clearly indicate that it is DOE's intent  
18 that this revised test procedure will be used for  
19 both the ongoing residential furnace and  
20 residential boiler rulemakings, correct?

21 MS. ARMSTRONG: That is correct. Thank  
22 you.

1 MR. BROOKMAN: Yes, please, Jim.

2 MR. VERSHAW: Jim VerShaw, Ingersoll  
3 Rand.

4 It looks like the rest of the program can  
5 be pretty technical. So I want to ask about  
6 regulatory burden. And did you consider the  
7 regulatory burden issues that this will bring in?  
8 If you're bringing in a change to the AFUE test  
9 procedure that goes into effect the middle of  
10 2016, right on top of that time we're trying to  
11 redesign and do testing for FER [fan efficiency  
12 rating] right on top of doing all of the  
13 commercial air conditioning and all of the other  
14 things.

15 It just seems like one thing right after  
16 another, and this is just one more thing that  
17 we're going to have to retest all of our products  
18 for.

19 MS. ARMSTRONG: So I think we can talk  
20 about that today. I think that's something we'd  
21 like your feedback on in terms of, are you going  
22 to need to retest all your products? Are you

1 testing to ASHRAE 103-1993 now? Are you testing  
2 towards to the new version?

3 MR. VERSHAW: Well, we're testing to the  
4 CFR [Code of Federal Regulations], whatever the  
5 numbers are.

6 MS. ARMSTRONG: You've been trained.

7 (Laughter.)

8 MS. ARMSTRONG: That's the right  
9 response, Jim.

10 (Laughter.)

11 MS. ARMSTRONG: I think DOE has gotten  
12 some feedback that some people have moved to  
13 ASHRAE [standard]. That's not, you know -- and  
14 we were strongly urged to consider moving to the  
15 new ASHRAE to keep up with industry, for a  
16 variety of different reasons.

17 So, obviously, we would look for your  
18 feedback on that. If there are certain aspects  
19 that you believe -- you know --

20 MR. VERSHAW: Well, just let me say one  
21 thing. If we're going to change the rounding  
22 rules from a whole number to a tenth, and we have

1 to have statistically -- data that statistically  
2 gives us the rating point rounded to the nearest  
3 tenth, I probably don't have numbers in the files  
4 that when I test the new procedure will give me  
5 exactly that number.

6 MS. ARMSTRONG: Okay.

7 MR. VERSHAW: So therefore, it seems it  
8 behooves us, we'd have to retest everything.

9 MS. ARMSTRONG: Okay. So I think that's  
10 great feedback.

11 MR. VERSHAW: Yeah. Okay.

12 MR. BROOKMAN: And, Jim, would you go  
13 further now, or maybe in your written comments,  
14 about suggesting what DOE might do about this  
15 condition the industry is in?

16 MR. VERSHAW: Well, if I had my -- if I  
17 was in charge, I would make this effective with  
18 the next change to the AFUE for furnaces.

19 MR. BROOKMAN: Okay.

20 MS. ARMSTRONG: So the one that's -- so  
21 concurrent with --

22 MR. VERSHAW: The one that we're going to

1 talk about tomorrow.

2 MS. ARMSTRONG: Okay. That clarifies.

3 Thank you. Okay.

4 MR. BROOKMAN: Thanks, Jim.

5 And, Diane, you wish to comment here?

6 MS. JAKOBS: Well, so this is Diane  
7 Jakobs from Rheem.

8 And we were just talking about, I think  
9 that --

10 MR. BROOKMAN: Is your microphone on?

11 MS. JAKOBS: The light is on.

12 MR. BROOKMAN: Great. Okay. Thank you.

13 MS. JAKOBS: Okay. We were just talking  
14 about whether we would -- are we required to  
15 test? Because there was a line in the NOPR about  
16 that they thought it -- you know, that you  
17 thought it would only change the AFUE slightly,  
18 but it wouldn't be on products that were minimum  
19 efficiency.

20 So, I specifically looked at the timing  
21 for collecting condensate, and on one sample, we  
22 lost 0.5 percent AFUE. So, you know, that's kind

1 of within the realm of manufacturing tolerances.  
2 Is that your expectation that we would test  
3 everything? It's kind of -- I mean, if we could  
4 do AEDM's [alternative efficiency determination  
5 methods], we could come up with some good numbers  
6 that we could be verified against. And it would  
7 be -- you know, there wouldn't be a problem. But  
8 are we, you know, required to have specific test  
9 data with specific calculations, you know, that  
10 are in the current test procedure? Thank you.

11 MS. ARMSTRONG: So, I'm going to table  
12 the question and get back to it this afternoon  
13 after I hear the discussion about, you know, the  
14 proposed impacts and potentially some of the  
15 feedback we might get on what the proposed  
16 changes may or may not do to your products.

17 As we presented in the NOPR, we did test  
18 a subset of products to kind of get to our  
19 answers. And generally speaking, we found that  
20 we believe the current readings would more or  
21 less be substantiated, and it would not affect  
22 compliance with standards.

1           Now, that being said, we are here today  
2 to talk about that. So as we go through the  
3 proposals, let me listen to the feedback. And  
4 then let me tee up your question towards the end  
5 of the day. And please ping me if we haven't  
6 gotten there by the end of the day. Okay?

7           MR. BROOKMAN: Thank you.

8           So, some productive conversation already.

9           Yes, Diane, please.

10          MS. JAKOBS: I have just one other issue,  
11 and I was telling Doug that my company uses a  
12 program that was developed by NIST [the National  
13 Institute of Standards and Technology]. And I've  
14 been on the ASHRAE 103 committee for 15 years, I  
15 think. And I don't think there's a program  
16 available for these updates. And I've been  
17 through ASHRAE 103, and it's very complicated.  
18 And the NIST one is written in Fortran, and only  
19 old people like me know, you know, are familiar  
20 with programming in Fortran.

21           (Laughter.)

22          MS. JAKOBS: So it's kind of -- it's an

1 old, old program. So, I'm a little bit  
2 concerned. My first concern would be anyone  
3 checking our equipment, would they be using the  
4 same program? And then, the level playing field  
5 that all my -- you know, all my competitors would  
6 also be making the same assumptions and have the  
7 same program?

8           And things that seem completely obvious  
9 to me, when I go to an ASHRAE meeting people  
10 disagree with me. So, my feeling is that people  
11 will interpret the equations in the standard  
12 maybe differently when they programmed them. So  
13 that's a concern, that there's no program that  
14 reflects these changes.

15           MR. BROOKMAN: Okay. Thank you, Diane.

16           Yes, Mark.

17           MR. KREBS: My main concern and reason  
18 for coming here is pretty similar to that of  
19 several manufacturers, some of whom have already  
20 spoken up, regarding what seems to me to be, you  
21 know, a big rush in the fact that we have this  
22 test procedure going forward at the same time as

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1 the NOPR for the furnaces [standard].

2           And at the bottom of page 11 of the pre-  
3 Federal Register publication, it says, "DOE has  
4 tentatively determined that the proposed test  
5 procedure amendments would have a *de minimis*  
6 impact on the product's measured efficiency."

7           You know, and I would like to see how --  
8 I would like to see how that tentative  
9 determination has been made, because frankly,  
10 you're just asking us to trust you, is what it  
11 comes down to. Thank you.

12           MR. BROOKMAN: Okay. Thank you.

13           So, these amount to additions to our  
14 opening statements, opening remarks.

15           (Laughter.)

16           MR. BROOKMAN: Which is good. Which is  
17 what we were hoping to achieve with that.

18           Additional opening remarks as we then  
19 move on to proceed with the content here in the  
20 packet?

21           (No audible response.)

22           MR. BROOKMAN: Okay. Are we set? Okay.

1 Victor Franco is going to proceed. And  
2 we are on about slide 15 now. By the way, I like  
3 this slide.

4 (Laughter.)

5 MR. BROOKMAN: A summary slide here right  
6 at the outset. And I also want to say, having  
7 reviewed many of these packets over the years, I  
8 think the graphics in this packet are especially  
9 good.

10 MR. FRANCO: Good afternoon. My name is  
11 Victor Franco. I'm from Lawrence Berkeley  
12 National Laboratory. And next we will be talking  
13 about the proposed updates to the Federal furnace  
14 and boiler test procedure.

15 Here in this slide, there's a summary of  
16 the proposed updates. We're proposing to update  
17 the industry references to the latest version of  
18 ASHRAE Standard 103-2007. Also proposing to do a  
19 measurement of condensate under steady-state  
20 conditions. The electricity consumption of  
21 additional components is being considered, as  
22 well.

1           Doing the smoke stick test for verifying  
2 the flow through the heat exchanger, as well as  
3 the duct work for units that are installed  
4 without return ducts. Also, there are additional  
5 testing requirements for the multi-position  
6 configurations, and there is a proposal for the  
7 verification test for automatic means of  
8 adjusting for water temperature in boilers.

9           The next few slides will be explaining in  
10 more detail these proposed changes. We will  
11 start the -- this gets a little bit more  
12 technical. We will start first with the updating  
13 the industry references to the latest ASHRAE  
14 [Standard 103-] 2007. There's a few slides here  
15 that will be technical, so please stop me if you  
16 have any questions at any time.

17           This slide, the current Federal test  
18 procedure, incorporates by reference ASHRAE 103-  
19 1993. In June 2007, ASHRAE published ASHRAE  
20 Standard 103-2007. DOE is currently proposing to  
21 update all references in the Federal test  
22 procedure from ASHRAE 103-1993 to ASHRAE 103-

1 2007, with some modifications. This will result  
2 in the proposed test procedure adopting three  
3 main changes from the ASHRAE 2007, as follows:

4           First, those would be a change in  
5 determining the AFUE [annual fuel utilization  
6 efficiency] for two-stage modulating products,  
7 which will require the recalculation of AFUE  
8 values for all two-stage and modulating products,  
9 including adding some new testing requirements  
10 for two-stage and modulating condensing products.  
11 At the same time, there will also be a reduced  
12 test burden for two-stage products which have a  
13 calculated balance point temperature less than or  
14 equal to 5 degrees.

15           Second, there is an update to, in ASHRAE  
16 103-2007, that will allow the calculation of off-  
17 period flue losses for products with post-purge  
18 times greater than three minutes.

19           Third, it will update the burner  
20 operating hours calculations, the annual fuel  
21 energy consumption, and annual electricity  
22 consumption calculations. This will also require

1 the recalculation of these values for all  
2 equipment that's currently being reported by  
3 manufacturers.

4           The next few slides will expand on these  
5 three main modifications. So, please hold your  
6 questions for the next few slides.

7           This slide is meant to give you a  
8 background about the changes in the determination  
9 of AFUE for two-stage and modulating products.  
10 In 2002, a NIST study reported issues on the  
11 proposed changes to the way AFUE was calculated  
12 in ASHRAE 103-1993. The main issue was that  
13 there was a significant discrepancy between the  
14 AFUE of some two-stage and modulating models and  
15 the AFUE of those same models calculated as a  
16 single-stage unit at reduced fire.

17           This difference was sometimes found to be  
18 as much as 1 percent or greater. Since most two-  
19 stage and modulating models are operating almost  
20 all the time at the reduced operating mode, the  
21 AFUE values should be very close. The NIST study  
22 found that the main cause of this was how the on

1 and off times cycle values for two-stage and  
2 modulating units are determined in ASHRAE 103-  
3 1993.

4           The fixed values of 10 minutes for  
5 furnaces and 15 minutes for boilers shown in the  
6 table are determined based on the operating at an  
7 average of 50 percent of the rated capacity, as  
8 well as other assumptions. Yet most two-stage  
9 and modulating furnaces and boilers operate at  
10 different conditions than these.

11           NIST's proposed solution was to add a  
12 calculation method for determining the on- and  
13 off-times for each two-stage and modulating model  
14 tested. In ASHRAE 103-2007, they adopted the  
15 proposed changes from the 2007 NIST report, with  
16 some additional modifications, which I will be  
17 describing in more detail in the next slide.

18           This slide presents a summary of all the  
19 ASHRAE 103-2007 calculation and testing changes  
20 related to the AFUE determination for two-stage  
21 and modulating products. As stated in the  
22 previous slide, the main changes to the

1 calculation was to add a calculation method for  
2 on- and off-times, t-on and t-off, compared to  
3 using fixed values in the ASHRAE 103-1993. More  
4 details about this change will be presented in  
5 the next slide.

6 In addition to this, ASHRAE 103-2007 did  
7 a number of other changes to the calculation  
8 method, including requiring all calculation at  
9 the reduced fire if the balance point temperature  
10 is less than or equal to 5 degrees Fahrenheit,  
11 replacing the design heating requirement, DHR  
12 [Design Heating Requirements], lookup table with  
13 equation of the output capacity of the maximum  
14 operating mode divided by one-plus-alpha, which  
15 is the oversize factor of the maximum load.

16 The calculations to the oversize factor  
17 were also changed. For the maximum operating  
18 mode, the oversized factor was set to 0.7, the  
19 same value used in the single-stage calculations.  
20 The oversize factor at the reduced operating mode  
21 is similar to the equation used before for the  
22 DHR, by replacing the DHR equation listed above,

1 mentioned previously.

2           Lastly, the lookup tables for the average  
3 outdoor temperature and the fractional heating  
4 loads have been replaced with equations dependent  
5 to the balance point temperature.

6           In addition to these calculation changes,  
7 ASHRAE 103-2007 did a number of changes to the  
8 testing conditions as well. For two-stage  
9 products with a balance point temperature less  
10 than or equal to 5 degrees Fahrenheit, testing is  
11 only required at the reduced operating load for a  
12 cool-down, heat-up, optional tracer gas, and  
13 condensate cycle test.

14           For a condensate cycle test, the on- and  
15 off-cycle times used are the calculated values  
16 instead of the fixed values used before. More  
17 details about these two testing changes will be  
18 presented in later slides.

19           As mentioned in the previous slide, the  
20 main change is to the on- and off-times in terms  
21 of impact to the AFUE. This slide shows the  
22 proposed equations listed in sections 11.4.9.11

1 and 11.4.9.12 of ASHRAE 103-2007, to determine  
2 the on- and off-times, which were based on  
3 equations used to determine the fixed values  
4 similar to the ones used to determine the fixed  
5 values in ASHRAE 103-1993.

6           One important thing to note here is that  
7 for the reduced operating mode, the on- and off-  
8 times are dependent on the ratio of the output  
9 capacity of the reduced mode to the output  
10 capacity at the maximum mode. That will become  
11 important once we discuss some of the other  
12 changes. The on- and off-times impact the  
13 sensible and infiltration heat losses in the AFUE  
14 calculations.

15           The change to the on- and off-cycle times  
16 also affects how the condensate cycle test is  
17 conducted for condensing two-stage and modulating  
18 products for this issue, too. The condensate  
19 cycle test described in section 9.8 of ASHRAE  
20 103-2007 requires the on- and off-cycle time  
21 values to conduct the test. As discussed  
22 earlier, the on- and off-cycle times in ASHRAE

1 103-1993 were fixed. Now they will need to be  
2 calculated using equations in the previous slide  
3 before performing the condensate cycle test.

4 Yes.

5 MR. BROOKMAN: Marshall Hunt.

6 MR. HUNT: Clarifying question. Marshall  
7 Hunt, PG and E.

8 So, this cycle -- what we're looking at  
9 here is only two-stage? Even though we have some  
10 really fantastic fully-modulating products,  
11 they're forced into a two-stage test?

12 MR. FRANCO: No, no. This is proposed  
13 two-stage and modulating.

14 MR. HUNT: So, if I have a wonderful  
15 product with nine steps, I have to declare a low-  
16 fire and a high-fire?

17 MR. FRANCO: The test actually only  
18 requires reduced. And then there's a calculation  
19 for what's called the modulating mode, based on  
20 those --

21 (Cross-talk.)

