UNITED STATES DEPARTMENT OF ENERGY
ENERGY EFFICIENCY AND RENEWABLE ENERGY
ENERGY CONSERVATION PROGRAM
PRELIMINARY ANALYSIS OF ENERGY CONSERVATION
STANDARDS FOR WALK-IN COOLERS AND
WALK-IN FREEZERS
PUBLIC MEETING
WEDNESDAY
MAY 19, 2010

The Public Meeting convened in Room 8E-089 in the Forrestal Building, 1000 Independence Avenue, S.W., Washington, D.C., at 9:00 a.m., Douglas Brookman, Facilitator, presiding,

PRESENT

DOUGLAS BROOKMAN, Facilitator
KARIM AMRANE, Ph.D., AHRI
ERIC S. ANDERSON, Pacific Northwest National Laboratory
TIM BALLO, Earthjustice
GOPAL BANDYOPADHYAY, Ph.D., Pacific Northwest National Laboratory
WARREN L. BEETON, Emerson Climate Technologies
MICHELLE BRITT, Pacific Northwest National Laboratory
JOHN CYMBALSKY, DOE
DARYL ERBS, Manitowoc Foodservice
ERIC H. FITZ, Navigant Consulting
CLAIRE GAGNE, Navigant Consulting
CONSUELO GUZMAN-LEONG, Pacific Northwest National Laboratory
DAVE HARTMAN, HTP Group
MICHAEL KIDO, DOE
MILEN KIRILOV, Carpenter Co.
ELIZABETH KOHL, DOE
STEVE KOUSKI, Carpenter Co.

PRESENT: (continued)
MICHAEL J. KRUPA, BASF
REBECCA LEGETT, Navigant Consulting
HARMON S. LEWIS, American Panel
DAN MANOLE, Ingersoll Rand
ARISTOTLE MARANTAN, Ph.D., Navigant Consulting
JOANNA MAUER, Appliance Standards Awareness Project
GAVIN McCORMICK, Pacific Northwest National Laboratory
JON McHUGH, McHugh Energy Consultants
FRED L. MINELLI, Kysor Panel Systems
BRETT A. MITCHELL, Kason Industries, Inc.
KENNY OWEN, Master-Bilt
RONALD E. PARK, Bayer MaterialScience LLC
GRAHAM B. PARKER, Pacific Northwest National Laboratory
MICHAEL PERRODIN, Hill Phoenix
JIM PERRY, Thermal Rite
LOREN RASMUSSON, Nor-Lake
DEVIN RAUSS, Southern California Edison
R. DOUGLAS ROBERTS, ThermoCor
CHARLIE STEPHENS, Adjuvant Consulting
MICHAEL STRAUB, Heatcraft Refrigeration Products LLC
PETER STRINI, Tafco
JAKE VANDEVORT, American Chemistry Council
COLLIN WEBER, Navigant Consulting
SARAH WIDDER, Pacific Northwest National Laboratory
DAVID WINIARSKI, Pacific Northwest National Laboratory

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

2 9:02 A.M.

3 MR. BROOKMAN: Good morning,

4 everyone, and welcome. My name is Doug

5 Brookman from Public Solutions in Baltimore.

6 I'm glad to see you. This is the U.S.

7 Department of Energy's Public Meeting on

8 Energy Conservation Standards for Walk-in

9 Coolers and Walk-in Freezers. Today is

10 Wednesday, May 19, 2010.

11 Charles Llenza wanted to make

12 welcome remarks.

13 MR. LLENZA: Welcome to the

14 Department of Energy and on behalf of the

15 Building Technology Program, the Appliance

16 Standards Group, I welcome you to the Pre-

17 Analysis Public Meeting for Walk-in Coolers

18 and Walk-in Freezers. I encourage today for

19 your discussions, your comments and additional

20 information that you may provide the

21 Department as we go through this process. And

22 I welcome you back since we were here a couple

1 of months ago.
2 I see a lot of familiar faces across the room
3 here, so welcome to the meeting.
4 MR. BROOKMAN: Thank you. It's
5 our tradition to do introductions right off
6 the start, so we'll start with that. If
7 you'll say your name and organization or
8 affiliation. You may wish to find another
9 chair, so you can see the screen.
10 Your name and organization,
11 please?
12 MR. PERRODIN: Mike Perrodin, Hill
13 Phoenix Walk-Ins.
14 MR. McHUGH: Jon McHugh, McHugh
15 Energy on behalf of Southern California
16 Edison.
17 MR. MINELLI: Fred Minelli, Kysor
18 Panel Systems.
19 MR. RASMUSSON: Loren Rasmusson of
20 Nor-Lake.
21 MR. ERBS: Daryl Erbs from
22 Manitowoc Foodservice.

1 MR. LEWIS: Harmon Lewis, American
2 Panel.
3 MR. PARK: Ron Park, Bayer.
4 MR. ROBERTS: Doug Roberts,
5 Thermocore.
6 MR. MANOLE: Dan Manole, Hussmann
7 Ingersoll-Rand.
8 MR. PERRY: Jim Perry, Crown Tonka
9 Walk-ins.
10 MR. KIRILOV: Milen Kirilov,
11 Carpenter Company.
12 MR. KRUPA: Mike Krupa from BASF.
13 DR. AMRANE: Karim Amrane, Air-
14 Conditioning, Heating, and Refrigeration
15 Institute.
16 MS. MAUER: Joanna Mauer,
17 Appliance Standards Awareness Project.
18 MS. KOHL: Betsy Kohl, Department
19 of Energy, General Counsel's Office.
20 MR. LLENZA: Charles Llenza,
21 Department of Energy.
22 DR. MARANTAN: Aris Marantan,

1 Navigant Consulting.
2 MR. FITZ: Eric Fitz, Navigant
3 Consulting.
4 MS. LEGETT: Rebecca Legett,
5 Navigant Consulting.
6 MS. GAGNE: Claire Gagne, Navigant
7 Consulting.
8 MR. WEBER: Collin Weber, Navigant
9 Consulting.
10 MR. McCORMICK: Gavin McCormick,
11 Pacific Northwest National Lab.
12 MR. STRINI: Peter Strini, Tafco
13 TMP.
14 MR. KOUSKI: Steve Kouski,
15 Carpenter Company.
16 MR. BEETON: Warren Beeton,
17 Emerson Climate Technologies.
18 MR. RAUSS: Devin Rauss, Southern
19 California Edison.
20 MS. GUZMAN-LEONG: Consuelo
21 Guzman-Leong, Pacific Northwest National
22 Laboratory.

1 MR. STEPHENS: Charlie Stephens,
2 Adjuvant Consulting. I represent the
3 Northwest Energy Efficiency Alliance and the
4 Northwest Power and Conservation Council.
5 MR. BALLO: Tim Ballo,
6 Earthjustice.
7 MR. ANDERSEN: Eric Andersen,
8 Pacific Northwest National Laboratory.
9 MS. BRITT: Michelle Britt,
10 Pacific Northwest National Laboratory.
11 MS. WIDDER: Sarah Widder, Pacific
12 Northwest National Lab.
13 MR. PARKER: Graham Parker,
14 Pacific Northwest National Lab.
15 MR. BROOKMAN: Thanks to all of
16 you. Did everybody get a chance? Okay.
17 I think all of you received a
18 packet as you registered at the front desk at
19 the Department of Energy this morning and in
20 it you ought to have an agenda, a copy of the
21 Federal Register notice, and also the
22 PowerPoint slides that will be the focus of

1 presentation and discussion for today.
2 I'm going to run through the
3 agenda briefly. If you could find a copy of
4 it. Immediately following this agenda review,
5 there's an opportunity for anybody that wishes
6 to do so to make brief opening remarks, a
7 summary of the issues that are important to
8 you, maybe to cue up the conversation that
9 we'll have in greater details as the day goes
10 on.
11 In addition to that, or following
12 that, we'll have a rulemaking overview and
13 following that market and technology
14 assessments, screening analysis and
15 engineering analysis. We'll take a break mid-
16 morning-ish around about 10:45.
17 Following the break, markups for
18 equipment price determination and energy use
19 analysis. Then shipment analysis, life-cycle
20 costs, payback period analysis and national
21 impact analysis. We'll take lunch midday,
22 12:30, 12:45 or so. Following that, a

1 description of manufacturing impact analysis
2 and then continuing on, NOPR analyses, the
3 next step, if you will, utility impact
4 analyses, employment impact analyses,
5 environmental assessment and regulatory impact
6 analyses.
7 We'll take a break, mid-afternoon
8 and then proceed with a discussion surrounding
9 test procedures and after the test procedures
10 discussion, next steps and also an opportunity
11 for closing remarks.
12 I call your attention to that
13 segment there at the end, the closing remarks.
14 It's yet another opportunity for anybody to
15 raise additional issues, issues that matter to
16 you, issues that haven't been covered
17 sufficiently from your perspective.
18 Yesterday, we had a meeting here
19 and some very good stuff came out in the
20 closing segment, that's an opportunity for
21 you.
22 So that's the plan for today.

1 Questions and comments?
2 Well, I would just note that the
3 issues surrounding test procedures tend to
4 become entwined with the issues surrounding
5 standards. And the segment that we have
6 allocated on the agenda, you can see it in the
7 afternoon from about 3 to 4, as much as it's
8 possible to segment it that way I think it
9 will be useful and keep our discussion on
10 track. So I'm going to try and herd it in
11 that direction. Okay? If it doesn't work,
12 we'll find a different way to approach it.
13 There's a segment, there's a dedicated space
14 for test procedure discussion.
15 Questions about any of this? I
16 see none. So I would ask for your
17 consideration what has emerged as ground rules
18 and I think common courtesies for these
19 meetings. Please speak one at a time. Please
20 say your name for the record. I'm going to be
21 cuing people by name to speak as best I can.
22 I also wish to encourage follow-on comments.

1 Sometimes the back and forth between
2 individuals is very useful for the Department
3 as they sort through these issues.
4 You don't need to say your
5 organizational affiliation every single time,
6 just say your name. I would like for you to
7 say your name each time you speak. There will
8 be a complete transcript, a complete record of
9 this meeting and it will be posted on the EERE
10 website in the span of about seven or ten days
11 for your purposes.
12 If you would please keep the focus
13 here. Put your cell phones or other devices
14 on silent mode. If you have a sidebar
15 conversation with the person next to you for
16 more than about 10 or 15 seconds, please take
17 it out of the room. These microphones work
18 well, but the little green LED button needs to
19 be turned on in order for us to hear you. You
20 might as well just leave them on, unless
21 you're going to have sidebar conversations.
22 And if you could please, there's a

1 lot to be said, it's a full agenda, if you
2 could be concise, share the air time as we go
3 along today. And that's our plan.
4 So then final -- anything
5 additional before we proceed? Then let's
6 start.
7 MR. LEWIS: Yes, Harmon Lewis with
8 American Panel. Just quickly, covering
9 towards the PTSD, one thing of interest, you
10 want comments on the manufacturer's markup and
11 I was amazed that it exactly matched the
12 markup we've been using for years and years,
13 so my boss now thinks I'm smarter than I used
14 to be. That's the good part.
15 The other one, you expressed
16 concern at the March meeting on the small
17 business impact and just to point out that 89
18 percent of the walk-in manufacturers are small
19 business. This came out in your study and
20 that's really important. And based on that,
21 most of the cost models on all the options
22 don't track to the small business

1 manufacturer. We're about a $20 million
2 company and those costs, thinking that we make
3 millions and millions of square feet of panel
4 a year are off by a factor of 8 to 11 times,
5 so we would be at a distinct disadvantage to
6 the large manufacturers.
7 We make mostly non-display walk-in
8 coolers and freezers and as that, the
9 refrigeration sizes picked to match up with
10 those coolers and freezers don't match what
11 we've done for the 43 years we've been in
12 business and what our competition does, so I'm
13 concerned that the cost analyses and the
14 energy savings have started from an incorrect
15 premise. And I've sent in paper on that
16 already.
17 Replacement doors, the premise
18 that they only last five years, I'd love that
19 because we would have multiple sales. We only
20 build five percent replacement doors in any
21 given year. We build 1800 doors. Less than
22 85 a year are replacements. So I'm not sure

1 how your factor of five years came up.
2 Shipping costs, for us, were also
3 not aligned. We have dedicated haulers that
4 will reduce the freight on the large units by
5 over 60 percent from the numbers that you all
6 had. And then the walk-in model costs, even
7 with our markups being the same, the cooler
8 prices were 70 to 100 percent lower than what
9 the marketplace is charging and the freezers,
10 anyone from 24 to 40 percent. So other than
11 that, we'll have an interesting day.
12 MR. BROOKMAN: Thank you. And I
13 wanted to introduce Charles Llenza who wanted
14 to make a few brief comments, mostly about the
15 process forward. And then we'll take the rest
16 of the opening remarks.
17 I kind of took us out of sequence
18 there. Harmon, you were on top of it.
19 Charles Llenza.
20 MR. LLENZA: Hi, again, you will
21 see our comments boxes throughout the
22 presentation and we encourage you at those

1 points and breaks to provide your comments for
2 the record. If you have additional comments
3 or you have comments that you haven't exactly
4 formulated, you're also welcome to send those
5 in and just a quick reminder the comment
6 period ends May 28th which is a Friday.
7 Also, the comments -- this slide
8 here is just to show where the comments can be
9 sent and in which formats. The most important
10 part here is to please make sure that the
11 docket numbers are referenced so that we can
12 catalog the comments accordingly.
13 The purpose of the public meeting,
14 basically, is to present our procedural and
15 analytical approaches in terms of evaluating
16 the energy conservation standard for this type
17 of equipment. This also provides a forum for
18 discussion and in addition it provides the
19 opportunity to hear back from our
20 stakeholders.
21 So we encourage all parties here
22 attending and even those not attending to

1 submit information, data, comments,
2 recommendations, because part of the process
3 here is proposing what the Department sees as
4 a path forward in terms of getting to the
5 energy conservation standard. This process is
6 interactive, so this is will not only be our
7 standard, it's also will be your standard.
8 And so this meeting will be held,
9 we have another meeting at the NOPR stage, at
10 the Notice of Proposed Rulemaking. These
11 meetings are here to facilitate in the
12 rulemaking process. So I welcome your opening
13 remarks.
14 MR. BROOKMAN: And Harmon, that
15 was very succinct and very focused. I didn't
16 want to pinch you though. Did you get
17 everything said that you wanted to say there?
18 Okay.
19 So other brief statements here at
20 the outset about issues that matter to you?
21 Joanna?
22 MS. MAUER: Joanna Mauer. I'd

1 just like to request an extension of the
2 comment period. As of now, I think we only
3 have about a week from today to respond and I
4 think it would be helpful for stakeholders to
5 have sufficient time to respond in writing to
6 the issues that come up today.
7 MR. LLENZA: The Department will
8 take it under advisement. We've actually
9 extended it. We usually give 45 days at this
10 point in time. We've added a few days, about
11 a week, because it falls on a Friday. I'm
12 sure that if we get comments the week after
13 that, I'm not going to be ignoring the
14 comments. But I think part of our problem,
15 not problem, but part of what the Department
16 likes to do is to maintain a tight schedule,
17 although we're starting the rulemaking process
18 at this point. The problem is that we have a
19 lot to do, so -- and what we don't want to do
20 is add additional work. So would have to put
21 a notice out on everything else.
22 But the Department at this point

1 would probably not have any problems with
2 getting your comments, even if they're a few
3 days late.
4 MS. MAUER: All right, thank you.
5 MR. BROOKMAN: And I know that the
6 Department would like to receive these
7 comments sooner rather than later. If they
8 all land on May 28, 29, or 30, then that's a
9 lot to sort through. If they can be spaced,
10 that's better for the Department.
11 So then additional opening remarks
12 here at the outset?
13 Did everybody get a copy of the
14 presentation materials as they registered this
15 morning? One or two did not. So you'll leave
16 a few additional copies for us? Just leave a
17 few over here.
18 MR. McHUGH: Good morning. I'm
19 Jon McHugh and I'm here on behalf of the
20 California Statewide Investor Owned Utility
21 Codes and Standards Program bringing energy
22 efficiency to 30 million customers in

1 California.

2 As many of you probably know, many

3 of the requirements in the existing EISA

4 standard were first originally brought into

5 the California's Title 20 appliance standard.

6 So what we're talking about today is

7 important. Refrigeration consumes

8 approximately the same amount of electricity

9 as does commercial air conditioning.

10 As you probably already know,

11 there's a series of prescriptive requirements

12 in EISA and what we're here today is to talk

13 about the additional performance requirements

14 for walk-ins. And yesterday, we had a meeting

15 about commercial refrigeration and I'd like to

16 point out that there's actually kind of a

17 precedent there in terms of how to isolate the

18 appliance from the refrigeration system

19 serving that appliance.