22 MR. HUNT: Yeah. I'd let them know.

1 MR. BROOKMAN: Please, go ahead, Diane.

2 MS. JAKOBS: So, this is Diane Jakobs  
3 from Rheem, and I'm on the ASHRAE 103 committee.

4 But there is a little bit of a difference  
5 -- well, actually for the two-stage and  
6 modulating, today there are two different  
7 classes. But in 2007, we combined them into one.  
8 And there are a couple of differences.

9 But we always only tested at the maximum  
10 capacity and the minimum capacity. So even  
11 though my modulating furnace has 13, when we're  
12 testing for AFUE, we're actually only running  
13 tests at maximum fire and minimum.

14 MR. HUNT: And the minimum is quite low.  
15 Is it 20, 30 percent --

16 MS. JAKOBS: It's 40, 40 percent.

17 MR. HUNT: Oh, it is 40. Yeah.

18 MS. JAKOBS: For mine. Some go lower.

19 MR. HUNT: Okay.

20 MS. JAKOBS: So.

21 MR. HUNT: Thank you.

22 MS. JAKOBS: Okay.

1 MR. BROOKMAN: Thanks, Diane.

2 Yes, Harvey Sachs.

3 MR. SACHS: Harvey Sachs, ACEEE.

4 Am I to infer, Diane, that manufacturers  
5 are comfortable with approximating the modulating  
6 with this two-step high-fire, low-fire?

7 MS. JAKOBS: This is Diane Jakobs from  
8 Rheem.

9 These equations are really old. So the  
10 papers were written actually before I was a  
11 heating engineer. So, I don't know. You know  
12 what? No, furnaces are -- Rheem had a modulating  
13 furnace in the '70s. But so, we did predate  
14 these equations. But the -- we had the -- Rheem  
15 had the first current modulating furnace with  
16 these 13 stages. And we had that around 2000, I  
17 think.

18 So, I think we learned to work with it.  
19 And I think our design was probably catered to  
20 what -- I mean, we were working to the task. And  
21 when a request for information, me personally, if  
22 I wanted to characterize the operation of a

1 modulating furnace, I would be looking at steady-  
2 state at 70 percent, because that's where it runs  
3 most of the time. It doesn't run at 100 percent  
4 unless you have a setback thermostat and you're,  
5 you know, it's a short period of time.

6           It spends more time probably at the  
7 lowest capacity. But most of the time, in a real  
8 -- you know, in a home, it's just running steady-  
9 state at 70 percent, and it's just inching up or  
10 down, and meeting the load as it changes through  
11 the day. So, modulating furnace, when you have  
12 so many steps, it doesn't really go on and off  
13 that much.

14           MR. BROOKMAN: Frank Stanonik.

15           MR. STANONIK: Frank Stanonik, AHRI.

16           But, Harvey, I think when the 2007  
17 edition of 103 was being developed, that issue  
18 was debated quite a bit. And so I think that  
19 what we see in 2007 is reflective of, let's say,  
20 the point at which there was consensus agreement.

21           MR. SACHS: Thank you. This is Harvey.  
22 The lowest common denominator. Thanks, Frank.

1           MR. BROOKMAN: Ron Caudle, who is joining  
2 us online, has a comment. Ron, you should now be  
3 unmuted.

4           MR. CAUDLE: I'm sorry. I had my hand up  
5 prematurely. I'm sorry. Can you hear me?

6           MR. BROOKMAN: Okay. Well, you sound  
7 great. We'll wait for you to join us later.

8           MR. CAUDLE: Okay. Thank you.

9           MR. BROOKMAN: Thank you.

10          MR. HUNT: I might mention -- this is  
11 Marshall Hunt, PG and E -- Ron Caudle is with  
12 SoCal Gas. He's part of our statewide codes and  
13 standards team. Thank you.

14          MR. BROOKMAN: Thank you. Okay.

15                    So then, let's, yes, please, Jeff.

16          MR. KLEISS: Jeff Kleiss with Lochinvar.

17                    I would agree that there may be some more  
18 realism as far as the cycle times. And this  
19 would be an advantage to products like ours that  
20 have turndown rates.

21                    However, the -- if we change these t-on  
22 and t-offs, it will require us to do retesting on

1 cyclical condensate load, which if the impact of  
2 this ultimately is going to be a *de minimis*  
3 change to the AFUE's, I would rather not impose  
4 the burden of having to go back and retest our  
5 products when there's going to be no net gain in  
6 efficiency caused by this.

7           And changing the t-on and t-off will  
8 require us to, at the very least, go back and  
9 redo our cyclical condensate tests on reduced  
10 firing rate.

11           MR. BROOKMAN: Okay. Thank you.

12           Diane.

13           MS. JAKOBS: This is Diane Jakobs from  
14 Rheem.

15           Not to give you the impression that we  
16 did -- you know, that -- we did good things, too.  
17 But one of the things is on slide 18, there is an  
18 alpha. And the way the 1993 test standard is,  
19 there is a table. And it's kind of a step, where  
20 you can go from a capacity of one number, and  
21 then like one more BTU per hour, you end up in  
22 another bin. And there were some strategic

1 things you could do to get a better number.

2 So, that thing has disappeared. So that  
3 was one improvement that I completely support.

4 MR. BROOKMAN: Okay. I guess we're  
5 ready, Victor.

6 MR. FRANCO: Great. Thank you. This is  
7 Victor Franco again.

8 Going back to the slide we were at. So  
9 basically, since the calculations of on- and off-  
10 times are dependent, as I mentioned before, on Q-  
11 out and Q-out, R, which were the output at the  
12 maximum and the output of the reduced, then the  
13 high- and low-fire steady-state test will need to  
14 be conducted before the condensate cyclic test.

15 The exception to this is that in ASHRAE  
16 103-2007, it does allow the ratio of the Q-in at  
17 the reduced and at the maximum to be a substitute  
18 for that other ratio of the Q-out at the reduced  
19 and at the maximum if the error between the two  
20 is not more than 2 percent. DOE found this  
21 condition to be true for most of models that it  
22 tested.

1           So this is the third major in terms of  
2 the AFUE determination of two-stage modulating  
3 products. And this is in regards to reduced  
4 burden. The two-stage furnaces and boilers have  
5 the following four tests that require only the  
6 reduced fire tests if the balance point  
7 temperature is less than or equal to 5 degrees  
8 Fahrenheit: the cool-down, the heat-up, the  
9 optional tracer gas, and the condensate cycle, as  
10 I mentioned earlier.

11           This reduces the burden, since the  
12 current test, ASHRAE 103-1993 test, requires  
13 these tests even though they have very little  
14 impact on AFUE due to the fact that the two-stage  
15 and boilers operate almost all the time at the  
16 reduced input rate.

17           The balance point temperature, which is  
18 determined by the following equation, at the  
19 bottom of the slide, is less than 5 degrees  
20 Fahrenheit when the reduced output to maximum  
21 output ratio is approximately 0.59 or greater,  
22 which occurs for almost all two-stage furnaces

1 and boilers currently available in the market.

2 MR. HUNT: Could you repeat that?

3 MR. FRANCO: Yes.

4 MR. HUNT: Give it a little more volume.

5 MR. FRANCO: Oh, sorry about that. The  
6 whole phrase or just the last part?

7 MR. HUNT: The last part, statement.

8 MR. FRANCO: It occurs almost always for  
9 two-stage furnaces and boilers currently  
10 available on the market.

11 MR. HUNT: Less than 5 degrees.

12 MR. FRANCO: Less than 5 degrees. And  
13 it's the ratio -- it's 0.59 that gives you the 5  
14 degrees or less.

15 MR. KLEISS: Jeff Kleiss, Lochinvar.

16 I'm sorry. I need to take issue with  
17 that, I think. If the -- if I go through this  
18 equation, the alpha is 0.7. That's a fixed  
19 value.

20 MR. FRANCO: Um-hm.

21 MR. KLEISS: So, as our Q-out, R, goes  
22 down with respect to Q-out, then that is going to

1 make TC a larger number. So the higher the turn-  
2 down rate, the higher TC is.

3 MR. FRANCO: The lower -- the lower. The  
4 other way around. The lower the rate. So if you  
5 go down to like 5.5, then that becomes --

6 (Cross-talk.)

7 MR. KLEISS: So the more you turn down  
8 your appliance --

9 MR. FRANCO: Correct.

10 MR. KLEISS: -- then the TC gets larger?

11 MR. FRANCO: Larger, yeah.

12 MR. KLEISS: Right. So, so, and when you  
13 calculate that out, any unit that has an output  
14 at reduced rate that is greater than 58.8 percent  
15 of the full firing rate would be a TC that's less  
16 than or equal to 5 degrees Fahrenheit?

17 MR. KLEISS: Yeah.

18 MR. FRANCO: It's 0.59, yeah.

19 MR. KLEISS: Right. So the majority of  
20 the products that are on the market, they're at  
21 low fire, is 50 percent or less, and would not  
22 gain any benefit from this. In fact, I don't

1 know of any products on the market that have low  
2 fire that's greater than 59 percent.

3 MR. FRANCO: This is for two-stage  
4 products. And this is mainly in relation to  
5 furnaces. It might be different for other, but,  
6 and it might be different for --

7 MR. BROOKMAN: Let's hear from Diane.

8 MS. JAKOBS: This is Diane Jakobs from  
9 Rheem.

10 And this is a part I worked on. But when  
11 we are digging into the equations, we realize  
12 that -- so we're running this test at low fire  
13 and high fire. But the efficiency is actually a  
14 weighted average of the two operating conditions.  
15 And based on the capacity, as TC goes up or down  
16 -- anyway, for a two-stage, there's hardly any  
17 weighting at all on the high fire.

18 So even though we're running the test,  
19 we're plugging in the numbers, it made like no  
20 difference in the final outcome. And when you  
21 looked at it, unless you get to 0.59 or greater,  
22 as a minimum capacity, that really high fire has

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1 no effect. So there's no reason for us to run  
2 high-fire tests.

3 MR. KLEISS: Jeff Kleiss, Lochinvar.

4 And I'm not arguing about the logic of  
5 this calculation at all. I think it's very  
6 smart. Basically, we're saying that a unit,  
7 running with this little turn-down, is basically  
8 going to act like an on-off unit because of over  
9 -- the oversize factor, which I think is totally  
10 legitimate.

11 The only thing that I'm bringing issue  
12 with is the assumption that DOE has made that  
13 this is going to be a reduction in test burden.  
14 Because I believe that there are few, if any,  
15 products that are actually going to receive a --  
16 not have to run these tests because of this  
17 factor.

18 MR. BROOKMAN: This factor will cause all  
19 of them to be retested?

20 MR. KLEISS: This factor will not -- it  
21 would allow --

22 MS. JAKOBS: It won't qualify.

1           MR. KLEISS: It would allow a product to  
2 not have to run a test if it did not have a very  
3 high turn-down ratio.

4           MR. BROOKMAN: Okay.

5           MR. KLEISS: The issue is that I don't  
6 know of any products in our industry that would  
7 actually get this benefit.

8           MR. BROOKMAN: Jim.

9           MR. KLEISS: So I don't want DOE to  
10 falsely assume that this would reduce the test  
11 burden, because it won't.

12          MR. BROOKMAN: Jim.

13          MR. VERSHAW: Yeah, Jim VerShaw, from  
14 Ingersoll Rand.

15                 The furnace, non-weatherized furnaces are  
16 quite a bit different from boilers. We have a  
17 lot of two-stage products around 65 percent; 65  
18 to 70 percent is kind of the average.

19          MS. ARMSTRONG: I think this will help.  
20 This is our testing.

21          MR. BROOKMAN: This is Ashley.

22          MS. ARMSTRONG: And you can see the

1 ratios supporting our conclusion. So while it  
2 may be different for boilers, I think this does  
3 somewhat support our conclusion for furnaces.

4 MR. BROOKMAN: Okay. Diane, do you want  
5 to comment here?

6 MS. JAKOBS: No.

7 MR. BROOKMAN: Jim got it. Okay.

8 Okay. Then, Victor.

9 MR. FRANCO: Great. Thank you. Victor  
10 Franco again.

11 Here we're representing the 14 different  
12 two-stage and modulating furnaces and boilers  
13 that DOE tested to look at the impact of these  
14 changes on AFUE. This table presents the  
15 different designs and controls of each of these.  
16 So we included five of the major product classes  
17 and 10 different manufacturers, both non-  
18 condensing and condensing furnaces, two-stage and  
19 modulating controls.

20 And as you can see, the ratio here that's  
21 being calculated once we did the test for two-  
22 stage equipment is around that ratio -- higher

1 than that ratio, as actually pointed out. For  
2 modulating equipment, it's lower, and for  
3 boilers, it's different as well.

4 The cyclic times from the proposed test  
5 procedure also are listed here. One thing to  
6 note is that they are much lower than the  
7 previous test procedure. The t-on was around 10  
8 minutes. There we're seeing around four to five  
9 minutes.

10 For boilers, it depends on whether it's a  
11 modulating or two-stage. A lot of boilers that  
12 we tested were around 20 percent at turn-down  
13 ratio. So they're actually higher than the 15  
14 minutes that's being required. And now they  
15 would be tested at around 20 minutes.

16 MR. BROOKMAN: Frank Stanonik.

17 MR. STANONIK: Frank Stanonik, AHRI.

18 So, well, I am going to pick a point a  
19 little bit. I mean, if you look at that data,  
20 and I would encourage you to recognize that  
21 furnaces are not boilers. In fact, your own data  
22 says that most boiler models are not going to

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1 benefit from this reduced test burden, because  
2 there's only one there that hit the 65 percent  
3 ratio, which was not convincing.

4 But at least for the hot water boilers,  
5 all of the other ones would not trigger the magic  
6 0.59 number, and they don't -- so there's no  
7 break for them. So I would just be cautioned  
8 about a statement that says, which is the case  
9 for most two-stage furnace and boilers.

10 MR. FRANCO: Just to clarify that, I  
11 forgot the previous slide to clarify it. The  
12 previous is just related to two-stage; it  
13 wouldn't impact modulating. Modulating for the  
14 tests are not required to be tested at high fire.

15 (Cross-talk.)

16 MR. STANONIK: Point taken. And again, I  
17 mean, let's be cautioned about extending  
18 conclusions here. So I understood. It's two-  
19 stage. And you tested one two-stage boiler. So,  
20 you know, again, I think if -- it may be, you  
21 know, may be correct. But at the moment, testing  
22 one isn't enough to say that it's going to fit

1 all boilers.

2 MR. FRANCO: No, you are definitely  
3 correct. Just from testing -- our previous  
4 statement is actually based on looking at actual  
5 models and looking at the -- from product  
6 literature.

7 So now, let's take a look at the results  
8 that we found. And I'll go over, there's two  
9 slides of results. The first slide presents the  
10 results of non-condensing furnaces and boilers.  
11 Obviously, the impacts would be much different  
12 from the condensing. So we might have to  
13 separate them out.

14 Here, we have testing for four of the  
15 five products that we had models for. The first  
16 column lists the test at the current test  
17 procedure. The second column is at the proposed  
18 Federal test procedure. So there you can see the  
19 difference.

20 The third column is actually the test as  
21 if it was in a low-fire, at the reduced-fire AFUE  
22 rating as a single-stage furnace. The difference

1 -- at the last column is the difference between  
2 the current and the proposed. For all these  
3 models, the differences are close to half an AFUE  
4 point. Some cases are going above one AFUE  
5 point. In all cases, the results are closer to  
6 the single-stage reduced-fire testing.

7           For boilers, the results were slightly  
8 different, and they're much lower than the  
9 results for furnaces.

10           So now, let's go to the condensing  
11 furnaces. So here, obviously, we have two things  
12 that are going on. We're having the  
13 calculations, but we're also having the testing  
14 conditions that are being changed for the  
15 condensate cyclic test.

16           So the same thing here. We have three  
17 different product classes for different models.  
18 The first column, again, is the current Federal  
19 test procedure standard; then the proposed  
20 Federal test procedure standard, measuring this  
21 furnace as a single-stage at reduced fire; and  
22 then the difference.

1           For some of these models, the difference  
2 is small. For some of them, it's larger than one  
3 [percent] AFUE. And they all seem to be closer  
4 to the single-stage reduced-fire.

5           MR. BROOKMAN: Yes, please, Jim.

6           MR. VERSHAW: Jim VerShaw, Ingersoll  
7 Rand.

8           If you look at line 2 of Manufacturer C,  
9 Model 1, and according to my earlier comments  
10 about having to retest and the new procedures,  
11 you can see that if I had today a 92-percent  
12 furnace that the new rule was 92 percent, I  
13 wouldn't qualify anymore, with the new standard.

14          I don't know whose furnace that is. But  
15 that's significant. That's a real issue. And  
16 that just tells me that we don't know for sure  
17 where we all stand on this. Or you've just  
18 identified lab uncertainty that hasn't been  
19 factored into the tolerances that we're doing and  
20 how we set up our ratings.

21          The other question I have -- and I  
22 couldn't find it in here. Did you recalculate

1 burner operating hours and show the difference  
2 between the old and new methods? Because you've  
3 got different on and off times.

4 MR. FRANCO: We're going to be talking  
5 burner operating hours --

6 MR. VERSHAW: Okay, good. Thanks.

7 MR. FRANCO: -- in just one second.

8 MR. BROOKMAN: Yes, Frank Stanonik.

9 MR. STANONIK: Frank Stanonik, AHRI.

10 Well, I think Jim has certainly touched  
11 on one of the things that we are very concerned  
12 about, is that -- and we very much wanted to see  
13 what tests had been done to this point as far as  
14 evaluating the effect of the revised test  
15 procedure.

16 We are concerned that maybe enough  
17 testing has not been done to really get to that  
18 conclusion that, let's say, the test provisions  
19 are neutral. And obviously, if they do have an  
20 effect, and particularly an effect of lowering a  
21 minimum, then DOE has to look at the issue of  
22 translating -- what I like to call translating

1 the efficiency standard to reflect the new  
2 procedure.

3 But I think one of the -- and just as an  
4 example, it's not here. But it would be  
5 interesting to see, were all of these roughly the  
6 same input model? I mean, because at least  
7 historically, with the test procedure, your input  
8 gave you a slightly different number, right?

9 MR. BROOKMAN: Jim.

10 MR. VERSHAW: Yeah, it's Jim VerShaw.

11 It would depend upon the house load it  
12 fell into.

13 MR. STANONIK: Yeah, right, right.

14 MR. VERSHAW: Yeah, yeah.

15 MR. STANONIK: Thanks, and I know you  
16 tried. But I think, again in terms of really  
17 evaluating whether this is a neutral change, we  
18 would need to look across the spectrum of inputs  
19 of products available just to make sure there's  
20 no weird effect that we didn't know about.

21 MS. ARMSTRONG: So, we would welcome the  
22 opportunity to work with AHRI to do just that.

1 We had a request to place some more details of  
2 our test data in the docket, which we're going to  
3 do. So you can look for that file.

4 But to the extent that all of you have  
5 test data, or if anyone has run the proposed  
6 method either during the ASHRAE process or  
7 otherwise, or if AHRI wants to work with us to  
8 set something up, we'd be happy to engage in that  
9 discussion.

10 MR. BROOKMAN: Thank you, Ashley. Thank  
11 you.

12 Yes, and one more. Just say your name  
13 for the record.

14 MR. YILMAZ: Ayk Yilmaz, AHRI.

15 A little bit of a specific question with  
16 relation to the test differences that you saw.  
17 You identified two different ways in which the  
18 different cycle times can change AFUE results,  
19 one being through the calculations which impact  
20 the L-S, on, L-S, off, and the infiltration  
21 losses. And then the other one, through the  
22 actual condensate cycling test that you did,

1 which also could create a different result for L-  
2 sub-G, I think was the term.

3 Did you identify, or were you able to  
4 identify which of those impacts actually created  
5 the differences that you saw?

6 MR. FRANCO: Thank you for that question.  
7 Yes, that's a good clarification.

8 So, as you can see from the results  
9 previously, which were only impacted by the  
10 calculations, they were pretty much all positive  
11 differences. Here, we're seeing all negative.

12 So, the negative comes in from the  
13 calculations for the condensate cyclic test.  
14 Basically, what happens is you're measuring the  
15 condensate for a short period of time. So you  
16 have more of the impact of the cycling. At the  
17 beginning, usually, there's a little bit less  
18 cyclic. There's a little bit less inefficient.  
19 As you're going closer to the steady-state, it's  
20 more.

21 MR. BROOKMAN: Jim? Comment?

22 MR. VERSHAW: No.

1 MR. BROOKMAN: Okay. Additional  
2 thoughts, questions, comments? Jeff.

3 MR. KLEISS: Jeff Kleiss, Lochinvar.

4 I'm just trying to get my mind around the  
5 -- you've got calculated values for the proposed  
6 Federal test procedure, and then the single-stage  
7 at reduced firing AFUE rating. And then the  
8 footnote down there.

9 And the differences that you're showing  
10 in the efficiencies are based on the difference  
11 between the current test procedure and the  
12 single-stage at reduced-firing AFUE? Is that --  
13 am I reading this correctly?

14 MR. FRANCO: No, no. Sorry about that.  
15 Sorry about the confusion. It's between the  
16 current Federal and the proposed.

17 MS. ARMSTRONG: This is Ashley. There's  
18 three columns, right? The middle column is the  
19 proposed?

20 (Pause.)

21 MR. FRANCO: Correct.

22 MS. ARMSTRONG: So what's the --

1           MR. KLEISS: Just some of the numbers  
2 don't seem to be --

3           MS. ARMSTRONG: You're talking about the  
4 deltas on the last column? That's what you're  
5 asking?

6           MR. KLEISS: Yeah.

7           MS. ARMSTRONG: Okay.

8           MR. KLEISS: Trying to find out what  
9 they're associated with.

10          MS. ARMSTRONG: Okay.

11          MR. BROOKMAN: Jim.

12          MR. VERSHAW: Yeah, Jim VerShaw.

13                 I'm going to go back to my earlier  
14 statement on burden. I wish we had time to have  
15 a lot of numbers to show between this test method  
16 and this test method on furnaces. But we just  
17 finished changing the AFUE's on our packaged  
18 products and non-weatherized furnaces. We're  
19 working on FER and a myriad of other things. We  
20 haven't had time to go in and even look at this.

21                 And whatever we did back in 2006, well,  
22 different people -- that's all gone. We can't

1 find that data, because it wasn't necessary to  
2 keep it, right? So it's kind of lost.

3 That was my whole point in the very  
4 beginning is that there's so much going on we  
5 have a hard time keeping up.

6 MR. BROOKMAN: Diane.

7 MS. JAKOBS: This is Diane Jakobs from  
8 Rheem.

9 But just because I was so enthralled with  
10 the whole thing, that we never really -- we never  
11 tested our furnaces to the 2007 version versus  
12 the 1999. I was always arguing about the  
13 assumptions. So I was more interested in how  
14 thermostats work and the interaction between the  
15 thermostat and the furnace.

16 But I would have to do testing now to --  
17 I don't have anything.

18 MR. BROOKMAN: Okay.

19 Okay, Victor.

20 MR. FRANCO: Thank you so much for those  
21 comments.

22 The next proposal that's from ASHRAE 2007

1 was to changes for the on-cycle losses for  
2 products with long post-purge time. Basically,  
3 in that same 2002 NIST study, they found the  
4 issue that there are some, primarily oil-fired  
5 boilers at that time, that require long post-  
6 purge times beyond three minutes. The existing  
7 test procedure produces small flue loss result.

8           The cause of this was in the Federal test  
9 procedure, that limits the post-purge time to  
10 three minutes for the flue loss calculation. The  
11 ASHRAE 103-2007 proposed the changes to the flue  
12 loss calculations that are based on the NIST  
13 derivations of those equations.

14           There are two changes. One is to the  
15 testing that now allows the post-purge time to be  
16 greater than three minutes. For units that have  
17 a post-purge time greater than three minutes,  
18 there's an additional flue gas temperature at the  
19 midpoint of that post-purge period of time.

20           There's also calculation changes for  
21 units that are above three minutes that are in  
22 sections 11.2.10.6 and 11.2.10.8 of the ASHRAE

1 2007 standard. So, going back, this next slide  
2 presents the results not affecting AFUE, but  
3 affecting other products.

4 MR. SACHS: Harvey Sachs, ACEEE.

5 Victor, I'm a little confused about these  
6 long purge cycles. I haven't thought it all the  
7 way through, but my understanding is a large  
8 fraction of furnaces, both condensing and non-  
9 condensing, are using inside air for combustion.  
10 That has to be replaced. So at some point, that  
11 infiltrated air has to be warmed before -- will  
12 be warmed before it gets to the furnace. And  
13 that has some heat content.

14 And it would seem that there's got to be  
15 a point -- and I don't know if it's three minutes  
16 or three hours -- where the value gained by the  
17 long purge cycle is offset by the heating of that  
18 air, replacement air.

19 MR. FRANCO: Yes. That --

20 MR. SACHS: Am I thinking wrong?

21 MR. FRANCO: No, that is correct. This,  
22 I think the intent of this change was that there

1 were some boilers, actually, not furnaces, and  
2 oil equipment that had these long three-minute  
3 purge times. We're not aware of any furnaces  
4 that have these long purge times. And there are  
5 very few boilers that the post-purge time is  
6 greater than three minutes. It's set to that --

7 MR. SACHS: Thank you for the  
8 clarification.

9 MR. FRANCO: Thank you for the question.

10 So now, we get back to the burner  
11 operating hours, the annual fuel use, and the  
12 electricity, annual electricity use calculation  
13 changes. So again, to emphasize, these do not  
14 impact the AFUE. These are side calculations  
15 that are provided in the Federal test procedure.

16 (Pause.)

17 MR. BROOKMAN: Get a little closer to the  
18 mic.

19 MR. FRANCO: Okay.

20 FEMALE VOICE: That's much better.

21 MR. FRANCO: Okay. Let me put this  
22 closer, too. Okay. Sorry about that.

1           So, let me say that again. This next  
2 slide is for the burner operating hours, annual  
3 fuel use, and annual electricity use  
4 calculations. These don't impact the AFUE  
5 calculations. These are primarily at a  
6 subsection of the test procedure for  
7 manufacturers to report if they wish. A lot of  
8 manufacturers of furnaces report these values,  
9 and boiler manufacturers report these values.

10           So again, there's some of the -- this is  
11 based on this 2002 NIST study. They found that,  
12 for two-stage and modulating products, the burner  
13 operating hours are primarily based on the  
14 maximum input rate. To adjust for this, they  
15 actually introduced a multiplication factor, the  
16 R factor, to account for the useful heat of the  
17 electrical components at the two-stage. So,  
18 usually, two-stage equipment operates longer so  
19 that these components would be operating a longer  
20 period of time.

21           What happens is it ignores the  
22 variability of the electrical component input for

1 multi-speed and variable speed, circulating and  
2 combustion blowers. So, many times, it over-  
3 estimates the efficiency in terms of fuel use of  
4 these products.

5 NIST proposed to change the burner  
6 operating hours calculation by calculating them  
7 at each operating mode. ASHRAE adopted these  
8 changes, but also did additional modifications  
9 primarily related to the modifications that we  
10 discussed previously.

11 DOE proposes to adopt these changes, with  
12 modifications to account for the electronic  
13 ignition and standby and off-mode electricity  
14 use, which are already part of the existing  
15 Federal test procedure.

16 This is a summary of the changes. So, in  
17 terms of -- again, in terms of operating hours,  
18 the biggest change is that all the burner  
19 operating hours are calculated for all operating  
20 modes. The correction factor, this R factor, has  
21 been removed because of the heat from the  
22 electricity of the burner -- in the burner

1 operating hours calculation is calculated  
2 separately for each operating mode.

3 In addition to this, the fuel consumption  
4 is now being calculated separately for high and  
5 reduced fire. The electricity consumption also  
6 has separate on-time ratios for high- and low-  
7 fire.

8 In terms of the on-time ratios, which are  
9 the ratios between the electrical component on-  
10 time to the burner operating on-time, these Y  
11 factors are based on the on-time cycle, the  
12 burner on-time cycle values that we were  
13 discussing previously for each operating mode.  
14 So, for two-stage, they are these calculated  
15 values that we discussed earlier.

16 Similar to what we discussed before, the  
17 design heating requirement has been replaced by  
18 this equation, and the fractional heating loads  
19 are being replaced by an equation, depending on  
20 the balance point temperature.

21 MR. BROOKMAN: Jim.

22 MR. VERSHAW: So, how do they change?

1           MR. FRANCO: It is a little bit  
2 complicated. There are two factors to consider.  
3 One is that there's actually changes to the AFUE  
4 that impact for two-stage equipment, whether it  
5 increases or decreases. There's also the impact  
6 of these changes in terms of how these  
7 calculations impact if you had -- if you were  
8 calculating the same AFUE between the existing  
9 and the proposed.

10           MR. VERSHAW: So, you don't have a table  
11 that says prior the BOH [burner operating hours]  
12 was this, now it's this? And prior, the EAE was  
13 this, and now it's this? Do you have that?

14           MR. FRANCO: We don't currently have  
15 that, no.

16           MR. VERSHAW: I'm getting ahead of  
17 myself. But when we did the analysis for the new  
18 AFUE standard, did you use this procedure? And  
19 doesn't how long the blower run play into how  
20 much energy is used by the furnace in the heating  
21 season? Wouldn't that make an effect on the  
22 numbers you got?

1 MR. FRANCO: Just do -- you're talking  
2 about the standard that --

3 MR. VERSHAW: I'm talking about  
4 tomorrow's meeting.

5 MR. FRANCO: Tomorrow's meeting. Great,  
6 great.

7 MR. VERSHAW: Yeah.

8 MR. FRANCO: Yes. Actually, we do. We  
9 use these calculations. We actually have been  
10 using these calculations even in the previous  
11 rulemaking in 2011. Because these do -- are more  
12 accurate in terms of representing field  
13 conditions.

14 MR. VERSHAW: But you don't know what the  
15 differences are?

16 MR. FRANCO: Yes, we've --

17 MR. VERSHAW: Because I've only been  
18 looking at the old way of doing it. So.

19 MR. FRANCO: We don't know in terms of  
20 the actual, your specific product. But overall,  
21 in terms of like an overall change, what it  
22 usually does is it decreases the fuel consumption

1 for -- it increases the fuel consumption for two-  
2 stage and modulating products.

3 MR. VERSHAW: For the gas or the  
4 electricity or both?

5 MR. FRANCO: The gas.

6 MR. VERSHAW: Yeah.

7 MR. FRANCO: The gas, and it depends on  
8 the electricity, the fan, primarily, efficiency,  
9 whether it increases or decreases slightly. That  
10 would be dependent on your specific product.  
11 It's hard to be a little bit -- but the primary,  
12 there's an ACEEE paper that kind of explains the  
13 effect of just simply going and plugging these  
14 into kind of similar equations.

15 (Cross-talk.)

16 MR. VERSHAW: So Harvey has all this  
17 information?

18 MS. ARMSTRONG: Yes. Harvey has all this  
19 information. And he's going to present next.

20 MR. VERSHAW: Good. Okay.

21 (Laughter.)

22 MR. BROOKMAN: Harvey, to the podium,

1 please.

2 (Laughter.)

3 MR. FRANCO: The reference to that paper  
4 is in the notice itself if you wanted to go to --  
5 into and read that.

6 MS. ARMSTRONG: Well, we will talk lots  
7 more about this stuff tomorrow.

8 MR. SACHS: Victor, can you cite the  
9 author of that paper?

10 (Laughter.)