20 And if you look at the commercial

21 refrigeration equipment, we have the self-

22 contained unit so that you can test that self-

1 contained product as compared to products that
2 are remote condensing and in that -- what you
3 do there is you look at the energy consumption
4 of that product which is, in that case, the
5 display case or the refrigerator, and then you
6 use essentially a fixed EER to describe the
7 energy consumption of the condensing unit. So
8 that allows you to sort of draw the control
9 volume around the piece sold together.
10 And of course, we've already
11 brought up the issue that a lot of times the
12 boxes are sold separately from the
13 refrigeration equipment, so we're really
14 talking about sort of drawing the control
15 volume around the unit cooler as the part that
16 makes sense to be regulated under a walk-in
17 regulation. And I think it actually calls
18 into question about sort of a broader scope
19 for the condensing unit and that that's
20 probably the subject of a different regulation
21 because those condensing units not only serve
22 walk-ins, but they can serve walk-ins and

1 display cases at the same time or multiple
2 walk-ins. And so there's a whole variety of
3 different things. That's a fairly specific
4 device and probably doesn't make sense to try
5 to regulate that remote condensing unit in the
6 same regulation.
7 So a desirable outcome of the rule
8 is that we end up with a situation where this
9 appliance standard is regulated like an
10 appliance. You know, if you buy a TV set or a
11 refrigerator, the enforcement occurs at the
12 point of sale. You can look at the
13 manufacturer's catalog. You can identify --
14 the manufacturer ideally would be identifying
15 those models that are compliant with the
16 standard. The market itself is often you have
17 the end user buying parts of the walk-in from
18 different manufacturers. It creates for a
19 very innovative and competitive market. So
20 the ability to rate individual components
21 keeps that competition in place. It reduces
22 the restraint of trade that might be affected

1 by having a unified rating of all the
2 components together.
3 And what's really important and
4 something that's currently missing from the
5 market is credible, third party information.
6 We know that there's problems with the rating
7 methods. There's a number of people that talk
8 about commercialized ratings, so to keep up
9 with their neighbor sometimes the accuracy of
10 the rating slips and to have that level
11 playing field, we need third party certified
12 ratings.
13 If you look at the standard that
14 DOE has based many of the comments or their
15 TSD is based on AHRI 1250, and I appreciate
16 the openness that AHRI did in having a very
17 open activity for incorporating comments from
18 many folks. But there are a series of
19 questions around AHRI 1250. I'm not going to
20 read each of these questions, but there's a
21 whole issue of if someone wants to rate their
22 product as a whole, for someone else to use

1 their condensing unit or someone else to use
2 their indoor unit cooler, then potentially
3 they would have to retest that product and so
4 it doesn't have the same ability to use your
5 product with a variety of different
6 manufacturers unless you have those separate
7 testing of what they call the mix-match format
8 of testing each of those components.
9 So anyway, I guess the other
10 question has to do with how do we -- some of
11 the largest efficiency measures for walk-ins
12 have to do with the various control measures.
13 And currently, it appears to me that this
14 1250 test method would require that you test
15 each of these controllers with each of the
16 products, each of the coils that you might
17 want to use them with. That would be
18 extremely costly for industry. It potentially
19 creates a barrier for new entrants into the
20 market and from my point of view it's anti-
21 competitive.
22 In terms of the TSD, there are a

1 number of measures that were not evaluated, so
2 the first one is controls that turn off
3 evaporator fans when the door is open. The
4 response was or the description was well, it
5 kind of falls between the stools in that it
6 affects both infiltration for the box and at
7 the same time it's a piece of refrigeration
8 equipment.
9 Whatever format we use, we can't
10 use the test method as a reason not to
11 evaluate cost- effective measures, so I think
12 it's important that this measure be evaluated.
13 Once you identify the savings from the
14 measure, you can always in terms of a test
15 method, you can develop a deemed savings value
16 for that particular technology.
17 Liquid suction heat exchangers,
18 even though we entered comments in our
19 original letter, they have not been evaluated
20 for this proceeding. I think it's a great
21 opportunity for modern refrigerants. Hot gas
22 defrost, not evaluated. And I was just at

1 LightFair and there's a number of LEDs.
2 There's a huge growth in LEDs for lighting.
3 Almost all of the large chains are looking at
4 LED lighting and motion controlled lighting
5 for display cases, so it's something worth
6 looking at.
7 And then there's a series of
8 questions around the TSD analysis, the issue
9 of time termination used for the base case for
10 defrost controls. Doug Scott, who is my
11 technical consultant on this project said he
12 went and looked through all of the circuit
13 diagrams and he couldn't find any that didn't
14 have temperature termination as an option. So
15 why that wouldn't be the base case and there's
16 a lot of liability issues associated with
17 using temperature termination. So it's not
18 realistic, in my opinion, that we use time
19 termination as the base case.
20 In addition, related to evaporator
21 and condenser increases in size that
22 particular measure, there was no increase in

1 fan power energy associated with that measure.
2 That also doesn't seem realistic.
3 Our understanding is that the
4 analysis is based on uncertified data with the
5 historical, but atypical, 65 degree return gas
6 temperature. And my understanding is at this
7 point we don't actually have any AHRI 1250
8 data to base the standards on.
9 And then finally, we've been
10 looking at a Title 20, which is our appliance
11 standards in California for walk-ins and we're
12 looking a variety of different measures. And
13 the largest single efficiency measure that
14 we've looked at turns out to be one that
15 doesn't seem to make it under the preliminary
16 TSD for just about all of the freezers in the
17 analysis.
18 This shows the analysis that
19 Southern California Edison did with DOE 2.2R
20 which is a whole building simulation that
21 includes modern refrigerants. So I guess some
22 of the questions I guess we'll talk about

1 later on today is whether or not the model
2 included both variable speed controls in
3 addition to just simple on/off fan controls.
4 So as I mentioned earlier,
5 freezers in the TSD did not pass the minimum
6 life cycle cost analysis that the Department
7 had done, yet when you do this analysis we
8 find a very fast, simple payback, very high
9 benefit/cost ratio and actually one of the
10 largest measures for walk-ins. So we want to
11 make sure we don't miss this.
12 So in conclusion, we want to make
13 sure that the standard is easily enforced at
14 the level of the manufacturer's catalog, that
15 performance standards build on the current
16 precedent with commercial refrigeration where
17 we only look at self-contained condensers as
18 counted as part of the walk-in. And ideally,
19 we look at a simpler unit cooler standard that
20 has two components, one which is a performance
21 component which looks at a specific efficiency
22 which is a capacity divided by its fan power

1 and also prescriptive component that looks at
2 some fairly straight-forward large energy
3 savings measures and primarily adjustable
4 variable speed fan control in response to
5 space conditions.
6 Thank you.
7 MR. BROOKMAN: Thank you. Other
8 comments here at the outset? Summary remarks?
9 Yes, Daryl.
10 MR. ERBS: Daryl Erbs, Manitowoc
11 Foodservice. I'll try to keep my comments
12 brief. I think there are three areas that I
13 have some concerns. One is a conversation
14 that I think will be ongoing for a while, but
15 it's -- or on the envelope -- how to manage
16 the compliance with a standard on performance
17 for an entire envelope that, in fact, may be
18 site-assembled from components that come from
19 various manufacturers. And there's some
20 language around. It could be the assembler.
21 In some cases that may be a pragmatic
22 solution, but in other cases, the assembler

1 may be nothing more than a local mechanical
2 contractor whose job is nothing more than
3 assembling panels and doors and he may put in
4 place, the refrigeration system. That may
5 actually be another mechanical subcontractor.
6 And I question whether those
7 people are really in a position to handle
8 responsibility for demonstration of compliance
9 with an overall performance standard. I'm
10 very concerned from an industry standpoint
11 that if those people now view themselves as
12 being liable for compliance with a federal
13 regulation, they may elect not to continue to
14 do their business for fear of the consequences
15 of noncompliance, so I think we have to really
16 look at that very carefully.
17 Around some of the other
18 provisions, and Jon made some note to it,
19 there's very little data, very little hard
20 data around performance of refrigeration
21 systems and how they work in the actual
22 application. Manufacturers publish

1 information, but they do that more for sizing
2 and other application requirements. And I
3 think I'd be cautious about reading too much
4 into all of that data. I'm not saying it's
5 bad data, but it just may not account for
6 everything that is really required to do the
7 analysis. And some of the findings in the TSD
8 amaze me. I'd like to understand more about
9 the assumptions. There isn't enough
10 information available today to understand how
11 those models were built and what are all the
12 assumptions that go into those models. They
13 contradict some of what I've learned over my
14 25 years in the industry in terms of how you
15 optimize the performance of a refrigeration
16 system. I know we have time, but I think we
17 really need to dig into that and understand it
18 as well.
19 And the third point would be to
20 remind the Department and their contractors
21 that this is a food safety issue in addition
22 to an energy issue. We have NSF and other

1 standards that may in some cases preclude all
2 of the technical options that could be used to
3 reduce energy use that -- we need to make sure
4 we don't put in place so many measures that we
5 keep people from being able to use these walk-
6 in systems for their primary purpose which is
7 food safety.
8 MR. BROOKMAN: Okay, thank you.
9 Other comments here at the outset?
10 No additional comments here.
11 Okay, so we'll get into more detail as the day
12 progresses.
13 Then let's proceed.
14 MR. LLENZA: Okay, so we
15 appreciate your comments and I have a little -
16 - a few questions and observation of some of
17 the comments made.
18 When we find problems with what
19 we're doing, we would like that the
20 stakeholders provide us their recommendations
21 on how to resolve the problems because one of
22 the things that we're struggling with is

1 making sure that what we're doing makes sense
2 and what we're doing is based on the best
3 available data that we know exists.
4 But you are the experts in the
5 industry, so we're going to rely on the
6 feedback we get from you people in terms of if
7 our models are correct or not, if the data
8 needs to be beefed up or also in terms of the
9 responsibilities of who is to certify, who is
10 the assembler, etcetera, we would like for the
11 stakeholders to help the Department in forming
12 this rule. And we're at a very preliminary
13 stage now. It's a good time to weigh in
14 heavily with your comments and our job is to
15 sort this out and organize it in such a
16 fashion under the regulation so that we can
17 have a better rule at the end of the process.
18 We are concerned about the health
19 and safety issues. That's going to be an
20 interesting part of this process because our
21 main responsibility is for the energy
22 conservation standard, but you're right, we

1 can't ignore the health and safety issues
2 either, because then it's a moot point. It
3 puts your people out of business. It doesn't
4 matter how efficient the equipment is.
5 Let me go back to the presentation
6 here. Pretty much we have by statute set
7 prescriptive standards for certain components
8 in the walk-in cooler and freezers. Also, the
9 statute has directed the Department to conduct
10 a test procedure. It is separate, but
11 concurrent. So what we've tried to do as part
12 of the process here is to make sure that every
13 opportunity we have, that when we talk about
14 the standard, we know that it's not completely
15 disconnected from
16 -- it's not disconnected from the test
17 procedure, therefore, this afternoon, we'll
18 have an opportunity to talk about the test
19 procedure again, because this is still in the
20 process of being formulated and finalized.
21 Also, the statute directs us to
22 come up with a performance-based standard for

1 walk-in coolers, walk-in freezers by January
2 1, 2012 which is the subject of this
3 rulemaking today.
4 Here you can see is a time line on
5 the rulemaking schedule. The Framework
6 Document was published January 6, 2009. And
7 the Notice for the Preliminary Analysis was
8 published April 5, 2010. We expect to issue a
9 NOPR spring 2011 and a Final Rule before
10 January 1, 2012.
11 The effective date is usually
12 three years after the rule is published, so --
13 that is January 1, 2015. So even though the
14 standard is finalized in 2012, there are three
15 years before the statute becomes effective and
16 this allows the industry to get organized for
17 the new standards the Department issues.
18 In terms of the process, this
19 slide is a little different interpretation of
20 how we are flowing through the process for the
21 rulemaking. We've had a Framework Document
22 process and today we're at the preliminary

1 analysis stage. Again, then we'll have the
2 Notice of Proposed Rulemaking which will be
3 spring 2011, and then a Final Rule by 2012.
4 And today, these are the topic
5 areas that we're going to be engaging in the
6 preliminary analysis. We have market
7 assessment and technology, screening analysis,
8 engineering analysis, preliminary manufacturer
9 impacts, energy use, markups, life-cycle cost
10 analysis, shipments and the national impact
11 analysis.
12 Again, just to emphasize, the
13 Department is developing separate standards
14 for the envelope and the refrigeration system.
15 DOE has conducted a market and technology
16 assessment and engineering analysis separately
17 from the envelope and the refrigeration
18 system. And DOE conducted downstream analysis
19 on combinations of the envelope and the
20 refrigeration classes at different efficiency
21 levels. Now again, this is a preliminary
22 analysis, so what we're doing at this time is

1 presenting what we have found from our end and
2 again, your comments are well appreciated, as
3 you can see please comment on Item 1-1 here.
4 DOE seeks comments on developing
5 separate standards for envelopes in the
6 refrigeration systems and that's also in the
7 Executive Summary as ES 4.1.
8 MR. BROOKMAN: So as Charles
9 observed earlier, when you see these comment
10 boxes, that's a cue to get extensive comment.
11 So comment on developing separate standards
12 for envelopes and refrigeration systems.
13 Daryl?
14 MR. ERBS: Hi, Daryl Erbs. I am
15 still in favor of separate standards for
16 envelopes and refrigeration standards. I know
17 when we first started discussion around the
18 test procedure, one of the original concepts
19 was could we use ARI 120 as a model. That
20 model is based on testing and integration of
21 essentially a cabinet in the case of a display
22 case and a refrigeration system or at least

1 the evaporator section. That works well for
2 display case where they're very much an
3 integral unit. Walk-ins, as we have discussed
4 many times, are supplied very often as a box
5 coming from one manufacturer and a
6 refrigeration system that may come from one or
7 more manufacturers. And there are a lot of
8 good reasons for that, in part, because there
9 are a lot of manufacturers who only make one
10 of those two components. And I don't think
11 we're going to change it in the industry. I
12 don't think it makes sense. I think that it's
13 a very well functioning way of satisfying the
14 need and I don't know if we're going to get
15 into it further, but I do want to also state
16 that I believe for the refrigeration system we
17 at least need to have the option to rate the
18 entire refrigeration system, that cutting out
19 the condensing unit from the refrigeration
20 part will stifle innovation. It will not
21 allow us to do things that you could do as a
22 matched system and I would be very much

1 against putting that restriction on the
2 refrigeration system.
3 MR. BROOKMAN: Daryl, in this case
4 are you speaking for yourself and your company
5 or are you speaking for some larger group?
6 MR. ERBS: I really have to speak
7 for myself and my company, but in our company
8 we have both conditions. We have one part of
9 the company that makes only the panel systems,
10 the boxes. We have another part of the
11 company that supplies both boxes and
12 refrigeration systems. So we kind of look at
13 it both ways and it depends on the application
14 which approach is best for the end customer.
15 MR. BROOKMAN: Other comments
16 about this approach that the Department is
17 considering?
18 Yes, Fred.
19 MR. MINELLI: Fred Minelli. I
20 agree that we should have two separate
21 performance standards, one for refrigeration
22 and one for the box, but I have some

1 difficulty understanding how a panel
2 manufacturer and as Daryl said more than 75
3 percent of the time we supply only panel. So
4 how can we be responsible for design and
5 performance of glass doors or lighting that's
6 supplied by someone else? A contractor has
7 nothing to do with refrigeration systems.
8 MR. BROOKMAN: You don't have any
9 control over the assembler?
10 MR. MINELLI: Absolutely no
11 control over design or the assembler.
12 MR. LLENZA: This is Charles
13 Llenza, Department of Energy, so how would you
14 handle a situation like that?
15 MR. MINELLI: The performance
16 standard?
17 MR. LLENZA: No, you say who would
18 be responsible for what? Who would be
19 responsible for which portions? How would you
20 handle that in the field?
21 MR. MINELLI: I think the
22 manufacturer of each component should be

1 responsible for their component. I think
2 we're seeing this in residential construction
3 where they're attempting to do a performance
4 standard, but they design an air conditioning
5 system, someone supplies the exterior siding,
6 the fiberglass insulation, but no one does the
7 performance standard on that residence because
8 there's no one who has control of the entire
9 system.
10 And walk-ins, we're pretty much
11 the same way. Someone manufactures the
12 refrigeration. Someone manufactures the
13 panels. And most cases, we don't even
14 manufacture the doors, someone else
15 manufactures the doors. The lighting comes
16 from some other contractor, some other person.
17 The entire assembly is done by someone else.
18 We do not have control of those systems.
19 MR. LLENZA: This is Charles
20 Llenza, Department of Energy with a follow up.
21 Well, the only problem that I would have, I
22 guess, or the Department would have is that at

1 the end of the day if everybody is
2 responsible, then no one is responsible
3 because the problem is you have all these
4 components and you're putting them together in
5 the field.
6 Now the performance of the
7 equipment in itself is the sum total. It's
8 not because the compressors are efficient.
9 It's not because you're using the best panels,
10 it's because in the assembly process once the
11 system is put together, this is at least my
12 observation, is the performance of that
13 equipment would have to do with putting it
14 together, picking the elements for the system,
15 and then the installation of the system
16 itself.
17 So I think part of our dilemma
18 here is how does the Department guarantee to
19 the highest level possible without over
20 burdening the industry, of course, that the
21 system performance is going to be there? And
22 so part of our task -- part of this meetings

1 purpose, is if people here have some good
2 ideas about how to do this, that you guys
3 provide us that information subsequently after
4 this meeting.
5 MR. MINELLI: Fred Minelli in
6 response. It is the end assembly that we're
7 talking about and the actual energy usage. It
8 is the end assembly and the glass door
9 manufacturer has no control over that. The
10 panel manufacturer has no control over that.
11 The refrigeration manufacturer -- none of
12 these individuals have control over that. And
13 as I've mentioned in previous meetings, this
14 certification or permitting or labeling should
15 be done by someone at the final site, someone
16 that is certifying the building or someone
17 that's approving the electrical, someone needs
18 to approve that assembly.
19 My panels aren't designed to go
20 together out of square and out of plumb. They
21 will not seal. I have no control over that.
22 If someone installs it out of square and out

1 of plumb, the energy usage would be
2 ridiculous. But I can't control that. I
3 can't do the certifying of a box that this guy
4 buys and glass doors that came from someone
5 else and lighting is installed by a site
6 electrician and a fourth or fifth party
7 assembles the entire structure. I do not have
8 control of that.
9 So if I did have control, then
10 perhaps that should be my responsibility, but
11 I think that the way these boxes are built of
12 buildings, they're not a little reach-in
13 refrigerator going down a production line and
14 you can certify it. It is a building. It has
15 walls, it has roofs, it has fastening systems.
16 It withstands roof and wall loads, wind
17 loads, seismic loads. It's a building. And
18 it has several different trades are
19 incorporated to assemble this structure.
20 So I don't know a solution. I
21 know the end site, the end location permitting
22 agencies are more in tune to what's going on

1 in the final assemble than a component
2 manufacturer.
3 MR. LLENZA: Charles Llenza,
4 Department of Energy. So at the point after
5 the equipment is assembled, is there always
6 some kind of permit process involved?
7 Somebody either certifying it? Does the
8 county send some inspector in to see to make
9 sure that -- because it's a food and safety
10 thing, too? Is there something that we could
11 -- that's consistent, that's already there
12 coming in certifying the equipment that we
13 could maybe tack on a few other issues and
14 maybe make that part of the process?
15 MR. MINELLI: There are several
16 steps in the process. You have to get
17 permitted to start with, so someone is
18 submitting drawings. Someone is submitting --
19 in many cases, the larger structures that we
20 build, we're required to submit professional
21 engineered staff drawings and calculations.
22 It goes through a permitting process. Someone

1 reviews the documents to make sure that it
2 meets a code or performance standard in this
3 case before you even build the box.
4 And then there's a Health
5 Department that goes through the same process.
6 They review the documents. They review if
7 it's NSF labeled or not, if the assembly meets
8 sanitation standards. And then there are
9 inspections throughout construction like any
10 other building so that there are many steps,
11 there are many agencies involved in reviewing
12 the design and assembly of the boxes.
13 MR. BROOKMAN: Okay. Daryl.
14 MR. ERBS: Daryl Erbs. I guess
15 from my perspective, if you break it down into
16 certain sub-classes of the components that
17 make up the entire envelope, so if you look at
18 panels, the R-value of a panel, in my view,
19 that is a performance metric. It's how
20 effective that panel is in controlling heat
21 loss through that assembly. And in fact, you
22 can include the gasketing or whatever sealing

1 system. So that's something that I think Fred
2 would agree, as a panel manufacturer, he could
3 have some responsibility for assuring that his
4 panel system meets the performance standard
5 for the heat loss for that panel system.
6 Windows or glass doors are in the
7 same category. There are well understood
8 performance metrics for glazings that can be
9 applied to those. Door seals, the
10 infiltration control through strip curtains or
11 spring doors or whatever, I think could all be
12 quantified based on their impact to the
13 overall load. And those can all be looked at
14 on a performance level and they can all be
15 managed at a manufacturer of that component
16 class level.
17 Unless the Department is looking
18 at what is restricting what people can do with
19 those individual component classes so saying
20 on a display case you can only have 50 percent
21 of the total surface area consisting of glass
22 doors, because otherwise it's too much of an

1 energy hog, I don't see how you are able to
2 regulate it at any other level than those
3 basic classes of components.
4 And then to the assembly process,
5 I think that there's already some pretty good
6 oversight on the part of the local health
7 inspectors. If you have a very shoddy job of
8 assembling the walk-in at the job site, it
9 won't be able to hold temperature. It will
10 not keep rodents and other bad things --
11 MR. BROOKMAN: Do they check that?
12 MR. ERBS: They're supposed to.
13 Now obviously with any local authority or
14 jurisdiction, you have varying levels of
15 competency, so you know, I can't say that they
16 always do, but there's a process that's
17 already in place that's driven around health
18 and in a lot of cases structural and other
19 elements that I think you should look at and
20 decide whether that can serve a purpose or do
21 you need to put in place some further
22 measures, along the lines of what's happening

1 with the housing.