11 MS. ARMSTRONG: Harvey, *et al.*

12 MR. BROOKMAN: Frank Stanonik.

13 MR. STANONIK: Frank Stanonik, AHRI.

14 And I'm unfortunately not familiar with  
15 that paper.

16 (Laughter.)

17 MR. BROOKMAN: Me either.

18 (Laughter.)

19 MR. STANONIK: But, okay, so what I  
20 understood is that the general -- the conclusion  
21 is that you're going to see a little more  
22 increased fuel consumption. But that occurs

1 because it appears that you are not -- no longer  
2 over-estimating the contribution of the electric  
3 energy to the heating.

4 MR. FRANCO: Correct.

5 MR. STANONIK: If that's correct, then  
6 why isn't the second part of the conclusion that,  
7 in general, your electric consumption number goes  
8 down? Where does that break off? Or where does  
9 that disconnect?

10 MR. FRANCO: Yeah. Let me explain a  
11 little bit further. The electricity consumption  
12 in the previous equation hasn't changed that  
13 much. The only change is from this slide, as you  
14 can see, is the addition of on-time ratios for  
15 the reduced fire, essentially. But the equation  
16 itself was basically calculated both for reduced  
17 and high. So that was not as big of a change.

18 The biggest change was actually to the  
19 burner operating hours of it that were used to  
20 calculate in the fuel use, which is actually only  
21 calculated at the high-fire for two-stage and  
22 modulating equipment. And then doing all these

1 adjustments to adjust it so that it's applicable.

2           So, this does approximate better the  
3 actual field conditions. And I just misspoke.  
4 The papers from ACEEE summer proceedings are  
5 actually not from ACEEE. It's actually by LBNL;  
6 it's from Lawrence Berkeley National Laboratory.

7           (Laughter.)

8           MR. FRANCO: So, I misspoke.

9           MR. SACHS: The defense rests.

10          (Laughter.)

11          MR. FRANCO: Sorry about that.

12          MR. HUNT: Marshall Hunt, PG and E.

13          Now I'm confused. So are we saying --

14          MR. BROOKMAN: Wait a second. Okay,  
15 Marshall. Go ahead.

16          MR. HUNT: Okay. Now I'm totally  
17 confused. Are we saying that a two-stage or  
18 modulating furnace will use more energy in the  
19 year, more gas?

20          MR. FRANCO: No. That's what the  
21 equation incorrectly calculated, the equation  
22 that was used before. The current equation

1 actually shows that it's about the same  
2 consumption. If you have the same efficiency --

3 MR. HUNT: Yes.

4 MR. FRANCO: -- furnace between a single-  
5 stage and two-stage, and you calculate both the  
6 electricity and the fuel, you calculate about the  
7 same. If you did the old calculations, it came  
8 out to about 3 percent higher.

9 MR. HUNT: Yes.

10 MR. FRANCO: Or 3 percent less fuel  
11 consumption, which didn't seem to be --

12 MR. HUNT: So we're talking about a  
13 comfort product, a comfort feature rather than an  
14 efficiency feature.

15 MR. FRANCO: Primarily. But there could  
16 be other -- again, in the calculations of the  
17 AFUE, you're doing these AFUE calculations at the  
18 reduced, that could also play a role.

19 MR. HUNT: Thank you.

20 MR. FRANCO: But it's primarily --

21 MR. BROOKMAN: Harvey Sachs.

22 MR. SACHS: Marshall has just completed

1 my confusion.

2 (Laughter.)

3 MR. HUNT: Thanks.

4 MR. SACHS: There seems to be some  
5 empirical evidence that suggests, or I've  
6 incorrectly inferred that a two-stage actually  
7 uses less gas over the season than a single-  
8 stage. But you're telling me that we're getting  
9 the same AFUE.

10 MR. FRANCO: Yeah. So that's a  
11 difference between how we're trying to kind of  
12 normalize everything in the test procedure and  
13 you might want to -- might see in the field.  
14 What happens in the field usually is a single-  
15 stage furnace is usually oversized and usually  
16 significantly oversized.

17 In the field, even if the two-stage  
18 furnace is oversized, that won't have as much of  
19 an impact. So there are many situations where  
20 you could see savings because of that.

21 MR. SACHS: So, after 30 years of work to  
22 get a decent representation of actual gas use

1 that would allow us to compare models, we're  
2 still stuck with something that doesn't reflect  
3 what a consumer sees when he buys the appliance.  
4 Does this strike anybody else as being nuts?  
5 Pardon me.

6 MR. FRANCO: Thank you for your comment.

7 MR. BROOKMAN: Diane.

8 MS. JAKOBS: So, this is Diane from  
9 Rheem.

10 And I've worked on this. And I think  
11 this test procedure provides a good method to  
12 compare one product to another. I think what it  
13 does not do is estimate the consumption in a  
14 consumer's home.

15 MR. SACHS: Harvey Sachs again.

16 And, Diane, I appreciate what ASHRAE  
17 committees work like. I'm there. I've done it.  
18 But I'm translating your statement as the  
19 statement that this allows the comparison of your  
20 single-stage to Joe's single-stage. But it  
21 doesn't allow you to look for the value-added by  
22 buying a two-stage over a single-stage in terms

1 of your expected gas savings.

2 MS. JAKOBS: Okay. Diane.

3 If you're comparing single-stage to two-  
4 stage, I think 2007 gives you better information  
5 for that.

6 MR. SACHS: Does it --

7 MS. JAKOBS: Modulating is maybe another  
8 one.

9 MR. BROOKMAN: Jeff, go ahead.

10 MR. KLEISS: Jeff Kleiss, Lochinvar.

11 If I'm understanding what I've heard  
12 correctly, it's that the current procedure that  
13 we're using, the 1993 ASHRAE 103 standards  
14 calculation has been overstating the savings for  
15 two-stage and modulating units as far as the  
16 energy consumption over the year. And what we're  
17 talking about in the 2007 calculation is a  
18 correction to that overstatement.

19 MR. FRANCO: Correct. Thank you. Thank  
20 you for that clarification.

21 MR. BROOKMAN: Thank you, Victor.  
22 Harvey.

1           MR. SACHS: The limited field -- this is  
2 Harvey Sachs.

3           The limited field data with which I'm  
4 familiar is primarily Scott Pigg's pioneering  
5 study, I think 2001. And my inference and my  
6 memory, which is not perfect, is that we found  
7 substantial over-sizing in the two-stage furnaces  
8 as well as the single-stage. So consequently, we  
9 had a very high ratio of single-stage operation  
10 to two-stage.

11           And again, I'm not an experienced furnace  
12 engineer. But that seems to me like it's saying  
13 there's a lot more BTU's -- a lot fewer BTU's per  
14 unit of heat transfer area, and it ought to use  
15 less fuel, run longer and use less fuel.

16           MR. BROOKMAN: Diane.

17           MS. JAKOBS: So, if you are taking out a  
18 single-stage furnace, you replace it with a two-  
19 stage. And the other thing is we sell them  
20 according to input, not output. But we're kind  
21 of steering people towards not over-sizing quite  
22 as much. So there is a savings associated with

1 that.

2 MR. SACHS: I don't mean to hijack  
3 this. But with all due respect to my good friend  
4 Charlie back there --

5 (Inaudible interjection and laughter.)

6 MR. SACHS: -- I'd rather continue  
7 pushing rocks uphill than convince the contractor  
8 that he doesn't need the safety factor to keep  
9 from getting that call-back on a cold night.  
10 It's a really hard fight the efficiency programs  
11 have had for a decade or two, that the quality  
12 installation has had. And end of rant.

13 MR. BROOKMAN: Do you wish to comment?  
14 Please. Microphone and say your name.

15 MR. YILMAZ: Yeah. Ayk Yilmaz, AHRI  
16 again.

17 I just wanted to clarify the error that  
18 is being corrected here. Is it something that's  
19 manifested in AFUE? Or is it limited to that EF  
20 that you're talking about?

21 MR. FRANCO: Thank you for clarifying.  
22 It's related to EF. Once you recalculate your

1 AFUE values, those would be additional inputs to  
2 that calculation. So that might change a little  
3 bit.

4 But these calculations, again, are  
5 separate from AFUE. They're not being used in  
6 calculating AFUE.

7 MR. YILMAZ: Okay. So, I guess I'm just  
8 trying to maybe address Harvey's question there.  
9 When you're talking about comparing a single-  
10 stage furnace to a modulating furnace that has  
11 the same AFUE, you're not talking about version A  
12 of the same furnace that's single-stage, and  
13 version B of the same furnace that's modulating.

14 You're talking about furnace one that's  
15 single-stage and a completely different furnace  
16 that's a different design that's step-modulating,  
17 that when you do an AFUE test on it, you get the  
18 same efficiency result. And that's not because  
19 of any impact that is due to the modulating; it  
20 could be because of a completely different  
21 furnace design.

22 MR. FRANCO: That is correct. Yes. And

1 that's a complication between actually comparing  
2 just a single unit and the change, because the  
3 change will have the impact of the AFUE  
4 difference from the other (inaudible).

5 MR. YILMAZ: Okay. So then, I guess just  
6 to summarize then, the AFUE is an accurate  
7 representation of how -- or as accurate as we can  
8 expect to get of a single-stage furnace's  
9 efficiency or a modulating furnace's efficiency.  
10 But when we're talking about one that has the  
11 same AFUE, we are talking about something we'd  
12 expect to have the same fuel consumption over the  
13 course of the year.

14 And it's really just about that EF number  
15 that ends up being different because of that  
16 error between how it's calculated for single-  
17 stage and modulating?

18 MR. FRANCO: Yes.

19 MR. SACHS: This is Harvey.

20 And I thank you very much. I have not  
21 reviewed the test procedures since the last time  
22 we did rulemaking, and you caught me. I had

1 forgotten that we go to a lot of work to compute  
2 something that's -- EF that's not used in AFUE.  
3 So.

4 MR. YILMAZ: It's been over a decade.

5 MR. BROOKMAN: Joanna Mauer, welcome.  
6 You are now unmuted.

7 MS. MAUER: Thanks. I had two questions.  
8 One is just a basic question. For a two-stage  
9 furnace, how does the steady-state efficiency  
10 compare at low-fire and high-fire?

11 MR. FRANCO: This is from -- you -- from  
12 our test data?

13 MS. ARMSTRONG: Why don't we just let  
14 them answer?

15 MR. BROOKMAN: Diane, please.

16 MS. JAKOBS: That is a matter of the  
17 design. We have choices.

18 MS. MAUER: So it's going to change.

19 MS. JAKOBS: It's going to change. It  
20 depends.

21 MS. ARMSTRONG: Okay. And it's not  
22 necessarily higher at the low-fire stage then?

1 MS. JAKOBS: We can design it that way.

2 If --

3 MS. ARMSTRONG: They're shaking their  
4 heads no. You can't see them, but they're saying  
5 not, no.

6 (Laughter.)

7 MS. JAKOBS: Yeah.

8 MS. MAUER: Okay.

9 MS. ARMSTRONG: It's not necessarily.  
10 They can design it one way or the other; let's  
11 put it that way.

12 MR. VERSHAW: Jim VerShaw from Trane.

13 It's difficult to get the excess air  
14 level at the same level at low-fire and high-fire  
15 because it's difficult to get the inducer motor  
16 to slow down enough. And so, that's why actually  
17 on our condensing two-stage furnaces, we have an  
18 inverter-driven motor because we had to slow it  
19 down farther in order to get the numbers we want.

20 Otherwise, the excess air goes up. The  
21 dew point goes way down. You can't condense  
22 anything. It's a little easier on non-condensing

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1 furnaces. But it's just really kind of driven by  
2 what you can do with excess air.

3           And as far as the numbers, they're pretty  
4 close. You know, it's a point one way or the  
5 other. It's not substantially higher on low-  
6 fire.

7           MR. BROOKMAN: Joanna, you said you had  
8 two questions?

9           MS. MAUER: Victor, I did take a quick  
10 look at the LBNL paper that you mentioned. And I  
11 just wanted to make sure kind of I understood the  
12 kind of general conclusion, which seemed to be  
13 that there may not be gas savings in the field  
14 from two-stage furnaces. Is that correctly -- a  
15 correct interpretation?

16           MR. FRANCO: That is correct. But again,  
17 that is comparing two models that are at 80-  
18 percent AFUE that are tested. And it's not  
19 comparing the same model being tested as a  
20 single-stage and as a two-stage. So it is  
21 comparing two different models both at the same  
22 efficiency level.

1 MS. MAUER: I see. Okay. Thank you.

2 MR. BROOKMAN: Thank you.

3 MR. FRANCO: So, any last comments on  
4 this --

5 (Cross-talk.)

6 MS. ARMSTRONG: Yeah. So we're going to  
7 close out the part relating to ASHRAE 103 before  
8 we do a summary of a couple of our other changes  
9 that are outside of ASHRAE 103. So at this time,  
10 if anyone has any other comments or issues or  
11 questions relating to ASHRAE 103 that they would  
12 like to bring up at this time, we welcome them.

13 MR. BROOKMAN: Ayk, please.

14 MR. YILMAZ: Ayk Yilmaz, AHRI.

15 I was just waiting for this slide before  
16 I jumped back to the issue of the, what was item  
17 1.B), the off-cycle losses for products with long  
18 post-purge time. And I guess the comment was  
19 made that this is a type of -- the products that  
20 have post-purge times longer than three minutes  
21 tend to be oil boilers. And I noticed that an  
22 oil boiler was not one of those items that was

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1 tested under the research.

2           So, I guess, two-part question. Number  
3 one, has there been an analysis of the fraction  
4 of products that might be affected by this change  
5 by product class, not just looking at oil  
6 boilers, but other types? And number two, is  
7 there an understanding of what the impact on AFUE  
8 might be from this change?

9           And I ask that question as trying to  
10 understand what the impact might be on the  
11 minimum efficiency standards from this change.

12           MR. FRANCO: Thank you so much for that  
13 question. We weren't actually able to get a  
14 model that fit that description of the post-purge  
15 for oil boilers. And so, we don't know the exact  
16 impact in terms of magnitude, whether it was --  
17 what it would be, if it was half an AFUE point,  
18 less than that. We don't know.

19           MS. ARMSTRONG: Well, I think -- this is  
20 Ashley from DOE.

21           I think what you're hearing is, no, we  
22 didn't test one. And we'd welcome data if you

1 have it, so, to help inform.

2 MR. BROOKMAN: Jeff.

3 MR. KLEISS: You could read my mind.

4 Jeff Kleiss, Lochinvar.

5 Just before we get off of the 2007 ASHRAE  
6 103 statement, I want to be clear about this,  
7 that it looks like what may -- by going to this  
8 standard, we may reduce the test burden for  
9 furnaces. But we will increase the test burden  
10 for boilers. And by that, I mean you would force  
11 us to go back and retest all of our existing  
12 products.

13 And if there's some way -- I'm not  
14 opposed to updating to the newer standard if we  
15 can find a way to do that that does not force us  
16 to go back and retest existing product when we  
17 don't expect there to be a change in the AFUE's.  
18 So if --

19 MS. ARMSTRONG: Okay. So, that's a good  
20 lead-in, Jeff. Thanks.

21 So I do want to confirm. You do not  
22 believe that any of the changes, at least with

1 regards to 2007 that we've proposed, will change  
2 your AFUE ratings as they exist today?

3 MR. KLEISS: That's a bit of a dicey  
4 question from the -- I'm sorry; Jeff Kleiss,  
5 Lochinvar -- from the standpoint that we don't  
6 have a calculator to use right now. And the  
7 specifics of how that calculator works may affect  
8 our AFUE's and have changes of several tenths of  
9 a percent, which could be significant when it  
10 comes to whether or not we meet certain  
11 efficiency rebate thresholds.

12 But that aside, I've run calculations on  
13 our products as they're updated. And I believe  
14 that they would be very small impacts.

15 MS. ARMSTRONG: So, to answer, you know,  
16 when you're thinking about making your written  
17 comments with regards to DOE's proposal and the  
18 potential adoption of ASHRAE 103, the way we look  
19 at retesting, if you have a previously tested --  
20 so this is going to answer Diane's question  
21 earlier, too.

22 If you have a previously tested and

1 certified model, no retesting will be necessary  
2 as long as the rating is still valid. If you  
3 have a previously tested and certified model  
4 whose rating is no longer valid, then you must  
5 test to the next procedure, rerate, and recertify  
6 before 180 days, at least under the proposal the  
7 way it was written.

8 MR. BROOKMAN: Diane.

9 MS. ARMSTRONG: Hang on one second; one  
10 more.

11 MR. BROOKMAN: Oh, I'm sorry. Yeah. No,  
12 this is good.

13 MS. ARMSTRONG: And if you have a new  
14 model introduced post the effective date of the  
15 test procedure, clearly for those you would need  
16 to use the new test procedure to rate and certify  
17 before distribution in commerce.

18 So, you know, if you can make the  
19 determination that your ratings would not change,  
20 you would fall into that first bucket for which  
21 previously tested and certified and no retesting  
22 is necessary.

1           MR. BROOKMAN: I want to make sure, Jeff,  
2 do you want to follow on, Jeff?

3           MR. KLEISS: Yeah, Jeff Kleiss.

4           I just want to know, where is that in the  
5 proposed rule?

6           MS. ARMSTRONG: So, that's the way our  
7 regulations work generally. That's what it says  
8 with regards to adoption of a test procedure,  
9 which is effective 30 days and for which must be  
10 used after the 180-day representation point. But  
11 I did want to clarify the three buckets in a  
12 little bit more what I would call plain language  
13 that I understand a little better. Hopefully,  
14 it's helpful to you.

15          MR. BROOKMAN: That was very helpful, I  
16 think.

17          Diane, please.

18          MS. JAKOBS: So, the way I would process  
19 things, I would say if you think that you would  
20 pass a verification test, that you would be okay  
21 and no one from DOE would expect to look at our  
22 records and see a test output that reflects the

1 new standard and was dated after the new test  
2 procedure. It's more like how -- it's more  
3 important how your appliance actually operates  
4 and whether or not you meet the regulation as it  
5 would be verified.

6 MS. ARMSTRONG: Generally speaking, I  
7 think you've said it another way. And it goes to  
8 twofold with compliance and then, obviously,  
9 valid rating. So. Seemingly, though, if you  
10 have test data, historical test data that  
11 underlies your rating, your rating continues to  
12 be valid even though the test procedure has  
13 changed. You maintain that historical data, and  
14 you're good.

15 MR. BROOKMAN: I wish to underline a  
16 little bit of this conversation. And I don't do  
17 this very often. Ashley, it strikes me that you  
18 were very careful the way you just stated all of  
19 that.

20 MS. ARMSTRONG: I was.

21 (Laughter.)

22 MR. BROOKMAN: Okay. I just wanted to

1 make that as an underlined statement.

2 Okay. Frank Stanonik.

3 MR. STANONIK: Frank Stanonik, AHRI.

4 All right. And the one thing that I  
5 would -- I want to rephrase in terms of what  
6 Ashley was saying is that she indicated that if  
7 your rating, I think you said doesn't change or  
8 is still valid -- I'm sorry, is still valid, that  
9 in fact no retesting would be required.

10 And I would just want to emphasize, at  
11 least I understand that to mean that if this  
12 revised test just happened to, if you would, if  
13 you had run it, raised your rating by some points  
14 or whatever, that you could continue to use your  
15 old rating under the idea that you now are  
16 conservatively rating and it's still valid.

17 MS. ARMSTRONG: That is correct.

18 MR. STANONIK: Okay.

19 MS. ARMSTRONG: Our regulations allow for  
20 that.

21 MR. STANONIK: Right. And one follow-up.  
22 I certainly appreciate and agree with what Ashley

1 has presented, but I'm going to ask that, I  
2 think, we would need something a little more  
3 formal from the legal counsel side of this.  
4 Because, you know, again, the letter -- my  
5 reading of the regulations says that your new --  
6 once a new test procedure, your rating has to be  
7 based on testing to the new procedure.

8           And, Ashley, I think what you said would  
9 allow that that may not totally be the case. And  
10 so I think we would need to make sure that's  
11 clear.

12           MR. BROOKMAN: Eric Stas.

13           MR. STAS: Eric Stas.

14           Will you please put that in your written  
15 comments? And it will be addressed in the final.

16           MR. STANONIK: Okay.

17           MS. ARMSTRONG: So, I just want to go  
18 back and address one point that Jim asked  
19 earlier. And you said with regards to the  
20 rounding, and I don't have a slide on this, and  
21 I'm completely high-jacking the middle of this  
22 presentation to go off key here. But, so excuse

1 that.

2 But we actually got a request from AHRI  
3 to do that. And the comment came in from Lennox  
4 Carrier Rheem and AHRI supporting that, saying  
5 that that's currently common industry practice.  
6 That's why your comment at the beginning threw me  
7 a little off guard with regards to the rounding.

8 MR. VERSHAW: Well, I try to do that  
9 whenever I can, you know.

10 (Laughter.)

11 MS. ARMSTRONG: Well, you fully  
12 accomplished it this time.

13 MALE VOICE: Good work, Jim.

14 MS. ARMSTRONG: Congratulations.

15 So I will say, if for some other reason  
16 we misunderstood the request or the comments that  
17 came in with regards to the RFI, please, please  
18 do clarify that for us. Because that is not  
19 something I anticipated.

20 MR. VERSHAW: Well, this is Jim VerShaw  
21 again.

22 I guess if -- we try to follow the letter

1 of the law, which says that you have two tests.  
2 And if they're close enough together  
3 statistically, take the average, and that's your  
4 rating. And if we're rating something at 95.6  
5 and the new test procedure makes it 95.5, one-  
6 tenth lower, it's no longer a legal rating,  
7 right? According to the way the rule is written.

8 MR. BROOKMAN: Frank Stanonik.

9 MR. STANONIK: I'm not going to ask --  
10 answer that question.

11 (Laughter.)

12 MR. STANONIK: But in regards to the  
13 issue you've raised, Ashley -- and I'm going to  
14 look to Ayk to confirm. But my understanding for  
15 furnaces, we have continued to provide our  
16 certification point reports to the nearest tenth.

17 Unfortunately, our friends at EPA and the  
18 ENERGY STAR for boilers gummed up the works on  
19 boilers. But on furnaces, we're still reporting  
20 to the nearest tenth to DOE. And it's been  
21 accepted. Well, because it was an influx thing.

22 MR. VERSHAW: And you'll find ratings --

1 this is Jim.

2           You'll find ratings from our products  
3 that are in the tenths. Okay?

4           MS. ARMSTRONG: Well, then you do have  
5 that test data.

6           (Laughter.)

7           MR. VERSHAW: And that's my concern. I  
8 don't have the test data, the 2007. And if it  
9 drops it by -- and if the average drops by a  
10 tenth, and according to this, you've got 0.8 plus  
11 just about -- it's about 0.3, 0.4 drop, on  
12 average, you know, I don't know how we could  
13 still rate it at that if it was down two-tenths.

14           MS. ARMSTRONG: So, I think your point is  
15 taken.

16           MR. VERSHAW: Yeah.

17           MS. ARMSTRONG: So, given the discussion  
18 we just had about when you have to retest, the  
19 different, the three -- what I would call the  
20 three different conditions, the clarifications  
21 regarding rounding, think about it. And in your  
22 written comments, please clarify, you know, if

1 you do propose changes -- I mean if you do  
2 support the proposed changes, but, you know,  
3 believe -- you know, want more time, whatever it  
4 is. Clarify your desire.

5 MR. VERSHAW: This is Jim again.

6 And again, going back to burden, we don't  
7 know. We don't know if it's going to be higher  
8 or lower until we run the test. And so, it puts  
9 us in a real catch-22 if we're going to have to  
10 run the test to find out if we don't have to run  
11 the test.

12 (Laughter.)

13 MR. VERSHAW: And that's just -- that's  
14 just -- something's wrong there. You know? And  
15 then I guess, if you really want to gum up the  
16 things, ASHRAE 103-2015 is going to be improved  
17 over 2007, and there are some things in there  
18 that you ought to consider adopting when it comes  
19 out.

20 MS. ARMSTRONG: Okay.

21 MR. BROOKMAN: Thanks.

22 Jeff, go ahead.

1 MR. KLEISS: Jeff Kleiss, Lochinvar.

2 And just going back to the -- what the  
3 DOES does require and doesn't require in terms of  
4 existing data, I have folders behind my desk that  
5 have the test data and the lower confidence level  
6 calculation to verify our product ratings.

7 So, if I have those and those tests are  
8 run to the old standard, and we adopt the new  
9 standard, then what legal verification do I have  
10 that those old ratings are valid to substantiate  
11 my product to DOE should that question ever be  
12 raised?

13 MS. ARMSTRONG: This is Ashley from DOE.

14 I think that gets to Frank's point, and  
15 asked a little earlier, that Eric asked him to  
16 put in writing with a little bit more detailed  
17 confirmation. I'll pass on your concern-slash-  
18 question to the proper person, which is Laura, to  
19 potentially clarify as she may wish for you guys.  
20 Okay?

21 MR. BROOKMAN: Okay.

22 Final comments?

1 Frank, please. Final comments on this  
2 segment, questions? We're due for a break.

3 Frank, before we go to break, go ahead.

4 MR. STANONIK: Frank Stanonik, AHRI.

5 One other question, because I didn't want  
6 to forget it. And -- okay. In this part,  
7 there's certainly a whole section where  
8 essentially it is just some recalculations. And  
9 I think it was Jeff or Diane, one of them  
10 mentioned that in fact we have a very old AFUE  
11 calculation tool.

12 I'm just curious. By any chance, is  
13 there a tool that you use that might be available  
14 for simply running that little group of  
15 calculations to see what the difference is when  
16 you plug in numbers X, Y, and Z? Just a  
17 question.

18 MS. ARMSTRONG: You've asked me this for  
19 a number of products now, Frank.

20 (Laughter.)

21 MS. ARMSTRONG: I think that's a great  
22 thing that AHRI should do for their members.

1           However, I will say that we did test at a  
2 third-party lab. We did get them to use -- so I  
3 have to go back and check. Typically, when we  
4 test at third-party labs, we make them use these  
5 like test data templates, which implement the  
6 equations and in Excel-based format. I don't  
7 know if we had one for this or if we actually had  
8 them write everything out. I can't remember off  
9 the top of my head.

10           If we have one, it will be posted online.  
11 We make them all available online. If it's  
12 online, obviously, you're welcome to use it as  
13 you may wish. If we don't have one, I'm not sure  
14 if we will be creating one or not. Typically, we  
15 use them for all our verification enforcement  
16 testing. It helps us get some things -- a level  
17 of documentation there that both we desire, but  
18 other people desire when they look at the test  
19 data.

20           So, I'll get back to you and let you  
21 know.

22           MR. STANONIK: All right. And -- Frank

1 Stanonik, AHRI.

2 I mean, to Ashley's point and some good-  
3 natured ribbing there, I will tell you that AHRI  
4 certainly intends that, once we do have a revised  
5 test procedure, we will be looking at creating a  
6 new software tool, because it's time. Among  
7 other things.

8 MS. ARMSTRONG: And we'd be happy to work  
9 with you.

10 MR. STANONIK: Because the people who  
11 know Fortran are far and few between anymore. So  
12 we want to get it to at least the twentieth  
13 century.

14 (Laughter.)

15 MS. ARMSTRONG: Yeah. Like I said, we'd  
16 be happy to work with you on that.

17 MR. BROOKMAN: Aniruddh.

18 MR. ROY: Aniruddh Roy, Goodman.

19 Victor, I just have a question for you on  
20 slide 26, on bullet 3. You mentioned standby and  
21 off mode. So that would be consistent with IEC  
22 62301 (Second Edition)?

1 MR. FRANCO: Second edition; that's  
2 correct, yes.

3 MR. ROY: Okay.

4 MR. FRANCO: And there's no proposed  
5 changes at this time.

6 MR. ROY: Okay. Thanks.

7 MS. ARMSTRONG: That's already in the  
8 current test procedure now.

9 MR. BROOKMAN: Thank you, Ashley.

10 Let's take a break. It's now 2:40 by  
11 that clock up there, which means we'll -- yeah.  
12 Let's try 10 minutes. Yeah. Let's see if we can  
13 do it in 10, which means at 2:51 we're going to  
14 resume here in this room. You know where the  
15 restrooms are. Make sure and wear your badges  
16 visible here in the Forestal Building.

17 (Whereupon, at 2:40 p.m., a recess was  
18 taken, to resume at 2:54 p.m.)

19 MR. BROOKMAN: Okay. Let's resume, then,  
20 please.

21 I want to say that I think the  
22 conversation has been really productive this

1 afternoon already, and we hope that continues.

2 And we're going to pick up where we left off.

3 MR. DILLON: Great. Good afternoon. My  
4 name is Ross Dillon, from Lawrence Berkeley  
5 National Laboratory.

6 Next I'll be talking about the -- can you  
7 hear me?

8 (Pause.)

9 MR. BROOKMAN: Thank you. Here we go.

10 MR. DILLON: I will be talking about the  
11 measurement of condensate under steady-state  
12 conditions.

13 The current test procedure requires the  
14 establishment of steady-state conditions during a  
15 minimum period of 30 minutes before measurement  
16 of condensate. The measurement of condensate  
17 requires an additional 30-minute period following  
18 the establishment of steady-state. DOE's  
19 proposed revision would allow the measurement of  
20 condensate during the establishment of steady-  
21 state conditions. This change impacts the test  
22 procedure through a reduction in test burden

1 resulting from shorter overall test duration.

2           The figures in this slide present the  
3 test results from DOE's product testing. These  
4 results reflect the condensate mass production of  
5 a single condensing hot water boiler. This is a  
6 single-stage unit.

7           This figure represents the combined  
8 duration of the two tests per section 9.1 and 9.2  
9 of ASHRAE 103-1993, which is incorporated by  
10 reference. The orange shaded area is the first  
11 30-minute period during which steady-state  
12 conditions are established. Is that orange  
13 definitive?

14           (Simultaneous speaking.)

15           MR. DILLON: Okay. The second 30-minute  
16 period is the additional 30 minutes required by  
17 the current test procedure for the measurement of  
18 condensate. As you will notice, the rate at  
19 which condensate is produced remains constant  
20 between the two periods, and the overall  
21 collection distribution remains relatively  
22 consistent.

1           DOE requests comment on the proposal to  
2 allow the measurement of condensate during the  
3 establishment of steady-state conditions.

4           MR. VERSHAW: Jim VerShaw.

5           Am I reading it right, you've got 218  
6 grams after it ran for 30 minutes and then took  
7 it, versus 215 if you took it during the time?

8           MR. DILLON: Correct. That's the total  
9 value during each period.

10          MR. VERSHAW: So, is this going to be an  
11 optional shortening? If we want to just get  
12 every gram of water we could, we would wait and  
13 do 30 minutes and then do it?

14          MR. DILLON: The test procedure will  
15 allow -- it proposes to allow it to collect  
16 condensate during the establishment of steady-  
17 state. However, I believe your --

18          MR. VERSHAW: So, but if I don't want to  
19 shorten my time. If I want to get three more  
20 grams of water, can I establish steady-state,  
21 then take 30, then do a condensate collection?

22          MR. DILLON: That's up to you.

1 MR. VERSHAW: Okay.

2 MS. ARMSTRONG: I wouldn't -- so if  
3 that's what you want to do -- this is Ashley from  
4 DOE.

5 The way I read the test procedure, it  
6 doesn't exclusively allow that. So if that's  
7 what you want the option of doing, you should  
8 make that clear. Sounds like that's a yes.