2 I mean I'm going to argue that a

3 walk-in is actually a more standardized

4 construction than a building, so it ought to

5 be easier to control that than a house. But I

6 think there's a way to decompose it into those

7 pieces and still argue that again without

8 restricting how people can use these end-

9 assemblies, you're going to control the energy

10 efficiency to whatever level that's decided is

11 economically feasible.

12 MR. STEPHENS: Charlie Stephens.

13 I personally late last year researched Title

14 20 code compliance in California for walk-in

15 coolers and freezers. I spent about two

16 months looking at how Title 20 did in terms of

17 getting what was specified in their

18 regulations in the field.

19 It was a very interesting

20 exercise. As Mr. Minelli said, these things

21 are essentially a building. A permit is

22 required to install them, but what we found is

1 that the local permit requirements did not
2 trigger a local building inspection by the
3 typical people who inspect buildings. This is
4 a Title 20 product in California, not Title
5 24.
6 Title 24 is the energy code. So
7 the building inspector didn't necessarily
8 inspect this Title 20 piece of stuff even
9 though a building permit per se was required
10 to erect the thing.
11 The health inspectors could not
12 relate air infiltration to health issues.
13 It's almost impossible to walk into any
14 structure and just look at it and have some
15 grasp of what the actual air infiltration is
16 unless you put a blower door on, even a small
17 walk-in type product, you're not necessarily
18 going to know just what the air leakage is and
19 where it is.
20 There are no NFRC labels on the
21 doors, on the glass doors like there are on
22 windows, so your typical building inspector

1 had no idea what the thermal properties of the
2 glass doors were on these things. There are
3 no labels on the doors. There's no labels on
4 anything. They didn't know what kind of foam
5 was inside the panels, so they didn't really
6 know what the R-value was. There was no
7 certification paper work typically associated
8 with any of these installations. So they
9 didn't know exactly what they were looking at.
10 All they could do was sort of look at it in
11 sort of a workman-like -- you know, was it
12 installed in a workman-like manner. And if
13 they bothered to have a ladder to climb up on
14 top of some of them they could inspect the
15 refrigeration system to some extent.
16 But again, short of having the
17 catalog information for the manufacturer of
18 that particular refrigeration system, and
19 knowing anything about the unit cooler that
20 was inside and whether the matching set, if it
21 was a matching set, complied with any
22 particular level of energy performance, they

1 had no idea.

2 So the fact is what we found out

3 in California is no one knows whether the

4 installations of those units comply with any

5 rules or not.

6 MR. BROOKMAN: Then you didn't

7 have the capacity to find out yourself?

8 MR. STEPHENS: No.

9 MR. BROOKMAN: You didn't do any

10 independent testing or analysis?

11 MR. STEPHENS: No. I personally

12 inspected about half a dozen of them in the

13 field and I had contractors going through

14 check lists with people and we visited the

15 code authorities to ask questions of them. We

16 did a fair amount of research over a couple of

17 months in trying to figure out what was out

18 there and who knew what about what was out

19 there and we basically found out that no one

20 really knew much of anything about what was

21 actually out there because it was really

22 impossible find out after the fact.

1 MR. BROOKMAN: So following
2 Charles Llenza's earlier request, do you have
3 any ideas about how we would solve this
4 situation?
5 MR. STEPHENS: Well, one thing
6 that would help immensely is just having some
7 sort of label on these things or some sort of
8 paperwork, standardized paperwork associated
9 with an installation that would tell somebody
10 if they bothered to inspect, what it is
11 they're inspecting. No matter how you're
12 regulated, if there's some sort of -- an NFRC
13 label, I'll give you an example on windows.
14 Those by rule, those things don't come off the
15 windows until those have been inspected by the
16 building inspector. If that were the case in
17 a walk-in cooler and you had such a label on
18 the doors, the glass doors, the inspector
19 would come along and say okay, those meet the
20 regulations, assuming you regulate those. You
21 would have evidence that okay, those comply,
22 those comply or those don't.

1 In terms of air leakage, short of
2 a blower door, no. But I think if there's
3 some sort of a label or standard set of
4 compliance paperwork that's shipped with the
5 box, with the assembly, whatever the assembly
6 may be, then yes, at least they can go and say
7 okay, ostensibly this is what I have and after
8 a time they might learn if what they're
9 supposed to have isn't what they're actually
10 looking at.
11 But there are some issues here
12 where this crosses over between in California
13 what's a Title 20 product and Title 24 which
14 is kind of a level at which this thing ends up
15 being where compliance is the factor.
16 MR. BROOKMAN: Right. Okay, thank
17 you.
18 Yes, Fred.
19 MR. MINELLI: Fred Minelli. Just
20 a couple of additional responses to that.
21 California is high seismic. Almost everything
22 we do requires PD stamp decals on the

1 drawings. It's a very high seismic area. The
2 Health Departments -- health officials that
3 know what to look for, look for loose joints
4 because NSF requires tight joints, gasketed
5 joints. They require that, but inspection
6 agencies, permitting agencies, some know what
7 they're doing, some don't. I mean it's what
8 you're going to deal with.
9 The label issue, as of January 1,
10 2009, we put a label on all of our units that
11 stated we met the requirements of EISA because
12 our competitors didn't do that. The people in
13 the field had no idea what it was. So we
14 labeled everything just to bring it to their
15 attention. And I think the labeling is an
16 excellent idea that each component
17 manufacturer tests to DOE's criteria and label
18 that they meet that criteria.
19 MR. BROOKMAN: You label each
20 panel, each component?
21 MR. MINELLI: Well, we will label
22 a box.

1 MR. BROOKMAN: The whole box.
2 MR. MINELLI: Normally, what we do
3 is label one in each corner and one at the
4 door section, so that you can -- you see some
5 inspection agencies require labels on every
6 single panel. It just depends.
7 Some do an excellent job of
8 inspecting the end product and some ignore it
9 totally. So I think a label per component, it
10 may be the right solution in this case.
11 MR. BROOKMAN: John Cymbalsky.
12 MR. CYMBALSKY: John Cymbalsky,
13 DOE. I agree with you, but I think to come up
14 with the overall system efficiency you would
15 have, I don't know, how many thousands of
16 combinations of each component that could meet
17 the standard. For example, you might have a
18 thousand box configurations or insulation
19 levels and then you've got the door and then
20 you've got the mechanical system.
21 MR. MINELLI: Fred Minelli. There
22 aren't a thousand insulation levels. I mean

there is a limit to what manufacturers build in panel thickness and there's a test to tell you what the R-value is, so the panel manufacturer would be responsible for labeling the panel as meeting certain R-value based on ASTMC 518 which is the standard requirement now.

The glass door manufacturers already -- there's a prescriptive standard in EISA, so all they have to do is label that.

The lighting, we're going through -- there's been an issue for 20 years, so I think that -- I'm not sure who would be responsible for doing lighting labels, but some certification on that product.

MR. BROOKMAN: So as I'm thinking about this, it seems like the box is what you just described there principally, what about all of the refrigeration system. Is it possible for the labeling and for those elements, those components to somehow predict a certain level of efficiency?

1 Daryl?

2 MR. ERBS: Well, I'm going to

3 speak to that. I mean we were involved with

4 AHRI in working on a standard for specifically

5 that purpose. And it's modeled largely after

6 what's been done in the air conditioning world

7 which is refrigeration systems can be tested

8 and then through fairly simple calculation

9 methods, some measure of annual energy

10 efficiency can be derived that can be

11 published.

12 So whether it goes into an AHRI

13 certification program or it's handled through

14 some other mechanism, a value could be

15 determined for either a match system which

16 again I think there needs to be an allowance

17 for that approach because it, in my opinion,

18 has the greatest potential for really

19 optimizing energy efficiency of a system.

20 But that doesn't serve every case,

21 so we also need to allow for the individual

22 components to be somehow tested and the

1 performance stated for those individual parts.
2 But unlike the boxes, unless you get to rack
3 systems, big parallel, multiplex rack systems
4 which we're not considering that because
5 that's really more about an overall
6 supermarket or convenience store, wherever it
7 goes, but when you get down to dedicated
8 refrigeration systems for walk-ins, they're
9 not engineered to order. They may be options
10 you can put on, different types of receivers
11 or valves or things like that. So there are
12 some options, but the basic combinations of
13 compressors and heat exchangers and really
14 even the controls that go with them, are
15 finite in number and are cataloged.
16 MR. BROOKMAN: And matchable.
17 MR. ERBS: And matchable.
18 MR. BROOKMAN: What percentage
19 would you say would fit in that category, of
20 what's delivered in the market?
21 MR. ERBS: Well, when you look at
22 the 3,000 square foot and below, I would say

1 it's more than 50 percent. It depends on the
2 category. If you're in food service, it's a
3 high percentage of them are basically catalog
4 units. If you get into retail, it's a lot
5 more variable. I mean you can have a small
6 walk-in in a retail environment, but because
7 it's in a retail environment and they've got a
8 rack system, they're just going to pick a unit
9 cooler.
10 Again, the unit coolers tend to be
11 for the most part pre-engineered systems with
12 again some options. And it's up to the design
13 person to decide well, do I want one big unit
14 cooler or am I going to put three smaller ones
15 in. And that's going to depend on the layout.
16 If it's a long narrow box, they're probably
17 going to put multiple unit coolers in because
18 their job is to make sure that they get good
19 uniformity of temperature in it.
20 MR. BROOKMAN: Of course, the
21 Department's interests here are clear. They
22 want to assure in the final analysis and in

1 the final installation that it's performing to
2 a certain standard and they want every way
3 that they can to figure out how these pieces
4 are going result in that, so if it's
5 predictable.
6 Charles?
7 MR. LLENZA: Yes, in the interest
8 of trying to get through the rest of the
9 process here, in the afternoon session, we'll
10 have the point that we can come back to some
11 of these discussions. And we're very much
12 interested in hearing what the stakeholders
13 have to say about these particular issues.
14 MR. BROOKMAN: That was very
15 useful which is why that went for a while.
16 Jon, finish this off and then
17 we'll proceed with the agenda.
18 MR. McHUGH: Thanks. Jon McHugh.
19 In response to Charlie's comments about the
20 Title 20 enforcement procedure, currently
21 Title 24, which is our building standard until
22 2008, which actually the 2008 standard which

1 went into effect January 1 of this year, only
2 conditioned spaces fell under the purview of
3 Title 24. That has changed starting this
4 year, so refrigerated warehouses and
5 refrigerated spaces now fall under that
6 purview and they are inspected for the
7 building code compliance.
8 Currently, the spaces that fall
9 under the Title 20 appliance standards for
10 walk-ins, they're exempted because they have
11 to comply with Title 20. It's our expectation
12 that in the future that those will also be
13 inspected for energy, but basically our Title
14 20 standard, because of the enforceability
15 issues, is enforced on a prescriptive
16 approach, essentially like the approach that's
17 already written into EISA, so looking for
18 triple-glazed windows in the doors, looking
19 for the R-value of the wall assembly, looking
20 for the automatic door closers.
21 So EISA actually already has a
22 pretty good set of envelope measures and the

1 question is that prescriptive list of measures
2 that's enforceable, is it actually broken?
3 As long as we have these
4 prescriptive measures in place, I'm not sure
5 that the performance approach is really going
6 to get you much. And in fact, you're not --
7 for the manufacturers that think that they're
8 going to be able to reduce -- increase
9 efficiency of one thing so that they can
10 reduce the efficiency of another component,
11 EISA already actually has that backstop. So
12 I'm not so sure the Department is really
13 getting that much additional benefit from
14 performance measures around the envelope.
15 I guess the only one issue might
16 be the issue of infiltration testing,
17 potentially blower door testing. That kind of
18 testing, typically would occur at the level of
19 the building standards and that would be
20 probably most appropriately dealt with in
21 conjunction with the Department of Energy's
22 interaction with the ASHRAE 90.1 standard

1 which, in turn, forms the minimum efficiency
2 standard for all commercial buildings. So I
3 just mention that.
4 In terms of refrigeration, the
5 question is for the indoor unit whether or not
6 the indoor unit has a minimum efficiency
7 requirement regardless of the other equipment
8 that it's attached to. And that's really, I
9 think, kind of where Daryl and I are still
10 probably not exactly in line, but I think
11 overall, we agree on a lot of the other issues
12 associated with these technologies.
13 MR. BROOKMAN: We'll take this up
14 in greater detail later on.
15 Let's proceed with the next
16 segment in the agenda, market and technology
17 assessment.
18 You've got probably a couple of
19 hours to figure this out.
20 MR. FITZ: Good morning. My name
21 is Eric Fitz. Before I get started, I want to
22 -- I'll just point out two things. Actually,

1 I have a follow-up question and then just one
2 thing to point out.
3 In the last slides in the handout
4 that you have, there's an appendix, it's
5 Slides 109 to the end. There's sort of a
6 cheat sheet with all of the acronyms that
7 we'll use throughout this presentation and
8 there's also sort of a summary overview of all
9 of these different analysis points that we're
10 going to discuss. There are a lot of moving
11 parts and when we're going through these
12 detailed discussions these will help you sort
13 of ground what's going on, what are the key
14 inputs and outputs for each step in the
15 analysis.
16 I have a follow-up question for
17 American Panel's opening remarks. I just
18 wanted to clarify. You stated that there's a
19 big difference between the prices that we're
20 seeing in the marketplace for non-display
21 freezers and coolers, were you referring to
22 the manufacturer's selling price from the

1 engineering analysis in the published document
2 or are you talking about a difference in the
3 end-user price?
4 MR. LEWIS: The manufacturer's
5 selling price.
6 MR. FITZ: Okay, thank you.
7 MR. LEWIS: And the bigger concern
8 was the mismatch of the refrigeration systems
9 with the cabinets because I don't really think
10 that they would work in the coolers. The
11 freezers are over or undersized also.
12 MR. FITZ: Thank you. All right,
13 so the market and tech assessment. I'm going
14 to first discuss the market component of this
15 analysis.
16 So the main purpose is to
17 characterize what the walk-in cooler/freezer
18 market looks like, how the manufacturers
19 produce their products, basically how the
20 products should be categorized or how these
21 product classes or equipment classes, sorry,
22 should be assigned.

1 So part of this process is to
2 identify the key characteristics that
3 differentiate the different equipment that's
4 actually sold in the marketplace. And this is
5 detailed in Chapter 3 of the published TSD.
6 So these are the equipment classes
7 that the Department has proposed thus far for
8 the envelopes and the refrigeration system.
9 They're developed based on these key
10 characteristics that we've already talked
11 about this morning. So for example, for the
12 envelope, the Department is using two
13 different classes for the non-display versus
14 display units because glass doors, for
15 example, by nature have a very different
16 energy characteristic than the insulated
17 panels.
18 And because the glass doors are
19 part of the utility of that product for
20 actually displaying merchandise, DOE then sets
21 different product classes or equipment classes
22 such that it might be possible later on to set

1 different standards. Therefore, that would
2 allow a manufacturer who is selling a display-
3 type product to comply with a unique standard
4 from the non-display product.
5 All of these equipment classes are
6 mutually exclusive and collectively
7 exhaustive, so that means that there's no
8 walk-in envelope or refrigeration system that
9 falls into more than one class, but all of
10 these -- all equipment that's sold should fall
11 into exactly one class.
12 MR. BROOKMAN: And that's what we
13 hope you will comment on now. Comments
14 surrounding these classes.
15 Dan?
16 MR. MANOLE: Dan Manole. I'd like
17 a clearer definition of the multiplex system.
18 How will that include or actually not include
19 the racks? I know that the slides I
20 downloaded from internet before coming to the
21 meeting had different information slightly.
22 MR. FITZ: Sure.

1 MS. LEGETT: Sure, I can just
2 clarify. The condensing type for the
3 multiplex, we recognize that the multiplex
4 condensers themselves may serve different
5 equipment other than that particular walk-in.
6 So in that case, we would only be regulating
7 the part of the refrigeration that pertains to
8 that walk-in. That would be the unit cooler.
9 For the dedicated systems, we
10 would be regulating the system as a whole.
11 Does that answer your question? Thank you.
12 MR. BROOKMAN: Thank you, both.
13 Okay? So we still are wanting comments on
14 this array of classes that the Department
15 suggests will be sufficient.
16 Harmon. Harmon first.
17 MR. LEWIS: Yes, I have a comment.
18 In your classes, you later talk about the
19 numbers of units sold in a year. Is that
20 going to be addressed somewhere in these
21 further slides?
22 MR. FITZ: Yes, it will.