9 MR. BROOKMAN: Diane.

10 MR. VERSHAW: I'll make it clear.

11 MS. ARMSTRONG: Okay. Thanks.

12 MS. JAKOBS: This is Diane from Rheem.

13 And that was the reaction I got in our  
14 lab, that it's more important to make sure  
15 everything is on the correct temperature. And  
16 they want to make sure that our tests are  
17 repeatable. And, you know.

18 MS. ARMSTRONG: So you want the freedom  
19 to go longer if you want to? Recognizing that --  
20 I will say, with this proposal, DOE would do the  
21 first 30. So that's okay for you?

22 MR. VERSHAW: Well, I don't know about

1 that.

2 (Laughter.)

3 MS. ARMSTRONG: Fair enough. Thanks a  
4 lot.

5 (Laughter.)

6 MR. BROOKMAN: Yes, please, Ayk.

7 MR. YILMAZ: Ayk Yilmaz, AHRI, again.

8 I just want to clarify how this data was  
9 taken. Was it -- was all the water, or rather  
10 all the condensate collected cumulatively? And  
11 then the intervals are just subtractions between  
12 each measurement interval?

13 MR. DILLON: No. It was 30-second  
14 interval measurements.

15 MR. YILMAZ: So then, I mean, I guess,  
16 with regard to that cup that you're collecting it  
17 in, supposedly, are you emptying it after every  
18 30 seconds and then filling it back up and  
19 measuring it?

20 MR. DILLON: I believe the interval  
21 measurement weight was the difference between the  
22 total weight at the initial 30 seconds and the

1 total weight at the following 60 seconds.

2 MR. YILMAZ: I got you. But you're  
3 keeping all that water in the container?

4 MR. DILLON: Correct.

5 MR. YILMAZ: Okay. Thank you.

6 MR. BROOKMAN: Judd Smith has a comment.  
7 Joining us online, Judd should now be unmuted.

8 MR. SMITH: Hello. Can you hear me?

9 MR. BROOKMAN: Yes. Sounds good.

10 MR. SMITH: Yeah, as the test lab, I  
11 would prefer to do one or the other and not have  
12 an option. Because we might test it wrong. If  
13 one manufacturer wants the 30 minutes after  
14 steady-state, or the 30 minutes during steady-  
15 state. We won't get that right. We'll adjust up  
16 to 15, we'll get 100 percent wrong.

17 MR. BROOKMAN: Make sure and include it  
18 in your comments, Judd.

19 MR. SMITH: Okay.

20 MR. VERSHAW: This is Jim VerShaw again.

21 MR. BROOKMAN: Jim, please.

22 MR. VERSHAW: This is a boiler. Boilers

1 act a lot different than furnaces. You don't  
2 have any data on what happens if you do a furnace  
3 in 30 minutes during the heat-up cycle? Because,  
4 you know, the heat exchangers are getting boiler  
5 -- boiler, the water temperature stays about the  
6 same the whole time. And you've got a really  
7 nice condensing system there, and it's not going  
8 to make a whole lot of difference, I think, to  
9 the little bit I've done with boilers back in the  
10 1900s.

11 (Laughter.)

12 MR. VERSHAW: Yeah, they had rivets  
13 holding them all together.

14 (Inaudible interjections and laughter.)

15 MR. VERSHAW: But furnaces start off  
16 cold, and you might get more water than you would  
17 normally. That might -- you know, might be a  
18 good thing. Maybe I want to do the first 15  
19 minutes and not the next 30. I mean, I wish you  
20 had data for that to say this was really a good  
21 idea. I don't. I don't know.

22 MS. ARMSTRONG: Okay.

1 MR. BROOKMAN: Thanks, Jim.

2 Harvey Sachs.

3 MR. SACHS: It's many decades ago that I  
4 took calculus and had to think about some of  
5 these things. But it seems to me that in 2015,  
6 you could define it by the trend becoming  
7 constant, that you're converging on a moving  
8 average, this within 1 percent of the same  
9 addition or X percent, and that that's really  
10 what you're trying to do. So you can truncate  
11 when you're confident instead of either arbitrary  
12 interval.

13 And that would take care of Jim's  
14 concerns. It would take care of the boiler-  
15 versus-furnace. And it could be written out as a  
16 pretty simple statement that would be available.

17 MR. BROOKMAN: Okay.

18 MR. SACHS: I can't write it out.

19 MR. BROOKMAN: Okay. Thank you, though.

20 Additional thoughts, comments on  
21 condensate?

22 Yes. Diane.

1 MS. JAKOBS: I was just thinking if you  
2 can imagine we run a pilot run. We have a whole  
3 bunch of furnaces. We storm outside in the lean-  
4 to. And it might even be cold in Arkansas. But  
5 there's a variety of temperatures, you know, and  
6 we just really -- it's an area of variation that  
7 we might not be familiar with now. And I guess  
8 we're a little worried about what it would  
9 introduce. So, thank you.

10 MR. BROOKMAN: Okay. Thank you.

11 MR. SACHS: This is Harvey. And, Diane,  
12 please accept my suggestion as for the next  
13 version of 103.

14 (Laughter.)

15 MR. BROOKMAN: Okay. We're moving on.

16 MR. DILLON: The next topic is related to  
17 the electrical consumption of auxiliary  
18 components. The current test procedure does not  
19 capture all the electrical consumption of a  
20 boiler or furnace. The current test procedure  
21 measures only the blower or circulation pump  
22 power, the inducer, blower power, the ignition

1 power, and the standby mode and off mode power.

2           These measurements may not capture all  
3 the electrical consumption of a boiler or  
4 furnace. DOE's proposed revision includes the  
5 measurement of additional electrical auxiliary  
6 components consisting of the secondary pump, if  
7 present, the gas valve, and the controls.

8           Included in this slide is an example  
9 calculation of the average annual electrical  
10 energy consumption, expressed as E-sub-AE, for a  
11 single-stage furnace or boiler. The highlighted  
12 terms represent the measured power of the  
13 additional components, where B-s represents the  
14 measured electrical power of the secondary pump  
15 and E-sub-O represents the measured power of the  
16 other components, in other words, the gas valve  
17 and the controls.

18           Also included are two additional Y terms,  
19 Y-S and Y-sub-O, which account for the ratio of  
20 the components' on-time to the average burner on-  
21 time.

22           The figure in this slide presents the

1 test results from DOE's product testing related  
2 to the measurement of component electrical power  
3 for the high and reduced fire of a two-stage  
4 furnace model. The figure presents the measured  
5 power in watts for each of the electrical-  
6 consuming components. According to these  
7 results, there is measureable auxiliary  
8 electrical power associated with components not  
9 captured by the current test procedure  
10 requirements.

11 As noted by the red highlighted area,  
12 these components account for 7 percent and 11  
13 percent of the total electrical power for the  
14 high and reduced fire, respectively.

15 DOE requests comment on the proposed  
16 changes, to include measurement of additional  
17 component electrical power for calculating the  
18 annual auxiliary electrical use.

19 MR. BROOKMAN: Yes. Michael McCabe.

20 MR. McCABE: Mike McCabe.

21 It's more of a question, including for  
22 DOE ENERGY -- excuse me, EPA ENERGY STAR and the

1 FTC labeling. But do you know if those two  
2 programs include the requirement that  
3 manufacturers report not only AFUE but also  
4 annual energy use?

5 MR. BROOKMAN: Diane.

6 MS. JAKOBS: Diane.

7 The E-sub-AE is used in the calculation  
8 of little e, which is part of the ENERGY STAR  
9 requirement. But it's a ratio. It's the  
10 electrical consumption over the sum of the  
11 electrical consumption and the gas consumption.  
12 So we get the 2 percent. But it's part of the  
13 calculation, but it's not specifically required.  
14 It's kind of a -- the number depends on the  
15 capacity. So it's hard to put it in perspective.

16 MR. McCABE: Because if the manufacturers  
17 have to include in the AHRI directory, which  
18 satisfies the FTC labeling requirements -- have  
19 to include the annual energy use, then the  
20 addition of these additional electrical energy  
21 use is going to change the measure of annual  
22 energy use for most, if not all, products. Would

1 it not?

2 MR. DILLON: It depends. It depends on  
3 how the electrical use is currently being  
4 measured by the manufacturer.

5 MR. BROOKMAN: Frank Stanonik.

6 MR. STANONIK: Frank Stanonik, AHRI.

7 That may be the case. But certainly,  
8 presenting this information -- maybe not. I  
9 guess I'm trying to understand why it was felt  
10 that you needed to identify the electrical energy  
11 separately of the gas valve and the controls,  
12 because from my understanding, when you look at  
13 PE, the burner electrical power, and as it's  
14 measured, I don't see how you are not inherently  
15 measuring whatever energy is going on at the  
16 controls, because the controls have to be  
17 operating for the burner to operate.

18 And that's electrical -- if there is  
19 electrical consumption, my understanding is that  
20 you'd be getting that -- you'd be getting that  
21 energy consumed as you measured PE. Is that not  
22 the case?

1 MR. BROOKMAN: I saw Diane first.

2 MS. JAKOBS: This is Diane.

3 And there is actually a diagram and how  
4 you wire up the test --

5 THE COURT REPORTER: Is your mic on?

6 MS. JAKOBS: Oh. I turned it up. I  
7 don't know what I did. But anyway --

8 MR. BROOKMAN: There is actually a  
9 diagram.

10 MS. JAKOBS: So it's Diane Jakobs.

11 And I would say in our listings, E-sub-AE  
12 includes the control and the gas valve. It's  
13 everything else except the blower, is the way we  
14 have interpreted the standard.

15 MR. BROOKMAN: Okay. Jeff.

16 MR. KLEISS: Jeff Kleiss, Lochinvar.

17 And I would say with all the burner -- or  
18 boiler manufacturers that I have worked for, we  
19 have done the total electrical power consumption  
20 at the hookup for the boilers. So that includes  
21 the controls, the gas valve, all the components  
22 are captured in that measurement.

1           So I would want to be clear that if  
2     adopting this change is not going to require us  
3     to go back and now hook up and read individual  
4     measurements.

5           MR. BROOKMAN:   Okay.   Frank?

6           MR. STANONIK:   Well, I'll let DOE answer.  
7     Well, okay.   I mean -- Frank Stanonik, AHRI.

8           I mean, to Jeff's point, again, reading  
9     this slide and this example calculation, they are  
10    introducing EO, which would be a separate  
11    measurement of your gas valve consumption.   So,  
12    to me, the intent clearly is they would make you  
13    measure that separately.   And I guess --

14          MS. ARMSTRONG:   I think -- so this is  
15    Ashley from DOE.

16          I think the intent is, I think what we  
17    found is that people aren't doing it the same  
18    way.   So what we are doing is making it explicit  
19    that it should be all electrical consuming, like  
20    you have been taking your measurements now.

21          So, to Jeff's point, if he has been  
22    taking them that way all along, his ask is, DOE,

1 can you clarify that my measurement is valid?

2 And so we will take that back.

3 MR. BROOKMAN: Okay. Thank you for that  
4 clarification.

5 Yes, Ayk.

6 MR. YILMAZ: Ayk Yilmaz, AHRI, again.

7 Just to address a different point, which  
8 is a secondary boiler pump electrical energy  
9 consumption, you had stated that we're going to  
10 be using a measured pump consumption for the BE.  
11 But in fact, under the current 103-2007, the  
12 primary energy BE is a nameplate pump energy;  
13 it's not a measured pump energy.

14 And I guess I completely missed the  
15 addition on this when I was going through it,  
16 because there wasn't any addressing of test  
17 apparatus or test setup and how to measure pump  
18 power consumption. So, what I would, without  
19 having really thought about this too, too much,  
20 but what I would recommend is to consider  
21 defining secondary pump energy the same way  
22 primary pump energy is defined, which is by the

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1 nameplate.

2 MR. BROOKMAN: Thank you. Okay.

3 Yes, Aniruddh.

4 MR. ROY: Aniruddh Roy, Goodman.

5 Just on slide 33, could you just explain  
6 the 7 and 11 percent, again?

7 MR. DILLON: The 7 percent is related to  
8 the electrical power measurements of the high  
9 fire for the controlling gas valve. So it's 7  
10 percent of the total consumption and 11 percent  
11 of the reduced-fire electrical consumption,  
12 electrical power.

13 MR. BROOKMAN: Are we ready to move on  
14 now? Okay.

15 MR. DILLON: The next --

16 MR. BROOKMAN: Oh, pardon me, I missed --  
17 okay, no. Please proceed.

18 MR. DILLON: The next topic is the  
19 proposal of the smoke stick test for verifying  
20 flow through the heat exchanger. The current  
21 test procedure has three approaches for  
22 determining the value used for the off-cycle flue

1 gas draft factor.

2           The first method measures the draft  
3 factor using the tracer gas test. However, the  
4 tracer gas test may produce unreliable results  
5 for a draft factor of less than 0.1. In place of  
6 conducting the tracer gas test, the DOE test  
7 procedure prescribes default draft factors.

8           For units designed such that there is  
9 absolutely no air flow through the heat  
10 exchanger, a minimum default draft factor of 0.05  
11 is allowed. With respect to the use of the  
12 minimum default draft factor, the current test  
13 procedure does not provide a method for  
14 establishing absolutely no air flow. DOE's  
15 proposed revision prescribes the use of a smoke  
16 stick test to verify the absence of flow through  
17 the heat exchanger.

18           Following execution of the smoke stick  
19 test, two paths will be followed. If no visual  
20 disturbance of smoke is demonstrated, the use of  
21 a minimum default draft factor is allowed. If a  
22 visual disturbance of smoke is demonstrated, then

1 either the tracer gas test would be performed or  
2 the default draft factor would be used.

3 In addition to the smoke stick test, DOE  
4 is proposing to remove, in the test procedure,  
5 the term "absolutely" when referencing to no air  
6 flow through the heat exchanger.

7 MR. BROOKMAN: Jim.

8 MR. VERSHAW: Yeah, Jim VerShaw.

9 Can you describe how that test would be  
10 run with the smoke stick and what a smoke stick  
11 is?

12 (Inaudible interjections and laughter.)

13 MR. BROOKMAN: For the record, Jim says  
14 they don't allow smoke in the building -- smoking  
15 in the building.

16 MR. DILLON: Oftentimes, there is puffer,  
17 puffer sticks are used for smoke stick tests.  
18 And the test is described further in detail in  
19 Appendix N of the NOPR.

20 And essentially, what the test prescribes  
21 is to, based on a minimum height and a minimum  
22 distance away from the combustion intake, you

1 place the stick following, I think it's two or  
2 three minutes after the boiler has been shut off.  
3 And you would visually observe to make sure that  
4 there's no induction of air into the combustion  
5 air intake.

6 MR. BROOKMAN: Yes, Jeff.

7 MR. KLEISS: Jeff Kleiss, Lochinvar.

8 And I kind of get where you're going with  
9 that. But I personally say thank you for this.

10 There's been some -- I've had arguments,  
11 discussions with third-party labs about a valid  
12 method, what they would accept for testing the  
13 presence of draft. And this clarification will  
14 be of significant value to us and help to  
15 simplify our testing.

16 MS. ARMSTRONG: This is Ashley from DOE.

17 And I think Jeff just explained very well  
18 why we ended up proposing it. We had similar  
19 issues with different things we were seeing at  
20 labs. So, perhaps Jim has a better way to do it.  
21 Open to it. But there was a problem that we were  
22 seeking a solution for, and this is the proposal

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1 that we went out with.

2 MR. BROOKMAN: So, Jeff, thanks for that  
3 comment. That's helpful. That is.

4 Jim?

5 MR. VERSHAW: I just missed this one. I  
6 was just asking questions about it. So that's  
7 all. Yeah, I was more concerned about air flow  
8 in the lab and how we're going to do that.

9 MS. ARMSTRONG: So I --

10 MR. VERSHAW: And if somebody can fix  
11 their venting such that it doesn't -- you know --

12 MS. ARMSTRONG: So this is Ashley from  
13 DOE. Points well taken. We had issues with the  
14 tracer gas as well. So, I don't know that, you  
15 know... This was the best solution we came up with  
16 and that's why we proposed it. Obviously, we're  
17 open to other ones. But we did see a problem  
18 here that we were trying to fix.

19 MR. BROOKMAN: Okay. We're moving on.

20 MR. DILLON: The next topic applies to  
21 the test ductwork for units that are installed  
22 without a return duct. For units that have been

1 designed to be installed without a return duct,  
2 DOE believes that the test setup requirements are  
3 not sufficiently specific.

4           The current test procedure specifies the  
5 use of a return duct for all furnaces according  
6 to the incorporated-by-reference section 7.2.1 of  
7 ASHRAE 103-1993. DOE proposes to not require a  
8 return duct during testing of units intended to  
9 be installed without a return duct.

10           DOE requests comment on the proposal to  
11 add a provision to the test procedure, clarifying  
12 that the return duct is not required during  
13 testing for units intended to be installed  
14 without a return duct, according to the  
15 manufacturer's I and O manual. DOE requests --

16           MR. BROOKMAN: Comments? Comments here?  
17           (No audible response.)

18           MR. BROOKMAN: Robert Glass asks, How  
19 does one calibrate a smoke stick under ISO lab  
20 certification?

21           (Laughter.)

22           MS. JAKOBS: Thank you, Robert.

1 (Laughter.)

2 MR. BROOKMAN: I should note that there  
3 is a little bit of chuckling in the room. Okay.  
4 We'll get a move-on then.

5 MR. DILLON: The next topic applies to  
6 the test requirements for multi-position  
7 configurations. It is common practice that some  
8 furnaces may be designed such that they can be  
9 installed in multiple configurations -- in other  
10 words, up-flow, down-flow, horizontal flow. For  
11 these types of furnaces, DOE believes that the  
12 test setup requirements in the current test  
13 procedure are not sufficiently specific.

14 DOE proposes to require that the multi-  
15 position furnaces be tested using, at a minimum,  
16 the least-efficient position. DOE is also  
17 proposing to allow testing using the blower door  
18 instead of one of the inlet openings for  
19 multiple-position furnaces shipped with no inlet  
20 opening.

21 DOE requests comment on its proposal to  
22 allow testing of units configured with multiple

1 position installations to use a blower access  
2 door as an option instead of one of the inlet  
3 openings.

4 MS. ARMSTRONG: So, this is Ashley from  
5 DOE, just to explain a little bit further where  
6 this came from.

7 When we went to a lab to do furnace fan  
8 testing, these questions came out of it. And so,  
9 there were some questions provided to DOE about,  
10 what do we do for furnaces? Because there is  
11 some specificity in the furnace fan test  
12 procedure, and what this is aimed to do is  
13 provide some harmonization there.

14 MR. VERSHAW: Well, this is Jim VerShaw.

15 We go to a lot of lengths to make sure  
16 the blower door is not open when we run a  
17 furnace. On our furnaces, the upper door won't  
18 stay on if you have the lower door off. And then  
19 you have to tape or jumper out the door switch.  
20 We -- I'm not so sure, I'm not sure, I don't  
21 think I've seen a furnace without an inlet.

22 MS. ARMSTRONG: So, there was one brought

1 up. So the question was asked; I can tell you  
2 that for certain.

3 MR. VERSHAW: Okay.

4 MS. ARMSTRONG: What would you do? So if  
5 you have one, we're going to use open inlet, no  
6 issue. But if you don't, the question was asked  
7 of DOE, "What do we do?" And so this is our  
8 clarification there.

9 MR. BROOKMAN: Dave?

10 MR. WINNINGHAM: This is Dave.

11 There are some products where it's got  
12 like maybe a bottom knock-out, or, you know,  
13 where the side --

14 MR. VERSHAW: We've got a panel that you  
15 have to take out. Yeah.

16 MS. ARMSTRONG: The panels and the knock-  
17 outs, I wouldn't call --

18 MR. VERSHAW: It's not open.

19 MS. ARMSTRONG: This wasn't a situation  
20 exactly we were dealing with.

21 MR. VERSHAW: Okay.

22 MS. ARMSTRONG: Fully. But this exact

1 question was asked of DOE.

2 MR. BROOKMAN: Frank Stanonik.

3 MR. STANONIK: Frank Stanonik, AHRI.

4 Without knowing the magnitude of the  
5 effect, this one clearly is -- would require some  
6 models to be rerated, just assuming that since  
7 the requirement now spells out that you're going  
8 to have to test it at least, at a minimum, at the  
9 least-efficient position, which would suggest  
10 that it wasn't as clear before.

11 This, you know, again, this seems to  
12 clearly would require rerating of some products.  
13 That is going to get into the issue of, you know,  
14 whether they are meeting the minimum.

15 MS. ARMSTRONG: Yes. So this is Ashley  
16 from DOE.

17 That is my understanding of what is done  
18 now. Obviously, I welcome comments on that.  
19 That is the suggestion we got for clarification  
20 from the industry. So, that was what I was  
21 understanding was being done today anyway. So it  
22 was our understanding that it would not impact

1 ratings, as you suggest. But like I said, I  
2 could be wrong.

3 MR. STANONIK: Frank Stanonik, AHRI.

4 Now, actually, I also believe that's what  
5 was being done today. And I was a little  
6 concerned because when DOE raised it, it raised  
7 the question, was somebody doing it differently?  
8 Okay. Okay.

9 MS. ARMSTRONG: No, no. I think that's  
10 fair. Thanks. We agree.

11 MR. BROOKMAN: Thanks, Frank.

12 MR. DILLON: The next topic is the  
13 proposal of the verification test for automatic  
14 means for adjusting the water temperature in hot  
15 water boilers. In 2008, DOE published a  
16 technical amendment to add design requirements  
17 for hot water boilers consistent with the  
18 provisions of EISA 2007.

19 The design requirements require an  
20 automatic means for adjusting the water  
21 temperature for gas-fired, oil-fired, and  
22 electric hot water boilers. DOE's proposed test

1 method would be used only in the case of  
2 assessment and enforcement testing by DOE, which  
3 is to be specified in 10 CFR 429.134. Currently,  
4 there is no test for functional verification of  
5 automatic means. DOE's proposed revision  
6 includes separate verification methods for hot  
7 water boilers with single-stage and two-stage  
8 modulating control.

9           DOE believes this allows for the  
10 necessary verification of boiler automatic means  
11 functionality. Also, manufacturers do not have  
12 to conduct this testing. These verification  
13 methods will be used by DOE to determine if a  
14 given basic model complies with the applicable  
15 design requirements.

16           MR. BROOKMAN: Jeff.

17           MR. KLEISS: Jeff Kleiss, Lochinvar, of  
18 course.

19           The first comment that I have about this  
20 is the test procedure that you have for single-  
21 stage boilers is verification of whether or not  
22 there's -- the call for heat is satisfied by

1 residual heat in the boiler. That is an optional  
2 method for automatic means for single-stage  
3 appliances. It is not the only allowed means.

4 And yet, the test procedure that you have  
5 written here, that is the only allowable means to  
6 verify automatic means -- compliance. That needs  
7 to be changed.

8 MS. ARMSTRONG: So, explain to me what  
9 your options are now.

10 MR. KLEISS: Currently, the requirement  
11 for automatic means is that you would adjust your  
12 temperature set point based on demand or heat  
13 load requirement, which is your test procedure  
14 that you have for multi-, two-stage, and  
15 modulating products.

16 And then, there is an option within the  
17 automatic means clause that single-stage  
18 appliances may check for meeting the heating  
19 requirement with residual heat in the boiler.  
20 That is an option.

21 So, what I'm saying is that the test to  
22 determine if you're complying with automatic

1 means for single-stage boilers should not only be  
2 based on residual heat in the boiler. But they  
3 should be allowed to be tested by the same test  
4 procedure as the two-stage and modulating  
5 boilers.

6 MS. ARMSTRONG: All right. Thank you.

7 MR. BROOKMAN: Yes, Frank.

8 MR. STANONIK: Frank Stanonik, with AHRI.

9 Again, I appreciate what's been said here  
10 as far as the impact. But again, I'm getting  
11 tangled up in what I believe are the regulations.  
12 So, it was mentioned at the end that  
13 manufacturers do not have to conduct this  
14 testing. It will be how DOE will determine if a  
15 model complies with the design requirements, but  
16 if I'm submitting a certification report to DOE,  
17 don't have to do it?

18 MS. ARMSTRONG: Don't have to do it.

19 MR. STANONIK: Don't have to do it.

20 Okay. All right. Right.

21 MS. ARMSTRONG: So, this is Ashley from  
22 DOE.

1           So, this is kind of new territory for DOE  
2 in the past couple of years. So perhaps I can  
3 explain a little bit. It is a design standard.  
4 As you certify today, you certify compliance with  
5 that design standard. It's more or less an  
6 affirmation that you've manufactured the product  
7 and it complies with that design standard.

8           So, Frank, we're not looking for anything  
9 from the test. We're not even looking for the  
10 test data for you. However, if we get a  
11 complaint, if we purchase a product for  
12 assessment or verification purposes, we will run  
13 this test to assess whether you comply with that  
14 design standard. This is how we are going to  
15 gauge it.

16           So this is so you know, so you don't have  
17 to run it. But if you want to know what we're  
18 going to do, and obviously you should know what  
19 we're going to do, this is a method we will be  
20 running. Does that help?

21           MR. BROOKMAN: That was clear. That  
22 explains it.

1           Please, Jeff.

2           MR. KLEISS: Jeff Kleiss, Lochinvar.

3           To that end, there is -- the method is  
4 fairly vague as far as -- and I know that's  
5 intentional, because there's a wide variety of  
6 different methods of automatic -- satisfying  
7 automatic means.

8           But within that, there is no -- nothing  
9 is listed as far as what is required to comply.  
10 There's a test method. And you get a result out  
11 of the test method of a certain time that it  
12 takes, the delay, for the burner to come on or  
13 something like that. But there's no indication  
14 of what does and does not constitute compliance.

15          MS. ARMSTRONG: Got it. Thank you.

16          MR. KLEISS: And if I may continue, I do  
17 have some concern as a participant in a VICP  
18 [voluntary industry certification program]. And  
19 we submit data, and we fill in a check-box to  
20 say, yes, we do have an automatic means. Is this  
21 something that will become a requirement that if  
22 you're participating in a VICP, that at some

1 point we're going to have to test to this rather  
2 than fill in our check-box?

3 MR. BROOKMAN: Say what a VICP is.

4 MR. KLEISS: Voluntary Industry  
5 Certification Program.

6 MR. BROOKMAN: Got you. Thank you.

7 MS. ARMSTRONG: So, I don't think that's  
8 for DOE to answer, *per se*. I think that's  
9 dependent upon your VICP. I mean, that's -- the  
10 VICPs are run by the industry programs. What  
11 we're just trying to do here is make it crystal  
12 clear in the cases of when we get into an  
13 assessment or an enforcement setting, how we are  
14 going to judge you.

15 So your points are well taken about some  
16 of the ambiguities that may be in the test  
17 procedure as it was proposed, and we will look  
18 into that. But I don't think DOE has any comment  
19 on the requirements of a VICP.

20 MR. KLEISS: Jeff Kleiss, Lochinvar.

21 And just from that standpoint, DOE does  
22 have certain requirements to accept data from a

1 VICP, and I guess that's where I'm directing my  
2 question.

3 MS. ARMSTRONG: Okay. So, this is Ashley  
4 from DOE.

5 So that's just certification data. And  
6 so that would go back to Frank's question. This  
7 test is not being proposed as a certification  
8 test that you need to do in advance of certifying  
9 your products and distributing in commerce. It's  
10 still going to have a check-box. There was no  
11 companion change to the cert report here.

12 But this is just purely a verification  
13 and enforcement test, which is why you see it  
14 located in 429.134 instead of in the Appendix  
15 with the test procedure.

16 MR. BROOKMAN: Okay. Thank you, Ashley.

17 Additional questions, comments, before we  
18 move on?

19 (No audible response.)

20 MR. BROOKMAN: Okay.

21 MR. DILLON: All right. Great.

22 The following slide includes details

1 related to the design requirements for hot water  
2 boilers and the known methods used to fulfill  
3 those requirements. The requirements and methods  
4 apply separately to the type of boiler, single-  
5 stage and two-stage. The design requirement for  
6 single-stage hot water boilers specifies that the  
7 requirement may be satisfied by providing an  
8 automatic means that allows the burner or heating  
9 element to fire only when the means has  
10 determined that the inferred heat load cannot be  
11 met by the residual heat of the water in the  
12 system.

13           DOE's understanding is that the common  
14 method for fulfilling this requirement is what is  
15 referred to as thermal pre-purge. This method  
16 delays burner activation until the residual heat  
17 of the boiler water cannot meet the heating load,  
18 thus using no fuel when operating using residual  
19 heat.

20           The design requirement for two-stage and  
21 modulating hot water boilers specifies that  
22 controls will automatically adjust the

1 temperature of the water supplied by the boiler  
2 to ensure that an incremental change in inferred  
3 heat load produces a corresponding incremental  
4 change in the temperature of water supply.

5           There are two commonly used methods for  
6 fulfilling this requirement -- outdoor reset and  
7 inferred load. The outdoor reset method adjusts  
8 supply water temperature in response to changes  
9 in outdoor air temperature, resulting in lower  
10 fuel input at higher outdoor air temperatures.  
11 The inferred load method uses outdoor and indoor  
12 temperature, thermostat demand, and/or burner  
13 cycling patterns to infer heating load and adjust  
14 the supply water temperature, resulting in lower  
15 fuel input at lower inferred loads.

16           The figure in this slide presents the  
17 test results from DOE's product testing  
18 associated with the proposed test for  
19 verification of automatic means for single-stage  
20 hot water boilers. The intent of this test is  
21 for a boiler containing residual heat to verify a  
22 delay in burner ignition following a call for

1 heat.

2           Supply water temperature is presented by  
3 the red dotted line. Inlet water temperature is  
4 presented by the blue dotted line, and gas  
5 consumption is presented by the green dotted  
6 line.

7           After the boiler is set up according to  
8 the prescribed method, the warm-up and  
9 stabilization period occurs and is represented by  
10 the gradual increase in supply water temperature  
11 at the point of stabilization, which occurs at  
12 the first box. After temperature stabilization,  
13 the call for heat is terminated at the next box.

14           The test method allows a delay of up to  
15 three minutes prior to re-initiating the call for  
16 heat. After the time delay, the call for heat is  
17 re-initiated. Immediately after the call for  
18 heat, the burner was monitored for ignition. A  
19 delay in burner ignition was observed of roughly  
20 45 seconds in this case, which is shown by the  
21 elapsed time between the call for heat and the  
22 burner ignition, the last two boxes.

1           The figure in this slide presents the  
2 test results from DOE's product testing,  
3 associated with the proposed test for  
4 verification of automatic means for two-stage and  
5 modulating hot water boilers, utilizing the  
6 outdoor temperature reset method.

7           The purpose of this test is to observe  
8 the response in supply water temperature as a  
9 result in change in outdoor air temperature.  
10 Supply water temperature is presented by the red;  
11 inlet temperature presented by the purple line;  
12 gas consumption, by the orange; and simulated  
13 outdoor temperature, by the green.

14           After the boiler is set up, warm-up  
15 initiated, and water temperature is stabilized  
16 according to the prescribed test method, the next  
17 step would be to activate the automatic means  
18 functionality, if that's necessary.

19           At the first box, the next step was to  
20 establish the simulated low inferred load  
21 conditions as presented by the high outdoor air  
22 temperature, which is seen on the first arrow on

1 the green line.

2           The next step was to establish the low --  
3 pardon me. Following the simulation of low  
4 inferred load conditions, the supply water  
5 temperature was allowed to stabilize. Once  
6 stabilized, the next step consisted of  
7 establishing the high inferred load conditions,  
8 which occur down here at the second arrow on the  
9 green line.