1 MR. LEWIS: I'll just wait until
2 then.
3 MR. BROOKMAN: Joanna.
4 MS. MAUER: Joanna Mauer. On the
5 equipment classes for the envelopes, I think
6 you certainly need to make an allowance for
7 the area that's the glass surface, but I'm
8 wondering whether it can just be one product
9 class and you would have some kind of an
10 equation where you would kind of utilize the -
11 - I think it's already the proposal to use
12 surface area. So whether you could kind of
13 use a weighted average of the opaque surface
14 area and the glass surface area, but just have
15 one product class.
16 MR. FITZ: We'll take that into
17 consideration.
18 MR. BROOKMAN: Other thoughts on
19 these product classes?
20 I guess what the Department would
21 like to hear is that you think this makes
22 sense.

1 Jon.

2 MR. McHUGH: So related to this is

3 the existing kind of condensing type that is

4 in the commercial refrigeration equipment

5 which is self contained versus remote. And

6 then so that would essentially make the two

7 standards match up and I believe has some

8 enforcement improvements.

9 MR. BROOKMAN: I didn't understand

10 that comment as it relates to these classes.

11 MR. McHUGH: So if you're looking

12 at the condensing type, instead of having

13 multiplex versus dedicated, have remote versus

14 self contained.

15 MR. BROOKMAN: Okay, thank you.

16 Daryl.

17 MR. ERBS: Can I ask Jon a

18 question? So Jon, by self contained, are you

19 talking about a single package versus a split

20 configuration?

21 MR. McHUGH: I'm talking about a

22 walk-in that has the condenser attached right

1 to the walk-in unit. So where you've got a
2 box with a condenser on top where the
3 condensing unit is inside the condition space
4 typically or it can be outside, if it's an
5 outdoor box, so for the smaller walk-ins.
6 MR. ERBS: And I guess from my
7 perspective, I mean we make a type of
8 refrigeration system which is all in one box
9 and then we actually cut a hole generally in
10 the ceiling of the box so that the evaporator
11 can protrude. That's a fairly small
12 percentage of our total sales. Those systems
13 for very small boxes are convenient, but not
14 used that -- the rest of them are all split
15 systems and so there are pipes that connect
16 the evaporator section to the condensing
17 section and the condensing section can either
18 be inside sitting on the roof of the walk-in
19 box or it can be outside and that's a
20 construction issue for those.
21 To me, those are dedicated systems
22 and the indoor and outdoor really pertains to

1 whether the condensing unit is designed to
2 operate over a wide range of temperatures and
3 therefore can take advantage of different
4 technologies.
5 MR. BROOKMAN: Daryl, do you think
6 that multiplex and dedicated is more
7 descriptive?
8 MR. ERBS: Yes, I like it the way
9 it is.
10 MR. BROOKMAN: Okay. Please, your
11 name?
12 DR. BANDYOPADHYAY: This is Gopal
13 from Pacific Northwest National Lab.
14 MR. BROOKMAN: Get close to the
15 microphone.
16 DR. BANDYOPADHYAY: DOE initially
17 wanted to make these names consistent with
18 what is already there for commercial
19 refrigeration equipment as suggested by Mr.
20 McHugh. But then what DOE realized is there
21 is a confusion there because of these split
22 systems which is where the condensing unit is

1 outside though it serves in the same box. And
2 also there are units where the condensing unit
3 is integrated with the box.
4 So that's why DOE thought of using
5 a common name like Mr. Erbs pointed out,
6 dedicated system, which really encompasses
7 both. And same way, because the multiplex
8 also includes the rack systems, but it also
9 might include a bank of compressors which are
10 probably together. So that's why in the
11 engineering literature DOE found that the
12 multiplex name is more common compared to the
13 rack system.
14 MR. BROOKMAN: Thank you.
15 DR. BANDYOPADHYAY: That is why
16 you use this terminology.
17 MR. BROOKMAN: Karim.
18 DR. AMRANE: Karim Amrane, AHRI.
19 I think what DOE is proposing here makes a lot
20 of sense in terms of how they define the
21 systems.
22 I guess I have a question for

1 Navigant. In the multiplex category, how do
2 you intend to rate the refrigeration system,
3 according to what test procedure then?
4 MR. FITZ: Do you want to take
5 that, Rebecca?
6 MR. BROOKMAN: Rebecca Legett.
7 MS. LEGETT: Yes, this is Rebecca.
8 So DOE's proposed test procedure that
9 incorporates AHRI 1250-2009, that has a
10 procedure for rating the unit cooler if it's
11 connected to a multiplex system which assumes
12 a certain EER multiplex system.
13 MR. BROOKMAN: Karim, okay? Okay.
14 I think the comments have been good. I'd
15 like to have additional comments, this is
16 important, these classes and how it gets
17 differentiated.
18 Any additional comments on that?
19 Charlie.
20 MR. STEPHENS: Charlie Stephens.
21 To go back to the display and non-display, we
22 had a discussion yesterday in the commercial

1 refrigeration discussion about display coolers
2 and why display area is more important than
3 volume in some of these products according to
4 the manufacturers and how important it is.
5 And it struck some of us that if
6 you have a single metric for display versus a
7 nondisplay, even if you normalize it, if you
8 normalize it to volume, you're not accounting
9 very well for the utility of the display and
10 it seems to me that you're almost in a
11 situation where you could either figure out
12 how to combine those two and get rid of one
13 whole layer of class here and simply
14 incorporate the performance of the display
15 area and the nondisplay area, the opaque
16 versus the door, and just simply come up with
17 a rated performance which again leads you back
18 to almost a component performance again, the
19 doors and the wall.
20 So regardless of how much display
21 area you have, you're optimizing the
22 performance of both and there's no

1 implications for how much display area you can
2 have. At what point, for instance, do you
3 decide that it's a display cooler? One square
4 foot of glass? Ten square feet of glass?
5 Fifty square feet of class? Two hundred?
6 MR. FITZ: Do you have a
7 recommendation for what DOE should be using?
8 MR. STEPHENS: I think it's a bad
9 idea to try to set a number and then
10 categorize this thing as a display cooler and
11 this other thing because it has one square
12 foot less glass than that as a nondisplay
13 cooler.
14 So I think you need to find a way
15 and we may make some suggestions about how to
16 do that, to not have to differentiate in that
17 way, particularly if you're going to arrive at
18 a place where you have to set a single metric
19 for this class display, and another single
20 metric for a different class, nondisplay.
21 MR. BROOKMAN: I see a
22 manufacturer or two nodding their heads, so

1 I'm going to give them a chance to speak
2 first.
3 Fred?
4 MR. MINELLI: I think maybe change
5 the description to coolers with glass doors,
6 or freezers with glass doors rather than
7 display. I don't think a window is what you
8 had in mind, is it? It's for glass doors, the
9 separation?
10 MR. BROOKMAN: Eric.
11 MR. FITZ: Yes, at this point as
12 we published in the pre-analysis, we intended
13 that it referred to glass doors.
14 MR. BROOKMAN: Daryl.
15 MR. ERBS: Actually, I agree with
16 the comment.
17 MR. BROOKMAN: Charlie's comment?
18 MR. ERBS: Yes. I'm thinking that
19 really what it comes down to is if we're going
20 to go to even at a component level, the types
21 of levels that you need to be at. If you're
22 putting a small window in a door on a storage

1 walk-in, you might not care as much about
2 things like anti-sweat control and other
3 measures, compared to a true display case
4 where a large percentage of the surface area
5 consists of glass doors. And so it becomes
6 very important that you pick the right levels
7 for the performance of those doors because
8 that's going to be 80 percent of your energy
9 use.
10 MR. BROOKMAN: Jon. I think we're
11 finishing out this segment, go ahead.
12 MR. McHUGH: Thanks. I think this
13 leads back to -- I think what Joanna was
14 saying earlier that potentially we can combine
15 the metric, look at a basically two-variable
16 equation that has opaque surface area and
17 glazed surface area.
18 MR. BROOKMAN: Thank you. Eric.
19 MR. FITZ: Just the last thing I
20 wanted to point out is that for the envelope
21 that DOE is not considering outdoor or indoor
22 - basically, location of the walk-in as part

1 of the product classes. I just wanted to make
2 sure that everybody noticed that, and if you
3 have comment, please.
4 MR. BROOKMAN: Jon McHugh.
5 MR. McHUGH: I think it makes
6 sense to have different performance
7 requirements for spaces that are exposed to
8 110 degrees versus those that are sitting in a
9 space that's 70 degrees 24/7.
10 MR. BROOKMAN: Fred.
11 MR. MINELLI: Fred Minelli.
12 Regardless of what the minimum standard is in
13 EISA, we would design the box for wherever
14 it's located so that if it's outdoors, we'll
15 design for high outdoor ambient at that
16 location. If it's indoors, then we'll design
17 for whether it's in a kitchen or whether it's
18 on a grocery store floor wherever it is. But
19 that is part of the design process.
20 MR. BROOKMAN: So how does that
21 relate to Jon's comment?
22 MR. MINELLI: You're designing for

1 an outdoor box, in particular, required R-
2 value for high ambient versus indoor.
3 MR. BROOKMAN: We'll hear from
4 Jim.
5 MR. PERRY: Generally speaking, I
6 think like Fred is saying that design would
7 incorporate which is inside or outside, but I
8 think that would be more related to the
9 refrigeration system, not the panel design,
10 not the envelope design.
11 Fred, would you agree?
12 MR. BROOKMAN: Fred, go ahead.
13 MR. MINELLI: No, we would design
14 the envelope for delta T every time. The
15 inside temperatures you want to maintain
16 versus outdoor temperature, the ambient
17 temperature.
18 MR. PERRY: By changing panel
19 thickness or --
20 MR. MINELLI: Yes, increasing
21 R-value.
22 MR. BROOKMAN: Daryl, go ahead.

1 And then I'm back to Jon.

2 MR. ERBS: My only comment is if

3 it were as black and white as either the whole

4 box outside or the whole box inside, I think

5 you could talk about that, but our experience

6 is in storage. A lot of times, we'll have one

7 wall which is facing outside because they want

8 an external access point for delivery of food.

9 And then the rest of it is inside because

10 they want the door for the daily inventory use

11 to be inside. I think you're just going to

12 open up a huge can of worms if you try to

13 create that classification.

14 MR. BROOKMAN: Jon, final comment,

15 and we're moving on.

16 MR. McHUGH: This again leads back

17 to essentially requirements by the location of

18 the wall. So for instance, a freezer wall

19 where the freezer is inside of a refrigerator,

20 should that wall be -- the full R-value that

21 should call for a freezer, so I think it makes

22 sense to have a series of different

1 conditions. Outdoor, indoor, sort of what we
2 call demising wall, but it's actually two
3 different temperatures between a freezer and a
4 refrigerator.
5 MR. BROOKMAN: Harmon.
6 MR. LEWIS: One point we don't
7 want to miss, the outdoor-installed walk-in
8 you save the energy of not building additional
9 building space inside that I know DOE can't
10 probably measure, look at, but overall trying
11 to save energy if you put the walk-in
12 outdoors, you saved a ton of energy the day it
13 arrives.
14 MR. BROOKMAN: Thank you.
15 MR. FITZ: I have two follow-up
16 questions, one for Kysor Panel. Other than
17 thickness of the panels, what other features
18 or design changes do you make specifically for
19 outdoor units that impact energy?
20 MR. MINELLI: Fred Minelli. R-
21 value is what we're designed for. We design
22 for delta T and the envelope is a very simple

1 process. There's nothing there but R-value.
2 MR. FITZ: So it's just R-value.
3 Okay. And then how often do manufacturers
4 know whether a unit -- say -- you probably
5 know if it's going to be installed at least
6 partially outdoors, but how often do you know
7 which wall will be outdoors versus indoors if
8 there's this split?
9 MR. MINELLI: Fred Minelli. You
10 have to know where it's going so you can
11 design for the snow load, wind load, the
12 application of that box. You would have to
13 know where it's going. It's a very, very
14 small part of our industry, manufactures a box
15 and sells it, doesn't know if it's cooler,
16 freezer or where it's going to go. Then, too,
17 you're going to run into permitting issues.
18 MR. BROOKMAN: Most of the time
19 you get a site plan or something.
20 MR. MINELLI: We get an
21 architectural drawing.
22 MR. BROOKMAN: Okay.

1 MR. FITZ: Thank you. Okay, so
2 the second piece of market and technology
3 assessment is the technology assessment. This
4 is where the Department develops a preliminary
5 list of technologies that can improve the
6 energy efficiency of freezers and coolers.
7 The main sources for this
8 brainstorm exercise is a broad literature
9 review, both from academia and industry,
10 documents such as manufacturer's marketing
11 brochures and then a key input. I want to
12 reiterate this is from stakeholders, comments
13 from manufacturers, from other interested
14 parties on what the technologies that are out
15 there that DOE should be evaluating.
16 So please comment. I'm going to
17 show the list that the Department came up with
18 in the next couple of slides, but please let
19 us know if there are additional technologies
20 that we've overlooked.
21 So I'm not going to go through
22 each one of these technologies, but there's a

1 lot of detail in the published documents. So
2 for all envelope equipment classes, these are
3 the applicable technologies. And then there's
4 a group just for display.
5 And the same way for refrigeration
6 equipment. There's a split for -- based on
7 these different equipment class groups.
8 MR. BROOKMAN: Let's deal with the
9 envelope first. Comments on these
10 technologies listed. Are we missing anything?
11 Doug.
12 MR. ROBERTS: Doug Roberts. We
13 fall into the insulation category and I guess
14 one of the interesting comments through this
15 morning session has been relative to
16 separating components and defining their
17 values.
18 At the same time, there's an issue
19 that revolves around this and that is there
20 can be substantial, with some of the
21 technologies, there can be substantial
22 differences in their performance based on the

1 integrated system.

2 We work closely with the home

3 appliance industry. A lot of changes have

4 needed to be made to compresser systems and

5 other components in order to optimize the

6 total solution that's out there.

7 So you kind of have this

8 interesting balance of technologies and how

9 they fit together and the effect on the

10 overall system and how you control that if you

11 do separate. So separation is a good thing in

12 the sense that it's easy to measure. At the

13 end, in the end-use application, have you

14 sized everything correctly, both for the

15 health and safety practices and the energy

16 consumption. It does become an issue.

17 MR. BROOKMAN: Okay. That's the

18 integration issue.

19 Looking at the list of

20 technologies here on Slide 21 and 22, comments

21 on what is there and particularly what the

22 Department may have missed.

1 Jim.

2 MR. PERRY: Jim Perry. On the

3 wall, ceiling, and floor insulation, when you

4 use the word insulation we should maybe also

5 include another separate one for panel

6 gaskets. You've got door gaskets, but all the

7 panels are gasketed also which forms a seal

8 and creates the infiltration barrier.

9 And then you've broken out that

10 only display envelopes have the anti-sweat

11 heater controls and that would not be correct.

12 All freezers go out with anti-sweat controls

13 on their doorways.

14 MR. FITZ: Are those anti-sweat or

15 just door heaters?

16 MR. PERRY: Correct.

17 MR. FITZ: They're door heaters

18 you mean?

19 MR. PERRY: Correct, and also

20 vents are sometimes heated and windows in the

21 doors. So just because it's not a display

22 cooler or freezer, it certainly has some of

1 these other features associated with the
2 display cooler.
3 MR. FITZ: Thank you.
4 MR. BROOKMAN: Thank you.
5 MR. FITZ: Your first comment on
6 the gasketing, that's captured in this panel
7 interface system category. Thank you for your
8 comment.
9 MR. BROOKMAN: Other thoughts on
10 this list of technologies? Pretty complete?
11 Okay, if we uncover any additions,
12 we'll hear from you. Let's move on then to
13 refrigeration systems.
14 Yes, Jon.
15 MR. McHUGH: John McHugh. I just
16 wanted to go back and just repeat again that
17 LED with motion control for your display
18 portion of the envelopes.
19 MR. BROOKMAN: Okay.
20 MR. FITZ: Yes.
21 MR. BROOKMAN: Then to
22 Refrigeration Systems, the next slide 23.

1 Yes, Gordon.

2 MR. BEETON: Warren Beeton,

3 Emerson. I think you might want to

4 differentiate between high efficiency

5 compressors and modulated compressors because

6 they require often times modulated or control

7 of other elements of the system to take full

8 advantage of the modulating compressor such

9 as evaporator fans and condenser fans, full

10 controls, so forth.

11 MR. BROOKMAN: Thank you.

12 MR. STRAUB: Mike Straub,

13 Heatcraft Refrigeration. I don't know if this

14 is the right time for this, but on the

15 analysis like improved evaporator coils where

16 you went and looked at fins for interfin

17 spacing and increasing it. I want to make

18 sure you take into consideration frost

19 accumulation as well as the actual product

20 that is being stored. For instance, floral,

21 you don't want to dry things out. If you put

22 too many fins in there, then you have to worry

1 about moisture removal.
2 On the high efficiency fan blades
3 or the evaporator fan blades, I wasn't sure
4 your analysis if you included the fan motor in
5 your analysis. Because it looked like what
6 you picked were EC motors or external rotor
7 motors which have been shown to have higher
8 efficiency and then attributed that with the
9 actual shape of the fan blade as opposed to
10 looking at the dynamics of the fan blades by
11 themselves.
12 MR. FITZ: Did you want to address
13 that, Rebecca?
14 MS. LEGETT: Maybe we can discuss
15 that in engineering.
16 MR. FITZ: Okay. Yes, we can
17 discuss that in a later analyses.
18 MR. BROOKMAN: Yes, Daryl.
19 MR. ERBS: Daryl Erbs. It's a
20 very complete list, but I feel compelled to
21 point out there are a couple areas that one
22 thing that I don't know if you've looked at.

1 But you know there's an option to look at
2 cascade systems. It doesn't make sense at a
3 very small size but when you get into larger.
4 You have down economizer cooling,
5 but there are also refrigeration technologies
6 to do economize cycles. So in addition to
7 ambient subcooling I guess there are other
8 subcooling or economizing cycle options that
9 can improve refrigeration cycle efficiency
10 that you may want to look at.
11 MR. BROOKMAN: Okay. Thank you.
12 Rebecca.
13 MS. LEGETT: Follow-up question
14 for Gordon. If you could, can you describe
15 exactly what you mean by modulating
16 compressors? Do you mean variable speed
17 compressors?
18 MR. BEETON: Warren Beeton.
19 Several different types. Variable speed is
20 one. Mechanical capacity control, digital or
21 other techniques. Two speed or multi-speed.
22 MR. BROOKMAN: I apologize. You

1 said your name is Warren.

2 MR. BEETON: Warren, yes.

3 MS. LEGETT: I'm sorry.

4 MR. BROOKMAN: I apologize. We

5 both apologize. We misnamed you.

6 MR. BEETON: That's all right.

7 MR. BROOKMAN: We won't do that

8 again. Warren, thank you.

9 MR. BEETON: That's all right.

10 MR. BROOKMAN: Okay.

11 So any additional comments on

12 refrigeration technologies? Yes. Warren.

13 MR. BEETON: Warren. One more

14 comment. On the integration of the systems,

15 this may be obvious to most. But I think it's

16 important that when these evaluated that the

17 combinations of these can be -- If you've got

18 certain assumptions about the systems, if

19 you've got some of these technologies in the

20 system and then you add another one to it, you

21 may get an entirely different answer if you

22 add that technology to the system that doesn't

1 have these others. So you can't make very
2 simple conclusions about the value of any of
3 these without looking at how they're combined
4 with other technologies.
5 MR. BROOKMAN: Okay.
6 Yes, Dan.
7 MR. MANOLE: Dan Manole. For
8 other applications, we can consider to have
9 cooling and heating effect. I'm thinking that
10 in this case if we want to increase the
11 efficiency of the system, if we want to
12 provide heat for defrost or subcooling by
13 integrating or adding to the walk-in cooler
14 another system that will provide heating
15 effect or something else, ice maker, whatever,
16 will that be considered as a hybrid system,
17 hybrid walk-in? That is not covered by this
18 standard.
19 MR. FITZ: I'm not sure I exactly
20 understand what your question is.
21 MR. MANOLE: For example, there
22 are some bottle coolers that they are

1 increasing the efficiency of that product by
2 using the heat generated back-up compressors
3 to make coffee.
4 MR. FITZ: Gotcha.
5 MR. MANOLE: Something like that.
6 If I attach to this walk-in something that
7 will use -- will superheat further the gases
8 for example for cooling something else, for
9 ambient, for air conditioning or whatever.
10 MR. FITZ: So just using waste
11 heat to do something else.
12 MR. MANOLE: Right. Either waste
13 heat or using some of the cooling effect.
14 Will that application be considered as a
15 hybrid something that will not be subject to
16 these standards?
17 MR. BROOKMAN: Charles.
18 MR. LLENZA: This is Charles
19 Llenza. No, we wouldn't consider this part of
20 the original system. So that would be -- I
21 mean if you have excess heat and you think of
22 a way of using the excess heat to your

1 advantage that would be not something that we
2 would be concerned about.
3 MR. MANOLE: Thank you.
4 MR. BROOKMAN: Thank you.
5 Final comments on this? John, do
6 you have one more comment?
7 MR. McHUGH: Yes. I just wanted
8 to try to identify that there are multiple
9 types of evaporator fan control whether it's
10 variable speed or a switching type control.
11 So there is multiple types of control. I
12 don't know if you've looked at that.
13 And then it's not really clear
14 what you mean by defrost controls since there
15 is a range of defrost controls. Are you
16 talking about these advanced controls that are
17 sensing frost build-up or are you just looking
18 at temperature termination? Hopefully,
19 there's some clarification about that.
20 MR. FITZ: There are a number of
21 details in the published TSD. So you can look
22 there unless, Rebecca, you want to comment on

1 that.

2 MS. LEGETT: We can in

3 engineering. We can get to it there.

4 MR. BROOKMAN: We'll take it up in

5 engineering analysis. Okay. Great.

6 MR. FITZ: So the next step after

7 the Department has done this brainstorming

8 exercise to come up with all of the possible

9 technologies we then perform a screening

10 analysis. This is a process that eliminates

11 certain technologies based on specific

12 criteria.

13 The first is that a given

14 technology is not actually feasible, like it's

15 not commercially available, whether it's

16 practicable to the manufacturer, if it has

17 some kind of adverse impact on the utility of

18 the product or on health or safety.

19 So DOE performed that analysis and

20 these are the technologies that were

21 eliminated and we seek comment on these

22 technologies.

1 MR. BROOKMAN: Jon.
2 MR. McHUGH: I guess it's not
3 screened out. It actually wasn't on the list.
4 Liquid suction heat exchangers was brought up
5 earlier. It wasn't on the earlier list. So
6 it wasn't screened out yet.
7 MR. BROOKMAN: Thank you.
8 MR. McHUGH: Or included.
9 MR. BROOKMAN: Gotcha. Okay.
10 What do you think? Are these the
11 ones to be screened out? Harmon, say it for
12 the record.
13 MR. LEWIS: Yes.
14 MR. BROOKMAN: Yes. Okay.
15 Karim.
16 DR. AMRANE: Karim Amrane, AHRI.
17 I guess I have a question about the economizer
18 cooling here. Obviously, it will make sense
19 only in certain application and I'm not sure
20 how you screened out the technology that makes
21 sense for all application I guess. I don't
22 know how this is accounted for in your --

1 MR. FITZ: Do you mean the process
2 for --
3 DR. AMRANE: I mean, yes. The
4 economizer cooling. Is it something that you
5 take into account when you do your analysis?
6 MR. FITZ: Do you want to address
7 that, Rebecca?
8 MR. BROOKMAN: Rebecca Legett.
9 MS. LEGETT: So we did screen that
10 out here because as you said it's only
11 applicable in certain locations and would not
12 be useful for all consumers.
13 DR. AMRANE: I'm sorry. It was
14 screened out. Okay. Fine.
15 MS. LEGETT: Yes. This list is
16 all --
17 DR. AMRANE: I misread.
18 MS. LEGETT: If anyone disagrees,
19 thinks it shouldn't be screened out.
20 DR. AMRANE: I agree with you.
21 Sorry.
22 MR. BROOKMAN: Thank you.

1 Okay. Yes. Warren.

2 MR. BEETON: Warren, very quickly.

3 The economizer cooling I guess I don't

4 understand why that would have been screened

5 out. There can be a significant efficiency

6 gain under the right circumstances of 10, 20

7 percent.

8 MR. BROOKMAN: Rebecca.

9 MR. ERBS: Just let me jump at

10 Warren. He's talking about bringing in

11 outside air into the box.

12 MR. BROOKMAN: Okay. Thanks for

13 that clarification.

14 Yes please. Go ahead.

15 MR. STRAUB: Mike Straub,

16 Heatcraft Refrigeration. Just for my benefit,

17 the screening out, does that mean that if a

18 manufacturer has this technology that they

19 can't take advantage of that or is this just

20 in your analysis?

21 MR. FITZ: This is just the

22 technologies that will not be considered in

1 the analysis.

2 MR. STRAUB: Okay. So you could

3 incorporate that technology and get the energy

4 benefit. But how would that manufacturer then

5 be able to go to the marketplace and say, "I

6 have this" without DOE backed?

7 MR. FITZ: If it's captured in the

8 test procedure, then you can see the benefit

9 from it.

10 MR. STRAUB: Okay.

11 MR. BROOKMAN: Dan.

12 MR. MANOLE: Dan Manole. I think

13 that we should not exclude out higher

14 efficiency of operator fan motors because that

15 brings some cost increase and as Warren

16 mentioned the high efficiency compressor will

17 go hand-in-hand with the modulated capacity.

18 And when you do that you will need to -- I

19 think you will need to have also variable

20 speed fans. So you should include that in my

21 opinion the cost increase due to high

22 efficiency fan motors.

1 MR. BROOKMAN: Okay.
2 Jon.
3 MR. McHUGH: Dan, I think this is
4 related to the prescriptive requirements for
5 ECM motors when you're looking at a fractional
6 horsepower motors. So it's already in the
7 base standard prescriptively. So that's why
8 they're not including it as a measure that
9 they're going to evaluate because it's already
10 there.
11 MR. LLENZA: Charles Llenza,
12 Department. It's not an option. It's
13 actually part of the standard already as a
14 prescribed requirement.
15 MS. LEGETT: Yes, and I want to
16 clarify. Higher efficiency means higher than
17 what's already prescribed, so anything that is
18 more efficient than an ECM motor. We weren't
19 aware that there were any of these motors in
20 use. But if people are aware please tell us.
21 MR. BROOKMAN: Okay. Thanks.
22 That was good clarification. Okay.

1 MR. FITZ: With that, I'll pass it
2 off to my colleague.
3 MS. LEGETT: Hi. This is Rebecca
4 Legett. And I'm going to take over where Eric
5 left off and talk about the Engineering
6 Analysis. I want to echo what Charlie said
7 earlier about feedback on models, our
8 assumptions, our data. I want to emphasize
9 this is a preliminary analysis and we are
10 interested in hearing your recommendations on
11 how we can improve our models and our
12 assumptions. So please feel free to present
13 that and also to submit that in written
14 comments. We would very much appreciate
15 hearing that.
16 The purpose of the engineering
17 analysis is to characterize the relationship
18 between a manufacturer's selling price and the
19 walk-in energy consumption. For various
20 efficiency levels, equipment incorporating
21 various technologies, how does that affect the
22 selling price of the equipment?

1 Again, DOE performed the
2 engineering analysis separately for envelopes
3 and refrigeration systems. In connecting that
4 analysis, DOE also chose a few representative
5 units from the market and for the envelope we
6 chose three different sizes per class to
7 analyze and for the refrigeration system DOE
8 chose two sizes. And we'll present details of
9 those sizes and ask you to comment in a couple
10 of slides.
11 For each unit, DOE determined the
12 baseline configuration which would be the
13 least efficient unit that is sold on the
14 market today. So it would have to meet all
15 the EISA requirements. But otherwise it would
16 be the least efficient unit. And then DOE
17 examined the effect of adding improved
18 technologies to each unit. And the
19 methodology and results are presented in
20 detail in chapter five of the preliminary TSD.
21 The overall approach was a design
22 option approach which means that for each of

1 these representative sizes for each class DOE
2 first calculated the energy consumption costs
3 of a baseline unit. Then DOE added advanced
4 technologies to the baseline and then
5 calculated the reduction in energy consumption
6 and also the incremental cost. And finally
7 DOE sorted the technologies in order from most
8 to least cost effective and the result is a
9 cost efficiency curve which shows that
10 relationship between energy consumption and
11 manufacturer selling price.
12 So now I'm going to get into some
13 of the inputs and the assumptions that we made
14 for creating these cost efficiency curves.
15 And then finally at the end of the analysis
16 discussion I'll show examples of cost
17 efficiency curves. And there will be
18 opportunity for comment at various points when
19 you see the comment boxes.
20 One assumption we had to make was
21 on which representative sizes to analyze. And
22 here's a very, very high level overview of an

1 approach to selecting these representative
2 sizes. And this has implications for the
3 engineering analysis and also for downstream
4 analyses, for instance, the overall energy
5 use.
6 The important points here are
7 first of all what are divisions between. This
8 would be for envelopes because you have three
9 sizes, small, medium and large. What are the
10 divisions between those and also within those
11 divisions what is the representative size?
12 And in a sec I'll ask for your comments on the
13 assumptions that we made.
14 These are the assumptions that we
15 made for representative equipment sizes for
16 envelopes and refrigeration systems and you
17 may have comments on this. In fact, actually,
18 let's go ahead and ask for comment on these
19 representative sizes.
20 MR. BROOKMAN: Okay. Fred first.
21 MR. MINELLI: Fred Minelli. I'm
22 just curious about the sizing. Looking at the

1 envelope in my perspective, the refrigeration
2 is really the only thing that's going to
3 change. The R-value of the panel does not
4 change. So how does size or how are you
5 seeing size affect the performance of the
6 envelope?
7 MS. LEGETT: These are analysis
8 points. So for each size we would calculate
9 the energy consumption. This is just to get a
10 sense of exactly what you're saying of how
11 does that change versus size.
12 MR. MINELLI: But this is not the
13 direction of the final ruling or is? You're
14 just trying to develop information, baseline
15 information? So it really has nothing to do
16 with R-value of the envelope. It's just a
17 combination of refrigeration envelope and
18 whatever else.
19 MS. LEGETT: I'm still not quite
20 sure what you're asking, but these are just
21 examples.
22 MR. MINELLI: My concern is that I

1 build panels. Panels have R-value. It
2 doesn't matter in our perspective if the box
3 is 10 X 8 or 25 X 30. It still has a certain
4 R-value.
5 MS. LEGETT: Okay.
6 MR. MINELLI: It's still energy
7 efficiency. It's not going to change.
8 MS. LEGETT: Okay. We're trying
9 to get a sense of energy consumption for a
10 class.
11 MR. MINELLI: Yes, to prove that
12 I'm correct.
13 (Laughter.)
14 MS. LEGETT: And maybe Eric can
15 speak to that.
16 MR. FITZ: This is Eric Fitz. I
17 just wanted to comment. In general, these
18 size characterizations are most useful for the
19 downstream analysis where the Department is
20 actually quantifying the total energy save for
21 the entire country. So these are meant to try
22 to reflect like the highest frequency or the

1 most common units that are actually shipped.
2 And then based on estimates of how many exist
3 currently and then predicting how many of
4 these different types will be shipped in the
5 future, the Department can then calculate an
6 overall energy savings. So it's to get a
7 picture of the real benefit or cost will be.
8 MR. BROOKMAN: And if there were
9 sizes that were more representative that would
10 be useful to know.
11 MR. LLENZA: This is Charles
12 Llenza, Department of Energy. This has to do
13 more with the shipments in terms of us
14 analyzing the shipments of the different types
15 of equipment. And we're just trying to
16 categorize within the sizes so that we have a
17 better idea of what kind of shipments we're
18 facing in terms of the industry and in terms
19 of stock, replacement stock and the actual
20 market of what's being shipped out.
21 MS. GAGNE: Claire Gagne. I think
22 to your point, Fred, the distinction is that

1 the classes are not affected by the sizes.
2 They are purely for analysis pieces that feed
3 into engineering type analysis that we need to
4 do. But the classes as proposed in a previous
5 slide are not affected by these size
6 distributions. I think that's the crux of
7 your question.
8 MR. MINELLI: Sure. My concern --
9 Fred Minelli again. My concern is required
10 performance testing of boxes. If this is
11 information gathering not a requirement for me
12 to process my product annually or whatever.
13 MR. LLENZA: This is Charles
14 Llenza. You're correct.
15 MR. MINELLI: Okay. All right.
16 Thank you.
17 MR. BROOKMAN: Okay. Thank you,
18 Charles.
19 Jim. And then I'm coming back to
20 Harmon.
21 MR. PERRY: Going back to the
22 slide -- this is Jim Perry -- that you have

1 small, medium and large with the different --
2 That one there. The question marks I'm
3 assuming you're looking for input on what
4 becomes small change as to medium. Given that
5 the EISA requirements are all below 3,000
6 square feet shouldn't it be end lined? Not
7 have a continuing arrow? That it should be at
8 3,000 square feet and below and probably most
9 of us would agree that's a medium size
10 anyways. Anything above 3,000 could be called
11 large and then just split into two sections?
12 MS. LEGETT: Is that what you
13 would recommend? Just consider --
14 MR. PERRY: Yes.
15 MS. LEGETT: Okay. Thank you.
16 MR. BROOKMAN: Yes. I see Mike up
17 there.
18 MR. STRAUB: Yes, I would agree.
19 Mike Straub from Heatcraft Refrigeration. I
20 would agree that the sizes that you've chosen
21 are a bit small because of the 3,000 square
22 foot and below. And I understand the concept

1 of we wanted to see where really the sweet
2 spot is in the market from the perspective of
3 units sold, etc.
4 But if I think about what you've
5 picked I mean the biggest box is 500 square
6 feet. I mean we sell equipment that's much,
7 much larger that we're impacted by this. Your
8 energy analysis where you looked at scrolls
9 and said, "Scrolls are more efficient than
10 hermetic compressors," in those sizes, we
11 wouldn't even use scrolls because scrolls are
12 not available technology now. We would be
13 using semi-hermetic compressors.
14 I think you need to reevaluate
15 that and look at higher sizes. And then if
16 you want to weight the sizes based on your
17 products sold then you can do some type of
18 weighting scale to say, "Okay. More units of
19 the smaller size are sold to convenience
20 stores, etc." But you have distribution
21 warehouses, etc., that would have much larger
22 sizes and much larger equipment. Three-phase

1 fan motors and those type of technologies
2 would be common.
3 MR. BROOKMAN: Can you be specific
4 what should be the sizes? What should be the
5 break points?
6 MR. STRAUB: I don't have a
7 specific because we don't make boxes. We make
8 the refrigeration systems. So I think it
9 would be good if box manufacturers could give
10 a better idea of what would be large. But I
11 think it needs to be something that's going to
12 get us much closer to the 3,000 square foot
13 for large, in that range.
14 MR. BROOKMAN: Okay.
15 Harmon.
16 MR. LEWIS: I was going to address
17 something else, but I'll say that one first.
18 You've got a bell curve on what walk-ins you
19 make and most of this is sweet spot. And we
20 can go way out towards the 3,000 square foot.
21 But how many of those are we going to make in
22 a given month? It's a very small number.

1 I know you're trying to get a
2 distribution of energy and see where it is.
3 So maybe you've got those three sizes and then
4 maybe you've got something out that's extra
5 large at the 3,000.
6 But the bigger issue, the one that
7 I mentioned earlier, up there you've got 12
8 different walk-ins between nondisplay and
9 display and all those sizes. And in the
10 dedicated systems like we build you've got
11 four refrigeration sizes. You probably need
12 10 or 12 to have any semblance of real world
13 operation.
14 When you put that small-medium
15 temp indoor, medium temp outdoor unit at
16 12,000 or 15,000 BTUs on a small, little
17 nondisplay cooler that needs 5,000 BTUs you've
18 got a rain forest. The labels would fall off
19 of whatever's in there. It's just not real
20 world. So any data you determine from that
21 doesn't mean anything. It's just a badly
22 designed experiment.