10           The high inferred load conditions were  
11 established by placing the outdoor air  
12 temperature sensor in an ice bath. Following  
13 placement of the outdoor temperature sensor into  
14 the ice bath, it was observed that the supply  
15 water temperature began increasing after a short  
16 delay. Once the supply temperature stabilized,  
17 the test was complete.

18           (Pause.)

19           MS. ARMSTRONG: I'm going to pause here.  
20 Does anyone have any last-minute questions on the  
21 verification procedures before we go to our  
22 closing remarks and kind of wrap up for the day?

1 Sure.

2 MS. JAKOBS: This is Diane from Rheem.

3 And on slide 32, I don't know if I wasn't  
4 paying attention. But you added a couple of new  
5 terms to the equation for E-sub-AE. And it's  
6 related to the ignition. Is that right? That's  
7 the way I --

8 MR. DILLON: This is Ross Dillon.

9 The BE-sub-S term is for the secondary  
10 pump if present. And the E-sub-O term is for the  
11 gas valve and controls.

12 MS. ARMSTRONG: So, Diane, to your point  
13 earlier -- this is Ashley -- you raised, said  
14 that's the way you were testing all along, that  
15 you were already incorporating that electrical  
16 consumption of your valves holistically into the  
17 terms. So we're going to take that back and take  
18 a look at it.

19 MS. JAKOBS: Okay. But I think I --  
20 well, I just want to clarify for myself. I  
21 thought you were going to take the electrical  
22 consumption during the ignition. So like our hot

1 surface ignition, or spark ignition, there's  
2 different electrical consumptions depending on  
3 how you light the gas. I might have read a lot  
4 more into it.

5 MR. BROOKMAN: Frank?

6 MS. ARMSTRONG: That's already in there,  
7 right?

8 MR. STANONIK: Frank Stanonik, AHRI.

9 Isn't there a term for that already?  
10 Yeah.

11 MR. DILLON: There is a term for the  
12 ignition. That was wrong.

13 MS. ARMSTRONG: That's already in there  
14 now.

15 MS. JAKOBS: Okay. All right. Thank  
16 you.

17 MS. ARMSTRONG: So, seemingly, we have  
18 some more ambiguities, perhaps, in this equation.  
19 We'll take it back and look at it. The intent,  
20 though, is to capture the electrical consumption  
21 wholesale.

22 MR. HUNT: This is Marshall Hunt, PG and

1 E.

2 But what I'm hearing is you can capture  
3 without breaking it out?

4 MS. ARMSTRONG: Yep.

5 MR. HUNT: Okay.

6 MR. BROOKMAN: Diane, did you get  
7 everything you wanted to say said?

8 MS. JAKOBS: I have to go home and read  
9 it again.

10 (Laughter.)

11 MR. BROOKMAN: Okay.

12 MS. JAKOBS: Thank you.

13 MR. BROOKMAN: You've got another five-  
14 ten minutes if you want to look.

15 Ayk.

16 MR. YILMAZ: Ayk Yilmaz, AHRI, again.

17 Is this the appropriate time to bring up  
18 topics about the test procedure that haven't been  
19 addressed in the public meeting?

20 MR. BROOKMAN: I think so. Yes.

21 MR. YILMAZ: Okay. I didn't hear much  
22 discussion about some of the modifications that

1 have been made to the setup of the gas and oil  
2 burners specifically with relation to the flue,  
3 O2 or CO2 adjustments. And it's on page, at  
4 least of the pre-publication, page 133 and 135.  
5 It's section 7.3 and 7.5 of the test procedure.

6           And I guess I was just hoping to get some  
7 statement from the developers of this about how  
8 the 30th percentage range was arrived at and the  
9 default O2 or CO2 levels were arrived at in the  
10 absence of direction from the I and O manual of  
11 the appliance.

12           MR. BROOKMAN: Just make sure that  
13 microphone is working there.

14           Victor, is that you?

15           (No audible response.)

16           MR. BROOKMAN: Ayk, stay at that  
17 microphone. Stay there.

18           (Pause.)

19           MR. FRANCO: Is it on?

20           MR. BROOKMAN: I think it's on, yes.

21           MR. FRANCO: Could you repeat that  
22 question once again?

1           MR. YILMAZ: Sure. Sections 7.3 and 7.5  
2 of the test procedures relate to the setup of the  
3 gas and oil burners, respectively. And there's a  
4 modification to the ASHRAE 103-2007 test  
5 procedure with relation to that.

6           And my question is specifically regarding  
7 the instructions to set up the burners to either  
8 the 30th percentile of the range specified in the  
9 furnace's or boiler's I and O manual, or in the  
10 absence of such a specification, a combustion air  
11 flow to provide a specified O2 or CO2; depending  
12 on whether it's a gas or oil burner, it changes.

13           And I was hoping to get some explanation  
14 about how those procedures were arrived at.

15           MR. BROOKMAN: Well, I see Frank has a  
16 comment here.

17           MR. STANONIK: Dave and Mark, you're  
18 really not whispering. Thank you. We can hear,  
19 and it's disrupting the discussion here. Sorry.

20           MR. BROOKMAN: So, thanks for restating  
21 the question.

22           Victor?

1           MR. FRANCO: Yes. We don't have a  
2 response to that right this second. We will try  
3 to come up with that.

4           MS. ARMSTRONG: How about this? This is  
5 Ashley. We'll look into it. Let me get back to  
6 you. That's the best way to do it.

7           MR. BROOKMAN: Thanks. Now, Frank,  
8 please.

9           MR. STANONIK: Frank Stanonik, AHRI.  
10           And I did not choreograph this. But I  
11 mean, there is two issues there. First of all, I  
12 mean, it is a change. Because right now, the  
13 procedure is kind of silent, and so they just  
14 need to find a number that's inside the range.  
15 And this is much more specific.

16           But then, to that second point, what the  
17 hell is the middle of the 30th percentile? I  
18 don't understand that. So, if it's going to be  
19 specific, you know, I would hope that there would  
20 be some better language that would be clear on  
21 that.

22           MR. BROOKMAN: Can you recommend

1 something off the top of your head?

2 MR. STANONIK: Frank Stanonik.

3 In this case, no. Because I'm not --  
4 again, I'm not sure what they were telling us to  
5 do.

6 MR. VERSHAW: Jim VerShaw.

7 On furnaces, the ones that I'm familiar  
8 with, including Diane's and all the competitors,  
9 there's no air adjustment, not anymore. I mean,  
10 in the olden days you used to have shutters and  
11 such. But I mean, you set the gas, and it is  
12 what it is. Unless you go in and put a variac on  
13 the inducer or you start restricting things,  
14 you're changing orifices and taking things apart.

15 So, and I don't think anybody puts a -- I  
16 don't think anybody puts a CO2 level in their I&O  
17 manual, because the gas is so different across  
18 the country in elevations and all that stuff.  
19 You'd have people going crazy trying to hit that.

20 MR. BROOKMAN: Frank.

21 MR. STANONIK: Frank Stanonik, AHRI.

22 And, Jim, I'm sure what you're saying is,

1 you know, reflective of gas. Okay? Or at least  
2 gas furnaces. But it is a trap we all fall into.  
3 This also addresses oil. And it is very common  
4 for an oil burner to specify. And so this has --

5 MR. VERSHAW: This section was not a gas  
6 burner.

7 MR. STANONIK: Well, no. It says the  
8 same thing for oil, though. I mean, in both  
9 cases they have established that --

10 MR. VERSHAW: Well, I'm pretty parochial  
11 in my comments. I'm worried about gas burners  
12 right now, okay?

13 (Laughter.)

14 MR. STANONIK: My comment was for both.

15 MR. BROOKMAN: You're sticking by gas,  
16 and Frank is going for both.

17 MS. ARMSTRONG: Thank you. We'll look  
18 into it, on both.

19 MR. BROOKMAN: Jeff?

20 MR. KLEISS: Yeah, Jeff Kleiss,  
21 Lochinvar.

22 And I can say for many of our gas

1 products, air-fuel ratio is controllable and we  
2 do publish ranges. But to call out, to be in the  
3 middle of the range is -- that would be  
4 problematic.

5 MS. ARMSTRONG: Okay.

6 MR. KLEISS: That is, we do have  
7 procedures that have been written that do specify  
8 operating within published ranges for certain  
9 product classes. And that, I think, would be  
10 reasonable to discuss. But to force it to be  
11 into the middle is a significant change and  
12 something that we oppose.

13 MS. ARMSTRONG: Okay.

14 MR. BROOKMAN: Michael McCabe.

15 MR. VERSHAW: This is Jim one more time.

16 I would think that you would have some  
17 statement in there. If you can -- if it is field  
18 adjustable on the air side, then you do this for  
19 an air setup.

20 MS. ARMSTRONG: Sure.

21 MR. VERSHAW: But if it's not, then it is  
22 what it is.

1 MS. ARMSTRONG: Got it. Thanks.

2 MR. BROOKMAN: Michael McCabe.

3 MR. McCABE: It's Michael McCabe.

4 A couple of housekeeping issues. The  
5 Department proposed amendments to section 430.23,  
6 N2, which is annual fuel utilization efficiency.  
7 This is the section that, for example, FTC refers  
8 to in what goes on the label. And in there, the  
9 Department proposed changes to the ASHRAE  
10 standards.

11 It was referencing the rounding to one-  
12 tenth of an AFUE. But they did not change a  
13 reference to section 10.1 of Appendix N. 10.1 of  
14 Appendix M is the heating seasonal efficiency of  
15 electric furnaces and boilers. That section  
16 reference, I believe, should be to section 10.2  
17 of the new Appendix N. The old Appendix N, it is  
18 an AFUE paragraph.

19 Similarly, in the section above, which  
20 deals with the estimated annual operating cost,  
21 that section includes references to sections  
22 10.2.2 and 10.2.3 of Appendix N. In the proposed

1 Appendix N, those sections do not exist. My  
2 recommendation to the Department, on 430.23N is,  
3 look at all those sections and the references,  
4 because I believe most, if not all, need to be  
5 cleaned up and properly referred to in the new  
6 Appendix N.

7 MR. BROOKMAN: Okay. Thank you, Michael.

8 MR. McCABE: Similarly, in the proposed  
9 Appendix N, I'll just -- one example. And I  
10 believe it will apply to many sections  
11 throughout. I'm kind of looking at Eric, because  
12 Eric and I, we've had discussions about  
13 consistency. And where you lack consistency,  
14 that's where things tend to fall apart.

15 And in section 10.5.1.3, which is for  
16 furnaces and boilers equipped with step  
17 modulating controls, there is an equation.  
18 Within the equation, there are three values which  
19 are not defined. X-sub-M, B-sub-M, and 2080.  
20 The first two, X-sub-M and B-sub-M, are not  
21 defined anywhere within Appendix N. The 2080 is  
22 defined elsewhere, but for most of the equations,

1 the Department tries to define all the values  
2 that are in there, but not all.

3 And my recommendation is to go through  
4 the entire Appendix N that's being proposed and  
5 scrub it so that the equations and the  
6 definitions are consistent from one to the other.  
7 Otherwise, you know, there are going to be  
8 questions raised as to exactly what the  
9 Department is getting at.

10 MR. BROOKMAN: Okay. Thank you.

11 MS. ARMSTRONG: So, I want to make one  
12 comment in response to that. And this is Ashley  
13 from DOE.

14 So those points are well taken, and we'll  
15 look back at it. I do want to say that FTC  
16 [Federal Trade Commission] updated their  
17 requirements lately. It's harmonized now with  
18 DOE's sampling provisions in 429, as well as the  
19 test procedures in part 430, so it no longer  
20 references 430.23. However, it's well taken that  
21 we should be consistent.

22 As well as the submission of data that

1 was mentioned earlier, FTC also revised that. So  
2 there was a question about E-sub-AE and whether  
3 FTC collects that information. FTC's regs and --  
4 I can't speak for Hampton. I'm just reading the  
5 regs from my cell phone. So, but FTC did revise  
6 to require submission for DOE-covered products to  
7 DOE through CCMS. And that is also consistent  
8 with the information that DOE collects, also is  
9 the same information that FTC is now requiring,  
10 because it cross-references our certification  
11 requirement. DOE does not collect E-sub-AE at  
12 this time.

13 MR. BROOKMAN: Diane.

14 MS. JAKOBS: Just to kind of follow on  
15 after Michael. It would be nice if we didn't  
16 have all these references back and forth to  
17 ASHRAE 103. It's really confusing. I mean, we  
18 do work with a program that's kind of a black  
19 box. And it's not that we're doing something  
20 wrong because an engineer doesn't understand it.  
21 But it would be good if everything was in one  
22 place and you could point a new employee to one

1 single document. It's just very complicated and  
2 confusing.

3 MR. BROOKMAN: Okay.

4 MS. JAKOBS: So, having it back and forth  
5 between two documents makes it worse.

6 MR. BROOKMAN: Whose job is that?

7 MS. ARMSTRONG: DOE's.

8 (Laughter.)

9 MS. ARMSTRONG: So, Diane, what I'm  
10 hearing from you is you're asking us to pull the  
11 applicable provisions from ASHRAE 103 into the  
12 CFR holistically.

13 MR. BROOKMAN: Okay. Thanks, Ashley, and  
14 also Diane.

15 We're reaching the point in the day where  
16 I think we're ready to take final comments,  
17 summary comments, closing remarks here at the  
18 end, as we move towards closure. Frank.

19 MR. STANONIK: Frank Stanonik, AHRI.

20 And this is an issue that we commented on  
21 in our response to the RFI. And it doesn't look  
22 like -- well, we don't know what DOE's response

1 is. And specifically, we do think, you know,  
2 that there should be an attempt in this revision  
3 to allow some means for calculations of ratings.

4           You know, it's always been there. For  
5 the famous example, cast-iron sectional boilers,  
6 you know, we've got processes for commercial  
7 products. And since we are revising the  
8 procedure, and it would certainly have the  
9 benefit of reducing burden, you know, we had kind  
10 of suggested that there ought to be something to  
11 allow some process for rating of products through  
12 interpolation, extrapolation.

13           And I guess, Ashley, I mean, one of the  
14 questions we have is, you know, we raised that in  
15 the RFI. And I don't even see it addressed in  
16 this. I guess, so is it just not now? Or is it  
17 not ever? Or -- sorry? Or what?

18           MS. ARMSTRONG: This is Ashley from DOE.  
19           Never say never.

20           (Laughter.)

21           MS. ARMSTRONG: So, I think the answer is  
22 we're still thinking about it, which is why you

1 don't see it there. You know, it's not typical  
2 practice to allow simulation AEDM-like methods  
3 for consumer products. There are a couple of  
4 exceptions to that -- CACs [central air  
5 conditioners] being one of them. You know, we're  
6 happy to continue the conversation, though.

7 MR. STANONIK: Okay. Thanks.

8 MS. ARMSTRONG: Okay?

9 MR. STANONIK: Okay.

10 MS. ARMSTRONG: So with that, I think I  
11 just want to thank you all for coming and  
12 participating today. It was very helpful to  
13 myself, so I appreciate you taking the time and  
14 effort. Just to remind you that the comment  
15 period closes in May.

16 I do want to point out that if you do  
17 take this home with you on the flight, the docket  
18 number on the front is wrong. It's correct on  
19 that. Somehow we added the zero on the front.  
20 So if you happen to use that one through your  
21 searching, it won't actually -- it's fixed,  
22 though, in the actual docket.

1           But thank you all for coming, and we'll  
2 talk to you later.

3           (Pause.)

4           MR. BROOKMAN: Okay. Thanks, everyone.

5           (Whereupon, at 3:51 p.m., the meeting was  
6 adjourned.)

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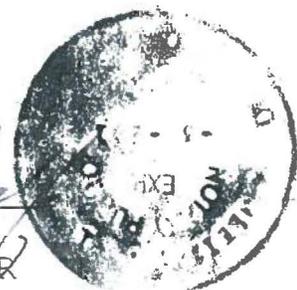
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