1 MR. BROOKMAN: So if we state your
2 recommendation, it's they need more --
3 MR. LEWIS: You would need more --
4 You would need -- Whatever size walk-ins you
5 chose you would have to size the refrigeration
6 to match the heat load of the walk-in. That's
7 what all the manufacturers do day in and day
8 out. And if you don't do that, then the
9 refrigeration won't be at the optimum size and
10 you know just real world it won't operate to
11 the satisfaction of the user.
12 MR. FITZ: This is Eric Fitz. I
13 can respond to both of those comments. So the
14 first one about this bell curve or this
15 histogram of units that are shipped, the
16 Department would really like that type of
17 information if you have that available.
18 Please submit it as formal comment because
19 that would help characterize this for us.
20 And then your second comment, this
21 issue of matching the refrigeration equipment
22 to the envelope, we're actually going to

1 discuss that in later slides. And we agree
2 that's a very important issue. There's a very
3 detailed sort of methodology of how we went
4 about that.
5 MR. LEWIS: But how do you match
6 four systems to that many walk-ins? It
7 doesn't work.
8 MR. FITZ: Yeah. We'll get into
9 that. But it's a good comment.
10 MR. BROOKMAN: Daryl.
11 MR. ERBS: My comment would be
12 though is on the refrigeration I don't think
13 small is really representative of small and I
14 think that's what Harmon's saying.
15 And the issue is as you go from
16 small to large, you know, to Mike's point also
17 you go through different technology classes
18 for compressors and even other components.
19 And so what goes into a 15,000 BTU per hour
20 medium temp unit versus a 5,000 may be a
21 different base level of performance for
22 something like a compressor. And so my

1 concern would be by not considering a wide
2 enough range we may be misrepresenting some of
3 the smaller systems.
4 MR. BROOKMAN: Thank you.
5 MS. LEGETT: Can I ask a follow-up
6 question? You got into something that we
7 actually have thought about which is whether
8 we should create different equipment classes
9 instead of different size analysis points.
10 Would you -- Is that what you would recommend?
11 MR. ERBS: Well, I'm not sure I
12 want to recommend that because that would
13 probably be my headache later on.
14 (Laughter.)
15 You know I think we have to be
16 careful -- I want to keep this as simple, as
17 few different categories as possible. But if
18 you look at a five horsepower, let's say a 10
19 horsepower semi-hermetic compressor, it's
20 going to have twice the efficiency of a
21 fractional horsepower hermetic compressor.
22 And if you drive the minimum

1 efficiency metric based on what you can do on
2 the large size, we won't be able to make small
3 size equipment anymore. So we probably need
4 to look at that.
5 MR. BROOKMAN: The Department
6 wants this to be as simple as possible and yet
7 adequately descriptive.
8 MR. ERBS: So if you set a low
9 enough standard we can live with that.
10 (Laughter.)
11 MR. BROOKMAN: Got it. Okay.
12 Yes.
13 MS. LEGETT: All right. If those
14 are all the comments. So this was the
15 representative sizes.
16 And the second part here is the
17 list of technologies for envelopes and
18 refrigeration systems. These are the
19 technologies that were not screened out in the
20 screening analysis. These are also
21 technologies that can be accounted for in the
22 proposed test procedure. So if it couldn't be

1 accounted for in the proposed test procedure,
2 we couldn't really consider it.
3 And one that Mr. McHugh mentioned
4 was auto evaporator fan shutoff when the door
5 is opened. Because the proposed test
6 procedure separates the envelope and the
7 refrigeration system, it doesn't account for
8 that kind of technology. So these are the
9 ones that we ended up with.
10 So I think we've already covered
11 Items 2.4 and 2.5 in the previous slides. But
12 Item 2.6, again we see coming-on technologies
13 that could improve the efficiency and also
14 questions on these technologies.
15 MR. BROOKMAN: Any -- Yes, Harmon.
16 MR. LEWIS: A couple of items
17 here. Panel interface system, I guess the
18 improved routing. I'd like to hear some
19 description of that. Also the different items
20 there on the envelopes that you all related
21 again to what it would cost an individual
22 manufacturer. I think you're off by a factor

1 of like I mentioned eight to 11 times the
2 impact on most every manufacturer that's in
3 this room and that was in the room at the
4 March meeting. Based on our volumes, you
5 picked a very nonrepresentative number.
6 But what is the new improved panel
7 interface system because I want to hear it and
8 nobody else.
9 (Laughter.)
10 MR. FITZ: Sure. This is Eric
11 Fitz. The improved interface system is this
12 idea of having a better way, a better tongue
13 and groove design, that would make sure that
14 there's a more precise interlock between the
15 different panels so that you ensure that the
16 panels are going to be more square, that
17 there's going to be uniform pressure
18 throughout the entire gasket of the interface,
19 and that can help improve the or reduce the
20 infiltration.
21 There are other options in there.
22 For example, if you had gasketing that itself

1 has a higher R-value so that you reduce
2 thermal bridging throughout the panel
3 interface. So it captures these individual
4 components and this sort of engineering design
5 system approach to that region of the panel.
6 Different geometries whether it's like a
7 standard tongue and groove where you have the
8 tongue going into a groove or whether you have
9 a very unique geometry that provides more
10 uniform pressure or reduces infiltration.
11 MR. LEWIS: Have you ever seen
12 how we build these panels? How you inject the
13 foam? How you've got to get it out of the
14 mold? The more intricate you make that the
15 harder it's going to be to build it? I'm not
16 against that.
17 We also have another expression.
18 We say, "This isn't rocket science." So we've
19 got to watch that what we make is possible.
20 The other thing, your improved
21 wall seal and floor insulation, you show
22 thicknesses I think from below four inches out

1 to seven inches. Most manufacturers probably
2 have fixtures depending on what they bought
3 them that might be adjustable from four to
4 maybe six inches depending on the tooling.
5 I think you misestimated the
6 reduction in manufacturing capacity. As you
7 do more size panels, when we're got a 24 foot
8 or 26 foot long platform we make maybe three
9 panels at once. They've all got to be
10 thickness and you've got to do changeover on
11 tooling.
12 So I think there's a whole lot of
13 cost there you have to watch out for. And the
14 more variables in the manufacturing process
15 the more chance for repair work to what you
16 manufactured. So the more complex you make it
17 the harder it's going to be and the more it's
18 going to cost to build it.
19 MS. LEGETT: Okay.
20 MR. FITZ: At least to address the
21 question about improved wall ceiling and floor
22 insulation, the range was up to seven inches

1 in the published TSD. DOE actually found
2 examples of manufacturers that offer up to 12
3 inches. But we felt like that was a little
4 bit outside of what's typically used for food
5 service for what's --
6 But there's a broad range and
7 these are technologies that are feasible that
8 are available. It's possible while it might
9 be more expensive. I mean that's what we're
10 trying to capture in this analysis is the
11 additional cost associated with going to
12 thicker panels. But it's available. It's
13 possible. So it's considered.
14 MR. BROOKMAN: Okay.
15 Jim.
16 MR. PERRY: Just to follow-up with
17 Eric. This is Jim Perry. Basically this is
18 brainstorming ideas. There are no improved
19 panel interface systems that you know of that
20 Harmon could get that would give us these
21 things. And also this is based on
22 assumptions, not testing, correct? We don't

1 know that the current systems available have
2 any measurable infiltration.
3 MR. FITZ: There's a --
4 MR. PERRY: Spending a lot of
5 money to make a new panel interface that's
6 solving no problem.
7 MR. FITZ: Right. So the analysis
8 is based on both assumptions and then also
9 available research that's been done by
10 academia and then industry.
11 MR. PERRY: Okay.
12 MR. FITZ: That covers issues such
13 as infiltration and thermal bridging, all of
14 these energy related components.
15 MR. BROOKMAN: Daryl.
16 MR. ERBS: Yes. I have a request
17 of Rebecca. Rebecca, when I went through the
18 TSD there was a lot of detail around how you
19 actually did the performance modeling that I
20 would be very interested in understanding.
21 There are some very basic level equation.
22 But, for example, the larger condenser there's

1 what I would describe as a overly simplistic
2 equation in there. If that's the entire basis
3 for how you're modeling the benefit of a
4 larger condenser coil, then I would have
5 concerns.
6 There may be a lot more detail
7 behind that you didn't see fit to put in the
8 TSD. But I think that's where we would really
9 need to understand. Because we have some
10 practical experience that we'd be more than
11 happy to share with you that when you make a
12 condenser coil larger some other things happen
13 and so you might not get all of the benefit
14 that a simple model might predict.
15 MR. BROOKMAN: It sounds like a
16 conversation that you might commence at lunch
17 or over the break which we're going to take
18 here very shortly. So let's take final
19 comments on these technologies that are listed
20 here on slide 33.
21 Jon.
22 MR. McHUGH: One other question is

1 in California we have -- Through EISA we're
2 allowed to have one more Title 20 appliance
3 standard that will stay in effect until the
4 2015 effective date of this standard. And the
5 question is how are you guys going to
6 accommodate or use that standard in the final
7 standard that you're going to adopt here.
8 And the reason I ask the question
9 is that there's a series of technologies here.
10 And it's likely or at least where we're
11 looking at going to is having an additional
12 prescriptive standard for both floating head
13 controls and evaporator controls, evaporator
14 speed controls. So how is this new standard
15 going to adapt to that given the history of
16 most of these other standards adopting what
17 the states have adopted earlier?
18 MR. LLENZA: Charles Llenza,
19 Department of Energy. I think the Department
20 first of all would like to make sure that
21 California provides us as much information as
22 possible of what you're adopting to see how we

1 could better utilize that for our standard's
2 purposes.
3 And of course if it's a fantastic
4 idea we would most likely look at the national
5 effect of that within our standard making
6 process here and potentially adopt that as a
7 national standard. But at this point we don't
8 know enough about it.
9 MR. McHUGH: It's concurrent.
10 MR. LLENZA: Yes. So part of the
11 proceedings here is to make sure and we have a
12 public proceeding is to make sure that we are
13 keeping up with other events that are
14 occurring in the industry and throughout and
15 the states and in terms of their regulations.
16 We're at a good point now. The
17 more information we get in terms of what
18 you're actually doing would be beneficial to
19 the Department to see if that's going to serve
20 the purpose for a national standard. Thanks.
21 MR. BROOKMAN: Yes. Karim.
22 DR. AMRANE: Karim Amrane, AHRI.

1 I guess I would to correct a little bit what
2 Jon said. He mischaracterized what happened
3 with the standard. Yes, most of the EISA
4 requirements are based on California and
5 they're not exactly what California had
6 adopted in the first place. It was an
7 agreement which was reached with the industry
8 in order that resulted in what you have in
9 EISA and what this rulemaking process is all
10 about.
11 So I guess I'd like to caution you
12 in assuming that what California will be doing
13 will be default something that DOE has to
14 consider. That's all. Thanks.
15 MR. BROOKMAN: Thank you.
16 I'm mindful that we might need a
17 break. Can you proceed with the rest of the
18 engineering analysis slides?
19 MS. LEGETT: Sure. There might be
20 extensive comment on --
21 MR. BROOKMAN: Do you think so?
22 So then let's take a break now. Obviously,

1 that caution let's take a break. It's ten
2 minutes after 11:00 a.m. We'll take a break
3 for 15 minutes which means we'll resume at
4 11:25 a.m.
5 We're probably going to go at
6 least another hour or so before we take lunch.
7 So if that means you need to grab a donut or
8 something please do so. Wear your badges if
9 you would while you're in the building and how
10 many of you are not familiar with the
11 Forrestal Building. Follow everybody else to
12 the coffee shop and then go quickly because
13 they're not very efficient. Although maybe
14 right now they're okay because it's not a busy
15 time.
16 So we'll resume at 11:25 a.m.
17 Thanks for a good start on the day. We've
18 really covered a lot of ground already. Off
19 the record.
20 (Whereupon, a short recess was
21 taken.)
22 MR. BROOKMAN: On the record.

1 Okay. We're going to resume where we left
2 off. And Rebecca Legett's going to describe
3 further engineering analysis beginning on
4 slide 35.
5 MS. LEGETT: Okay. If everyone's
6 back. So to try to organize some of these
7 comments, comments that people are going to
8 have probably on these next few slides, just
9 very briefly first I'm going to go through the
10 model, a high level overview of the model, for
11 envelope and refrigeration. And this is how
12 the end result of the energy consumption is
13 calculated. The next thing is to talk about
14 the cost model, how DOE came up with cost for
15 the equipment. And finally, the last part of
16 the engineering analysis is actually showing
17 some example curves and talking about the
18 effect of improved technologies.
19 So here we have a model, the
20 envelope engineering model, and these are all
21 the things that feed into the daily energy
22 consumption that is calculated. And I want to

1 note that for both envelope and refrigeration
2 these energy calculation models are really
3 based on test procedure methodology, the
4 proposed test procedure methodology.
5 So to the extent that you want to
6 comment on that just be aware that for the
7 stuff that depends on the test procedure
8 that's a separate analysis. Does anyone have
9 any comments on the envelope? I'm not really
10 going to try to explain each piece of this.
11 MR. STEPHENS: Charlie Stephens.
12 I just have one question down there at the
13 bottom, the non-electric load, where you've
14 got conduction, steady-state infiltration and
15 door opening infiltration.
16 MS. LEGETT: Okay.
17 MR. STEPHENS: Do you know off the
18 top of your head in a round number what
19 fraction of the total load of those three
20 combined is door opening infiltration load?
21 MR. FITZ: This is Eric Fitz. I
22 can't remember the exact number, but it's a

very large portion.

MR. STEPHENS: Okay. And do you have anything that you can explain as to how you calculated that?

MR. FITZ: So for the door opening infiltration, that's based on the proposed test procedure and that laid out the methodology that's been adopted by ASHRAE. So it's the ASHRAE equations for based on the door geometry, the door opening frequency, the difference in temperatures between the inside and outside of the walk-in, etc.

MR. STEPHENS: Is there any data that backs up that model that you know of?

MR. FITZ: Yes. It's based on Gosney and Olama from 1975 and then there's been a number, I'd say, a dozen papers since then that have done empirical testing and actual computational modeling to simulate and make sure that those empirical equations are accurate and they seem to be quite good.

MR. STEPHENS: Okay.

1 MR. BROOKMAN: Thank you, Charlie.
2 Harmon please.
3 MR. LEWIS: Yeah, that door
4 opening load by ASHRAE ends up being about 35
5 to 40 percent of most walk-in coolers or
6 freezers of the heat load.
7 MR. BROOKMAN: Thank you. Okay.
8 Daryl.
9 MR. ERBS: Daryl Erbs. I think
10 the only question I had is -- I mean the
11 infiltration models I'm pretty confident with.
12 The big question is the number of door
13 openings and what the basis for -- I think
14 it's 60 openings a day.
15 MR. FITZ: Sure. Do you have
16 comment or recommendations for what the
17 assumptions should be for the analysis for
18 whether it's a passage door, whether it's a
19 glass display door or whether it's a freight
20 door what the assumptions should be.
21 MR. ERBS: I'm working on that.
22 MR. FITZ: Okay.

1 (Laughter.)

2 MR. FITZ: But the numbers were

3 based on what are typically used in other

4 research that's been done in academia and in

5 industry that we came across. But I would

6 love -- We would love your input on what you

7 believe these numbers should be.

8 MR. BROOKMAN: Eric, does the TSD

9 say what the numbers were?

10 MR. FITZ: Yes.

11 MR. BROOKMAN: It does. Okay.

12 Thank you. So you can comment on that.

13 So Rebecca left the question on

14 the table about any additional thoughts or

15 questions surrounding this flow chart on 35.

16 So anything additional on that before we move

17 on?

18 Jon.

19 MR. McHUGH: Rebecca, what's the

20 watts per square foot for your lighting load?

21 MR. FITZ: It's the EISA minimum

22 requirement.

1 MR. McHUGH: That's lumens per
2 watt not a --
3 MR. FITZ: I'm sorry. The
4 efficacy is based on EISA. That's right.
5 Lumens per watt. But there is no -- We're
6 not doing any -- As we published, we're not
7 considering a component based standard. It's
8 a system standard.
9 MR. McHUGH: No, I understand.
10 But for your model you need to know a watts
11 per square foot so you can put the watts into
12 your model.
13 MR. FITZ: Sure. So it's
14 different depending on the lighting
15 technology. So there's tube fluorescence.
16 There's then the bulbs for like nondisplay.
17 So that's a CFL. And then there's also
18 considerations for LED lights.
19 MR. McHUGH: And is that
20 documented in the TSD the watts per square
21 foot?
22 MR. FITZ: Yes.

1 MR. McHUGH: Okay.
2 MR. BROOKMAN: With no additional
3 comment, Rebecca, move us on.
4 MS. LEGETT: All right. So the
5 same thing for the refrigeration energy model.
6 And this is also based on the AHRI 1250 test
7 procedure.
8 I think coil capacity on the left
9 should actually be compressor capacity.
10 MR. BROOKMAN: Maybe the colors of
11 the different boxes, tell us what they are. I
12 don't see a legend.
13 MS. LEGETT: Not really. It's
14 just on what level it is. Yes.
15 MR. BROOKMAN: Okay.
16 MS. LEGETT: Okay.
17 MR. BROOKMAN: Jon.
18 MR. McHUGH: For your off-cycle
19 fan power, what are you using when you're
20 looking at fan controls?
21 MS. LEGETT: That's actually one
22 of the technology options, but I can mention

1 that here. For the AHRI 1250 test procedure,
2 I think it's the greater of what the controls
3 actually are or 25 percent of the I think duty
4 cycle. And so we used 25 percent as the
5 highest or 25 percent of the on-cycle fan
6 power as the lowest off-cycle fan power that
7 you could have. And if that's not correct
8 please correct me.
9 MR. McHUGH: And for the on-cycle
10 fan power when you have a rack system, how are
11 you modeling fan power? Because in that
12 situation, it's not like you have you're at
13 full load or at part load. You're at part
14 load most of the time. So are you modulating
15 your fan speed?
16 MS. LEGETT: We did not consider
17 modulating the fan speed when the compressor
18 is actually running. Yeah, when the
19 compressor is actually running. If you think
20 we should and you can recommend methodology by
21 which we can incorporate that please do so.
22 MR. McHUGH: Okay. So

1 recommendation is DOE 2.2R directly models
2 modulating of the fan speed. So it directly
3 models the fan speed and the fan energy and
4 the improvement in heat transfer under those
5 part load conditions. So that would be my
6 recommendation.
7 MS. LEGETT: Thank you.
8 MR. BROOKMAN: Additional thoughts
9 on refrigeration energy model? Or questions?
10 (No verbal response.)
11 MS. LEGETT: All right. So next
12 I'm going to talk about the cost model that we
13 used for the engineering analysis, both the
14 cost model and the inputs and we've had
15 several comments so far critiquing our costs
16 and we welcome those comments. And if you can
17 provide specific recommendations, again that
18 would be very helpful.
19 I'm going to discuss the cost
20 model and the inputs that DOE used to develop
21 the manufacturer selling prices. You see
22 there are three inputs, manufacturer

1 production cost, manufacturer markups and
2 outbound freight costs. I'm going to talk
3 about each of these as inputs to the
4 manufacturer selling price and then I'm going
5 to ask for comment on our assumptions. So if
6 you'll bear with me for the next few slides
7 I'll explain each of these parts.
8 The full equipment cost, the
9 manufacturer production cost, consist of
10 direct material, direct labor, factory
11 overhead and depreciation. And DOE found that
12 the bulk of this manufacturer production cost
13 can be attributed to the direct material and
14 also the direct labor costs. The factory
15 overhead markup accounts for costs associated
16 with equipment, indirect materials, energy
17 use, taxes and insurance.
18 The next component is the
19 manufacturer markup and DOE estimated the
20 manufacturer markup from publicly available
21 financial information. That is SEC 10k
22 reports filed annually by publicly-held

1 corporations. Information contained in these
2 reports such as total revenues allowed DOE to
3 estimate corresponding markups for each
4 manufacturer and thus an estimate for the
5 industry as a whole. And you can see that the
6 estimate that we found, the aggregate, was
7 1.39 and we heard a comment saying that that
8 sounded about right. But if that doesn't
9 sound right to you please let us know when we
10 ask for comment the slide after next.
11 And finally DOE assumed that
12 manufacturers included their outbound freight
13 cost. That is the cost of shipping from the
14 manufacturer to the next stage in the
15 distribution chain. And this outbound freight
16 cost varies by volume and weight.
17 At this time, we'll ask for
18 comment on all three of these assumptions.
19 Maybe we can go one at a time.
20 MR. BROOKMAN: So manufacturer
21 production costs first. Daryl.
22 MR. ERBS: I guess my question

1 would be again down in the details. As you're
2 putting these design options in, what costs
3 are you associating with those design options?
4 It's not clear to me if you change at a
5 component level do you fully reflect all the
6 other changes that might occur to the unit or
7 are you just estimating the cost for, let's
8 say, a higher efficiency compressor or
9 something?
10 MR. BROOKMAN: What other costs
11 would there be, Daryl?
12 MR. ERBS: Well, I guess I can
13 keep harping on the same example. If I put a
14 bigger condenser coil in, I may need a larger
15 cabinet. Did you account for all of the
16 additional sheet metal costs associated with
17 that larger cabinet?
18 MS. LEGETT: Yes, we did attempt
19 to quantify this.
20 MR. FITZ: And there are lots and
21 lots of details on this in the chapter five
22 that was published.

1 MS. LEGETT: To the extent that
2 you feel that we didn't account for some
3 costs, please make recommendations.
4 MR. BROOKMAN: I guess your
5 purpose in laying out this cost model is to
6 show everyone basically your methodology so
7 that they can comment on aspects of it that
8 are incorrect or missing.
9 Yes, Harmon.
10 MR. LEWIS: Again I already put it
11 in on my comments last week. But your
12 outbound freight cost, you need to look at for
13 larger shipments, the dedicated haulers.
14 Because your costs are off and you may be
15 about that -- about two or three times which
16 will factor into your overall price.
17 MS. LEGETT: Thank you.
18 MR. BROOKMAN: So three different
19 aspects of this cost model, manufacturer
20 production cost, manufacturer markup and also
21 outbound freight. Comments on any of those
22 three?

1 Harmon.

2 MR. LEWIS: One other one. A lot

3 of the times the outbound freight cost

4 although it's on our quotation is not

5 typically on the purchase order that we

6 receive because the freight may be billed by

7 the freight company to that food service

8 equipment dealer and such. So it's not

9 necessarily a part or it.

10 It's probably on maybe 15 or 20

11 percent of the purchase orders more likely

12 because it's a chain account that we lump that

13 in. But most individual purchases the freight

14 is paid by dealer, by the end user, and it's

15 not part of that. It becomes part of the

16 overall cost landed at the job site, not part

17 of our cost.

18 MS. LEGETT: Okay. Thank you for

19 that comment. And we realize that this may

20 vary throughout the industry. So we welcome

21 other. Does anyone else have comment on that?

22 Yes.

1 MR. BROOKMAN: Jim.
2 MR. PERRY: Jim Perry. We found
3 ourselves in the same situation as Harmon that
4 sometimes freight is part of the selling price
5 and sometimes it's not.
6 MS. LEGETT: Can you give a
7 percentage of how often it is or isn't?
8 MR. PERRY: I could probably
9 research it for you and get back to you on
10 that, Rebecca, but not right off the top of my
11 head.
12 MS. LEGETT: Okay. If you could
13 submit a written comment, that would be very
14 helpful.
15 MR. BROOKMAN: Other comments on
16 these elements of cost modeling?
17 MR. LLENZA: Charles Llenza,
18 Department of Energy. I realize that some of
19 this information may not be just here at the
20 meeting right now. But this is important
21 because it's part of our baselines. So if
22 everybody can take a better look at the TSD

1 chapter five, right, to make sure that we're
2 on track with what we're putting in there.
3 Because part of the baseline when we start
4 doing the cost estimates at the beginning it
5 will affect a lot of our modeling downstream.
6 MR. BROOKMAN: Daryl.
7 MR. ERBS: Daryl Erbs. I mean
8 I've read through everything that's in chapter
9 five and I guess what I don't know is where
10 you started from. I mean there's a dollar
11 amount for the different technology options.
12 But as I recall you went out and
13 found some manufacturer's data, published
14 data. There isn't the level of test data that
15 you'd probably like and somehow had to back
16 out of that some base system design
17 information or maybe that was part of the
18 manufacturer's. But if you're able to share
19 any more detail it might make our job a bit
20 easier of saying is that reasonable or
21 unreasonable. Otherwise we almost have to go
22 through the same analysis on our own to say

1 "Do we get to the same end conclusion that you
2 have in terms of how much does it cost for
3 floating head pressure control? How much does
4 it cost for a better fan? How much does it
5 cost for a better heat exchanger?"
6 MR. FITZ: Where we commented that
7 it was based on manufacturer information, as
8 you can imagine particularly cost data is very
9 sensitive. Some manufacturers don't like to
10 share that. So whenever we make that
11 reference that means we received information
12 from at least three manufacturers and we
13 averaged that data. And we were specifically
14 protecting the manufacturers from disclosing
15 where we got that data.
16 However, manufacturers if they
17 choose to are welcome to submit information
18 public forum, either through written comment
19 or in this forum right now, of what you think
20 the cost should be for a certain component or
21 additional labor associated with a design
22 option.

1 MR. LLENZA: And that brings --
2 this is Charles Llenza, Department of Energy -
3 - us to another point. When you send
4 information to the Department and it's marked
5 private, we don't disclose that to anybody.
6 It doesn't even get in the docket formally.
7 We actually we put a notation that we received
8 the comment or the information. But that
9 information then is not reflected in the
10 docket because what's in the docket is for
11 public consumption and if it's been marked
12 company private or proprietary or something
13 like that, then we take the extra step to
14 protect the information from the public.
15 That's part of our confidentiality agreement
16 in this process.
17 MR. BROOKMAN: Eric, if you have
18 three bits of data and you average them, you
19 use that. But you don't disclose the sources.
20 MR. FITZ: That's correct.
21 MR. BROOKMAN: Okay. So final
22 comments on these?

1 MS. LEGETT: Particularly the
2 markups, you'll notice that the markups were
3 based on publicly available data from publicly
4 traded companies. What we understand about
5 the industry is that a lot of the businesses
6 are small, privately-owned, may not publish
7 that information. So we want to account for
8 that in our analysis, but basically the only
9 way we can get that kind of data is if you
10 tell us. Maybe not necessarily right now, but
11 in written comments.
12 Okay. Next I'm going to talk
13 about -- I'm going to show two example cost
14 efficiency curves and explain a little bit
15 about them and how we arrived at them and then
16 give you an opportunity to comment, ask
17 questions, critique our methodology and please
18 do so.
19 Here we have an example cost
20 efficiency curve for the envelope. A few
21 things to note about this graph. This first
22 point here labeled Baseline, that is again the

1 least efficient walk-in of this type and size.
2 You'll notice this is a medium, non-display
3 cooler with medium being characterized in the
4 previous slide on the representative sizes.
5 We calculated that a baseline -- least
6 efficient -- medium non-display cooler would
7 use that much energy and cost approximately
8 that much.
9 Then all the other dots represent
10 adding one technology at a time to that
11 baseline and this is -- we've calculated the
12 cumulative effect. So you have the rightmost
13 dot which is the baseline. The next dot to
14 the left is adding the first technology
15 option. The second dot to the left is adding
16 the second technology option. So you have
17 both one and two implemented in that envelope.
18 And then that last dot there
19 labeled Max Tech, that is what we call the
20 maximum technologically feasible walk-in
21 envelope, the one with all of the design
22 options implemented. Comments please.

1 DR. AMRANE: Karim Amrane, AHRI.
2 I guess for clarification the baseline is EISA
3 2007, right?
4 MS. LEGETT: Yes. It's the least
5 efficient walk-in that can actually be sold.
6 So it must comply with the EISA 2007
7 prescriptive requirements.
8 MR. LLENZA: This is Charles
9 Llenza of the Department. This is just an
10 example. We've picked a medium, non-display
11 cooler and for all of the different classes of
12 walk-in coolers/walk-in freezers that we
13 developed models for, we will have a similar
14 curve developed for that. So this is just an
15 example of how we're doing this for
16 illustrative purposes.
17 MS. LEGETT: Yes.
18 MR. LLENZA: We didn't want to
19 list them all.
20 MS. LEGETT: Right. All the
21 curves for all of the classes and sizes are
22 contained in chapter five of the TSD.

1 MR. BROOKMAN: Charlie.
2 MR. STEPHENS: Charlie Stephens.
3 I'll just note here that one of the reasons I
4 asked you about the infiltration earlier was
5 that I looked at all the curves that you
6 generated and pretty much for all of them in
7 the boxes it varies a little bit, but you're
8 showing that about half of the total energy
9 use of the box can saved with strip curtains
10 or shall we say the strip curtain measure.
11 And I'm assuming that the strip curtain
12 measure is not 100 percent effective at
13 stopping door infiltration. So I'm assuming
14 that more than half of the energy load of the
15 box is strip curtain or is infiltration from
16 the door since you can't save what you didn't
17 use.
18 MR. FITZ: So just a comment on
19 effectiveness on strip curtains.
20 MR. STEPHENS: Yes.
21 MR. FITZ: The number we're
22 currently using is 0.9 or 90 percent

1 effective.

2 MR. STEPHENS: Okay. So if you go

3 from just under 12 to just under six kilowatt

4 hours per day with that one measure, it's 90

5 percent effective. So I'm sort of reading

6 that as half or more of the total load in

7 kilowatt hours per day used by this box and

8 all the boxes because it's pretty much the

9 same on all of them.

10 MR. FITZ: Sure.

11 MR. STEPHENS: It's half.

12 MR. FITZ: Right. So for this

13 particular example and for this particular

14 baseline, that's true.

15 MR. STEPHENS: Okay. And, yeah,

16 like I said, I looked at all of them and

17 they're all pretty much the same for the

18 boxes.

19 So I'm a little skeptical about

20 that I have to say. I'd be a lot happier if

21 it were more like one-third. But the reason I

22 say that is because I've done this work with

1 this kind of a cost efficiency, life cycle
2 cost curve doing code work and if you get that
3 first one wrong because it's big it affects
4 all of the subsequent ones fairly
5 substantially in some cases. So I really hope
6 you worked really hard at getting that first
7 one right because it really does diminish the
8 apparent cost effectiveness of everything
9 subsequent.
10 MR. FITZ: That's right and we've
11 tried our best. And so please submit your
12 comments on how you think we should adjust the
13 analysis, you know, how we should change our
14 assumptions, etc.
15 MR. BROOKMAN: Thank you, Eric.
16 MR. FITZ: Because we recognize
17 this is important.
18 MR. BROOKMAN: Okay.
19 Yes, Harmon.
20 MR. LEWIS: Eric, that 90 percent
21 efficiency, was that from the strip curtain
22 manufacturer or from academia? Because our

1 strip curtain manufacturers don't say as high
2 as 90 percent.
3 MR. FITZ: So that's from multiple
4 academic research papers.
5 MR. BROOKMAN: Jim.
6 MR. PERRY: Just a quick question.
7 Did you say, Charles, that this is not an
8 accurate graph or is this actually one of the
9 graphs out of the TSD?
10 MR. LLENZA: I said that this was
11 a representative graph of what we would do for
12 each different one.
13 MR. PERRY: There are 12 data
14 points up there and only eight technologies
15 identified for the envelope.
16 MR. FITZ: Those technology
17 groupings, they're actually multiple options
18 within each category. For example, the wall,
19 ceiling and floor insulation, you could change
20 the underlying materials whether you used like
21 a --
22 MR. PERRY: You applied one to the

1 floor and then another data point for the wall
2 and another data point for the ceiling.
3 MR. FITZ: Exactly. And then you
4 could have different thicknesses as well.
5 MR. LLENZA: It's a clarification.
6 It's not a one-to-one ratio on the
7 technology.
8 MR. PERRY: Okay. And is there
9 somewhere that correlates each of the data
10 points with what technology was applied? It's
11 in the TSD. I can review that. Okay.
12 MR. FITZ: Yes, it is.
13 MR. PERRY: Thank you.
14 MR. BROOKMAN: Thank you.
15 Yes, Jon.
16 MR. McHUGH: I have a question
17 around why strip curtains are even not listed
18 here in that they are part of the prescriptive
19 requirements of EISA.
20 MR. BROOKMAN: Eric.
21 MR. FITZ: Say that again. Why
22 they're --

1 MR. McHUGH: Strip curtains are a
2 part of the prescriptive requirements in EISA.
3 So why are they listed here as an efficiency
4 level since they're already required by the
5 standard?
6 MS. LEGETT: Maybe we can -- Is
7 there a copy of EISA handy that we can read
8 from?
9 MR. MINELLI: The EISA standard,
10 there is a clarification on the DOE website.
11 The EISA standard does not require strip
12 curtains on self-closing doors meaning
13 everything 3.9 X 6.9.
14 MR. BROOKMAN: Did you get that?
15 Did you get Fred on the -- Repeat it, Fred.
16 MR. MINELLI: There's a
17 clarification on the DOE website that was
18 early in '09 that states that as long as the
19 doors are self-closing they do not require
20 strip curtains. So there are no strip
21 curtains on small doors as a requirement in
22 EISA. So that is not a basis.

1 MS. LEGETT: I wanted to check
2 EISA because it doesn't say you must have
3 strip curtains and only strip curtains. There
4 are multiple things.
5 MR. McHUGH: It says infiltration
6 barriers.
7 MS. LEGETT: Right. This would be
8 strip curtains in addition to whatever else
9 EISA requires.
10 MR. BROOKMAN: Okay.
11 MR. MINELLI: And they're
12 considering spring loaded hinges to take the
13 place of strip curtains.
14 MR. BROOKMAN: Thanks for that
15 clarification.
16 MR. LLENZA: Charles Llenza, the
17 Department of Energy. I think the fact that
18 EISA doesn't exactly tell you which particular
19 type of either strip curtain or spring loaded
20 door or some kind of other infiltration
21 barrier that's why we list it as an option.
22 It's not really an option in that sense. But

1 it's a combination of technology mixes that
2 you would use to get to the energy efficiency
3 levels in order of describing the daily energy
4 consumption.
5 MR. BROOKMAN: Joanna.
6 MS. MAUER: Joanna Mauer. So is
7 there a specific assumption about which
8 technology is being used in the baseline for
9 infiltration reduction?
10 MS. LEGETT: I believe so.
11 MR. FITZ: Yes. The baselines,
12 DOE's attempt to represent what is the least
13 efficient that is typically sold in the market
14 today. So DOE found that in most cases strip
15 curtains are not included. That's one
16 technology that's not part of the baseline.
17 But there are numerous other assumptions.
18 MS. MAUER: Joanna Mauer. Can you
19 -- Is there a specific assumption about what
20 is included in the baseline?
21 MR. FITZ: Yes, and it's outlined
22 in the chapter. There are dozens of

1 assumptions about the baseline.

2 MR. BROOKMAN: Please your name.

3 MR. FITZ: Of what is included.

4 MS. MAUER: Just specifically for

5 the infiltration reduction in the door I guess

6 is what I'm asking. But I can look.

7 MR. FITZ: Yes.

8 MR. BROOKMAN: Thank you, Eric.

9 Please.

10 MR. OWEN: Kenny Owen with Master-

11 Bilt. I just want to reinforce what Charlie

12 is saying here. If you look at the graph to

13 think that we could go that far and save half

14 the energy with something that costs almost

15 nothing, it doesn't pass the smell test. I

16 mean if that was true, we would all be touting

17 that, whatever that is, strip curtains, and

18 selling it as a big energy saver right now.

19 And that's just not realistic. So I think we

20 definitely need to do some work there.

21 MR. BROOKMAN: Once again, the

22 Department would really appreciate the

1 experience of manufacturers on this subject,
2 what they have found.
3 Are we ready to --
4 MS. LEGETT: If there are no
5 further questions on the envelope, we'll move
6 on to refrigeration. And here I realize that
7 this might be pretty contentious. So I'll
8 explain it very briefly and then let people
9 comment.
10 The graph looks different from the
11 previous graph and one of the reasons for this
12 is that refrigeration systems were analyzed
13 somewhat differently from envelopes. If you
14 look at the axis here, on the previous slide,
15 it was manufacturer selling price and daily
16 energy consumption. You'll notice on the
17 refrigeration it's normalized manufacturer
18 selling price and normalized daily energy
19 consumption.
20 The reason for this was that for
21 refrigeration systems some of the design
22 options increase the capacity of the system.

1 So an increase in the manufacturer price could
2 be attributed to either a gain in efficiency
3 or a gain in capacity. So to account for
4 this, DOE divided both the cost and the energy
5 consumption by the net capacity. And that's
6 why the axes say normalized here.
7 What we found in our preliminary
8 results was that for the first two efficiency
9 levels, these first two points after the
10 baseline, which actually correspond to
11 increased larger evaporator and condenser coil
12 respectively, in absolute terms they cost
13 more. But it also adds capacity. So the cost
14 per capacity goes down. And the energy
15 consumption per capacity goes down. That's
16 why we see this dip in the graph here.
17 And I'll go ahead and let people
18 comment on that.
19 MR. BROOKMAN: Daryl.
20 MR. ERBS: So let me just give you
21 the smell test on this. If I go across to the
22 left to get back to where I was on cost,

1 normalized selling price, I'm basically at
2 half the energy consumption that I started at
3 the same selling price. You know if we look
4 at the history of unitary air conditioners it
5 would be like going from a SEER of eight which
6 is I think where we started if my memory
7 serves me to 16 which is probably where you
8 guys are going next on unitary for no added
9 cost to the system.
10 And I'd ask you to go look at the
11 history on air conditioning. Did they get
12 from eight to 13 without adding cost let alone
13 16? And I think the answer is no.
14 Now it could be that refrigeration
15 manufacturers are way behind and we've got a
16 lot more low hanging fruit and there's
17 probably some truth to that.
18 MR. BROOKMAN: It seems like the
19 Department has counted on you being more
20 brilliant yet.
21 MR. ERBS: This to me is -- Boy,
22 we've been leaving a lot of money on the table

1 for a long time. And that's why I'm asking
2 you about did you include sheet metal and did
3 you consider the fact that a smaller
4 compressor which is part of where you get to
5 on this may not cost as much less as a
6 reduction in its size. So if I use as half a
7 large of a compressor it may not cost half as
8 much. You know, some things like that I think
9 might be part of why I'm just uncomfortable
10 looking at this curve and thinking we can
11 really get there.
12 MS. LEGETT: Yes. This is why
13 we're asking for comment on this because there
14 were a lot of assumptions that went into this.
15 One was exactly what you just said, the cost
16 of different tech options like the cost of
17 compressors. Can you provide costs of more
18 efficient compressors that are different from
19 the costs that we actually have in the TSD?
20 And if you can, that would be a good basis for
21 us reevaluating.
22 MR. ERBS: I'm not sure we can --

1 I mean you really need to get a broad view of
2 the whole industry and all the different
3 sizes. And can we all do that by the 28th of
4 May? I'm not sure.
5 MS. LEGETT: Okay.
6 MR. ERBS: I think we can give you
7 comments to say we're not convinced that this
8 is entirely accurate and tell you when maybe
9 we can give you some data and see if that
10 works for you.
11 MS. LEGETT: Okay.
12 MR. BROOKMAN: Warren, go ahead.
13 MR. BEETON: Warren Beeton again.
14 Another way to look at this, does this mean
15 that your curve implies that if you put --
16 You've got an example somewhere there that we
17 ought to look at which is you've increased the
18 efficiency which also brought along some
19 additional capacity. But never in my
20 experience has the capacity increase been so
21 large. It's usually a small effect that to
22 offset that capacity, to keep the capacity the

1 same, you can put in a smaller component, a
2 smaller compressor, but that savings is --
3 I've never seen a case where it isn't
4 minuscule compared to the cost at or for the
5 efficiency increase.
6 So I think it would be instructive
7 to look at your examples specifically to try
8 to find out how you got to those numbers.
9 That might be a more productive way than us
10 just giving a bunch of data.
11 MS. LEGETT: Okay. Thank you.
12 MR. ERBS: And that's why I was
13 asking. I mean you told us how much the
14 larger condenser costs. You haven't told us
15 how you took a bunch of money out elsewhere to
16 get to that lower net cost per increment of
17 capacity. And again we could work on it and I
18 understand you might not be able to share all
19 of the detail, but just maybe some relative
20 information would help us respond more
21 effectively.
22 MR. LLENZA: This is Charles

1 Llenza of the Department of Energy. I think
2 what we can do is as we revise the TSD from
3 this meeting so that we could try to provide a
4 little bit more information in terms of how we
5 got to the different points, the different
6 analysis.
7 MR. BROOKMAN: Aris.
8 DR. MARANTAN: Aris Marantan. I
9 just want to also mention that to follow up on
10 your comment, Daryl, about the 28th.
11 Obviously, that is when the comment period
12 ends for this proceeding. But we do have an
13 opportunity coming up after the preliminary
14 stage. In fact, it starts after the 28th
15 after the comment period closes.
16 You'll hear in a couple of slides
17 later on or this afternoon that we'll be
18 conducting the manufacturer impact analysis.
19 That's primarily for financial information
20 needed for the MIA. But we also take that
21 opportunity to get into a little more detail
22 about the analyses we've conducted for this

1 stage so we can update it for the NOPR.
2 So you'll hear this afternoon that
3 we'll be happy to come out and visit
4 manufacturers like we did. I believe it was
5 last year. And we'll be happy to talk to you
6 about specific assumptions we've made in the
7 analysis. We can provide you a lot more
8 detail because we set up non-disclosure
9 agreements with companies.
10 MR. LLENZA: This is Charles
11 Llenza of the Department of Energy also. Just
12 a clarification here in terms of the process.
13 We have formal deadlines for these comments
14 to be submitted. But the Department doesn't -
15 - I mean if you send us comments in a month
16 and you have specific details that you have
17 fleshed out, the Department would not put that
18 aside and ignore it. It's not beneficial to
19 anybody.
20 And this process also is not
21 regimented in such a level that we just stop
22 listening at certain periods of time. All the

1 way through to the NOPR, up to the NOPR
2 process, we are constantly revising our
3 analysis and our methodologies, etc., in terms
4 of getting to the next level which is the
5 notice of proposed rulemaking.
6 In terms of the formality of the
7 deadline, I would not be discouraged by the
8 formality of the deadline for submitting
9 comments to the Department as discouraging you
10 from submitting comments after the comment
11 period closes.
12 MR. BROOKMAN: Karim first.
13 DR. AMRANE: Again, just a quick
14 question. Karim Amrane, AHRI. Are the
15 details of those tables available in the TSD?
16 MS. LEGETT: I'm sorry. What was
17 that first part?
18 DR. AMRANE: The details, the
19 analysis that was used to derive those numbers
20 in the chapter or whatever, chapter five?
21 MS. LEGETT: What Charlie just
22 said to the extent that the TSD lacks certain

1 details that you would like, we can look into
2 revising the TSD to add those.
3 DR. AMRANE: I guess as far as to
4 be able to provide this kind of input we will
5 have to know how you are deriving those
6 numbers.
7 MS. LEGETT: Okay. Do you have a
8 particular number that --
9 DR. AMRANE: Yes. We are
10 questioning the curve here and as well as to
11 understand how you ended up having this curve,
12 we need to understand the details that went
13 into deriving the curve.
14 MS. LEGETT: Thank you.
15 MR. BROOKMAN: Charlie.
16 MR. STEPHENS: Charlie Stephens.
17 I did just look up EISA 2007 Section 312 just
18 to read it through for myself to make sure I
19 was reading it correctly and my reading of
20 that section on infiltration control suggest
21 that they do require some means. It's not
22 strip curtains per se, but there's some means

1 of controlling infiltration when the door is
2 open which suggests that the entire
3 infiltration load from door openings is not
4 available at this point in this proceeding to
5 reduce but rather some fraction of that if you
6 can come up with a means that's more effective
7 than what's specified in EISA today.
8 There are several options
9 specified there, spring hinge doors, strip
10 curtains, etc., and those don't have zero
11 effectiveness. I think we've heard that they
12 may not be 90 percent either. But they don't
13 have zero effectiveness. And I think there's
14 probably a substantial amount of infiltration
15 there left to work on you might say with this
16 rulemaking. So just from my reading of the
17 statute suggests that.
18 MR. BROOKMAN: Thanks, Charlie.
19 Jon.
20 MR. McHUGH: So I think it would
21 be helpful if -- It might be already in the
22 spreadsheets--- but the non-normalized values

1 for this. So what is -- I'm assuming that
2 showing the non-normalized values doesn't
3 violate any proprietary information. That
4 would be helpful to help understand what's
5 going on here. Thanks.
6 MS. LEGETT: Thank you.
7 MR. BROOKMAN: Are we ready to
8 move on now?
9 MR. McHUGH: One more comment.
10 MR. BROOKMAN: Yes.
11 MR. McHUGH: These meetings are --
12 There's a lot of information to cover and
13 there's a lot of really deep technical detail
14 to understand why potentially our R-value
15 evaluations of the measures are substantially
16 different from Department's. I was wondering.
17 Is there any method of sort of meeting
18 directly with the people that are involved in
19 developing these numbers so that there's some
20 kind of dialogue that's at a much more sort of
21 esoteric level than the discussions that we
22 have here?

1 (Off the record comment.)
2 I'm suggesting for non
3 manufacturers by the way. So I'm not a
4 manufacturer and I don't represent
5 manufacturers.
6 (Off the record comments.)
7 MR. LLENZA: This is Charlie
8 Llenza here. I think that in the interest of
9 everybody's time that instead of coming in one
10 party at a time that if there was a little bit
11 of a consensus on certain particular issues
12 that you wanted to discuss on the analysis
13 that we would entertain parties coming to the
14 Department to talk to the analysis team to
15 help us clarify or further define our
16 analysis.
17 I would just recommend that we do
18 this at an early stage, an early summer stage,
19 rather than a later because we have to do a
20 lot of number crunching and there's other
21 steps for this rulemaking. This is not the
22 only thing we're doing here.

1 (Off the record comment.)
2 I would see what we need to do. I
3 don't think it's -- I'm not opposed. I don't
4 think the Department would be opposed to
5 having an interaction with the industry or the
6 stakeholders or whichever particular group. I
7 think we just need to get a little bit
8 organized so we're using the time most
9 efficient.
10 There are some issues. There are
11 clearly some issues in terms of how we got to
12 these numbers. We see it differently because
13 we're not experts, of course. We're trying to
14 become the experts. But we could certainly
15 benefit from a meeting that's organized in
16 terms of and couched around some kind of
17 agenda in terms of specifics.
18 MR. BROOKMAN: Betsy Kohl.
19 MS. KOHL: Hi. This is Betsy
20 Kohl, DOE. I just wanted to say the
21 manufacturer interview when you're gathering
22 technical details are different. But we don't

1 want to create the impression of one-on-one
2 meetings. So if those meetings do take place,
3 there is documentation so that everybody knows
4 what's being talked about.
5 MR. McHUGH: Jon McHugh. What I'd
6 recommend is there's the ASHRAE summer
7 meeting. It's the end of June. Most
8 manufacturers or many of the utilities are
9 also at that meeting. That would be a perfect
10 place to have a public forum to discuss these
11 things.
12 MR. BROOKMAN: To go into much
13 greater detail.
14 MR. McHUGH: That's right. A
15 detailed discussion of the modeling aspects
16 and the energy.
17 MR. BROOKMAN: So to facilitate
18 that happening I would guess that those of you
19 that would be interested in taking that deep
20 dive that you would need to describe the
21 elements for which you'd like to go into
22 considerable detail.

1 MR. McHUGH: Correct. Yes.
2 MR. BROOKMAN: Okay. Thank you.
3 Harmon.
4 MR. LEWIS: One other thing on
5 this. The fact that you get more output on a
6 unit is not necessarily a bonus because the
7 refrigeration system has to balance the heat
8 load need of a walk-in so that the walk-in can
9 control the humidity as well as the
10 temperature. So if you can come up -- If this
11 one improves, you know, you take a 20,000 BTU
12 unit and you make it 30,000 I can't use it on
13 a 20,000 BTU walk-in that we started out at
14 the baseline. So bigger isn't better all the
15 time.
16 Now a lower cost 20,000 BTU,
17 that's what you need but not a lower cost
18 30,000 that won't work on a 20,000.
19 MR. BROOKMAN: Let's proceed.
20 MS. LEGETT: Thank you. If there
21 are no further comments on this graph, this is
22 actually the last slide in the section and

1 this is to describe how this engineering
2 analysis feeds into the downstream analyses.
3 So here you see this chart again and each of
4 these points corresponded to a particular
5 design option.
6 But now we are going to call each
7 point an efficiency level. And for downstream
8 analyses, DOE conducted these analyses at each
9 combination of efficiency levels for envelope
10 and refrigeration system pairs. And we're
11 going to get into details of how those were
12 matched and how the energy consumption was
13 calculated in further analyses.
14 So that's the end of that section.
15 MR. BROOKMAN: Comments on that?
16 (No verbal response.)
17 I was just consulting with
18 Charles. I think maybe we should take lunch
19 now. It's now 12:15 a.m. and we have -- We're
20 behind schedule maybe as much as 45 minutes.
21 But I do think we'll catch it up toward the
22 end of the day.

1 So let's take lunch now. It's
2 12:15 p.m. We'll resume here at 1:15 p.m. I
3 think the discussion has been very, very
4 useful and very fruitful and I appreciate
5 everybody just talking about the stuff that
6 matters to them.
7 Make sure you wear your badge in
8 the building. This room will be locked. So
9 you can leave your stuff here. For those of
10 you that are unfamiliar with Forrestal to get
11 to the big cafeteria you go down to the ground
12 floor and you go about a 100 yards that way
13 (Indicating) and then up the escalator to the
14 cafeteria.
15 You'll have to pass through
16 security light to get back in. They might --
17 You might need to have your ID although it's
18 been hit or miss whether they require that or
19 not to get back in. So enjoy your lunch and
20 we'll resume at 1:15 p.m. Off the record.
21 (Whereupon, at 12:15 p.m., the
22 above-entitled matter recessed to reconvene at

1 1:15 p.m. the same day.)

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20 A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

21 1:20 p.m.

22 MR. BROOKMAN: Let's start back

1 up. Please take your seats.

2 A housekeeping note that I forgot

3 this morning, the Department will make a

4 photocopy of the business cards that you all

5 handed over this morning. And if you haven't

6 done so already, you might still be able to

7 get your card in the basket to Brenda. So

8 there will be a visual copy of all those that

9 have attended, that registered, as a courtesy.

10 So we're going to then proceed as

11 we had planned with the agenda.

12 Gopal?

13 DR. BANDYOPADHYAY: This is Gopal

14 Bandyopadhyay. And I'm from Pacific Northwest

15 National Lab. And in this section of the

16 presentation, we will briefly describe two

17 very key steps in the whole analysis process.

18 First we will explain the

19 methodology which DOE used to determine the

20 end-user price of the equipment by a process

21 called a markup analysis. And later we will

22 move to energy analysis, the DOE's process of

1 estimating the annual energy consumption for a
2 combination of the box and a refrigeration
3 system together.
4 So first we have the -- okay, when
5 we first start with the markup analysis
6 process, we had to really figure out what the
7 price of the whole equipment is, the
8 equipment, walk-in coolers and freezer boxes
9 to the final customer. And for that, we had
10 to also know at various efficiency levels.
11 So from the engineering analysis
12 that we obtained, the manufacturer's sales
13 price, which was explained by Rebecca in
14 detail what it consists of. And sometimes the
15 boxes move through the distribution channel
16 operators, they add their own markup.
17 So the first step in this process
18 is to map and characterize the distribution
19 channels. And then, of course, we have to
20 figure out the costs which are involved and
21 how much is the markup percentage of the base
22 channel.

1 The way this is done is that we
2 use actual public domain data. There are two
3 associations. One is ACCA. Of course, ACCA
4 is the contractors association. But we have
5 got HARDI, H-A-R-D-I, that is Heating, Air-
6 Conditioning, and Refrigeration Distributors
7 International. They represent really the
8 dealers.
9 And they periodically collect data
10 from their members and they create the balance
11 sheets. And this is called the periodic
12 profit report. And we have used this periodic
13 profit report data to determine the markups,
14 which covers both the baseline markups and
15 also the incremental markups.
16 The baseline markups is a markup
17 percentage, what is applicable today in the
18 market. And incremental markup refers to like
19 a situation when suppose there is energy
20 conservation -- energy saving measures
21 implemented in the equipment and we have
22 additional costs which are incurred.

1 Then, of course, the baseline
2 markup percentage is not applicable. The
3 markup percentage goes up a fractional amount
4 of what the total is. So this is called the
5 incremental markup and we will explain that
6 with an example.
7 So this is DOE's impression of the
8 distribution channels for equipment for the
9 grocery and the large supermarket segment.
10 And to our left, we have the national
11 accounts. But that is actually the national
12 accounts are the large chain stores. In fact
13 they negotiate and transact business directly
14 with the manufacturers.
15 And, of course, in addition to
16 that, we have the three other distribution
17 intermediaries who have significant roles.
18 When we talk about the small, independent
19 chains and also the chains with few stores,
20 those kind of businesses. So they have
21 essentially procured their equipment through
22 one of those intermediaries.

1 We have at the highest level the
2 equipment dealer. And, of course, below him
3 we have got a mechanical contractor.
4 Sometimes the distribution intermediary, the
5 equipment dealer, and the mechanical
6 contractor can be one and the same person.
7 But, of course, sometimes we see situations
8 where the mechanical contractor is an
9 independent entity and he has really no role
10 in the distribution of the equipment.
11 And in addition to that, a small
12 percentage of the business, what DOE has seen,
13 is also done by the food and equipment
14 wholesalers who kind of -- they kind of do
15 both. They also sell and distribute food and
16 also distribute the equipment.
17 So from here we move on to the
18 DOE's impression about the distribution
19 channels for equipment to food service
20 segment. Food service segment is acquiring
21 different kinds of things where you have our
22 standard models. And there are distributors

1 that DOE has identified.

2 Dealers are the usual dealers what

3 we described earlier and then you have got

4 some portion of the business, we believe is

5 done by what we call E-Commerce resellers,

6 people who can have their warehouse anywhere

7 but they sell primarily through their website.

8 And we have got what we call broad

9 line distributors which, again, are the

10 people, the integrated distributors who sell

11 both food and the equipment. And they feed

12 into the operators who are really the owners,

13 the mom and pop stores, or the big chains, or

14 who does this food service business.

15 And what we have seen also, what

16 DOE has seen also is that there are other

17 important players in this whole value chain

18 like we have the buying groups -- associations

19 of dealers who negotiate the business directly

20 with the manufacturer. I mean they have an

21 important role.

22 And the design consultants and the

1 franchisers who also decide on the equipment
2 specifications. And they also even determine
3 the particular manufacturer. They also have
4 got a role to play.
5 So this is all the structure of
6 DOE's impression of the market for the food
7 service segment.
8 MR. BROOKMAN: Gopal, hang on just
9 one moment. So before we move off these two
10 slides, questions and comments before we go
11 into greater detail surrounding what is
12 represented here.
13 DR. BANDYOPADHYAY: Yes, okay.
14 MR. BROOKMAN: Just briefly, just
15 to answer any questions on these two.
16 Yes, Mike?
17 MR. STRAUB: Mike Straub,
18 Heatcraft.
19 The walk-in cooler freezer
20 manufacturers, is that the envelope
21 manufacturer or the system manufacturer? Or
22 is it the aggregate?

1 DR. BANDYOPADHYAY: Walk-in
2 coolers manufacturers, we would -- of course,
3 system manufacturers are included there but we
4 would also include the manufacturers of the
5 envelopes.
6 MR. STRAUB: Okay. Because the
7 system manufacturers actually sell to the box
8 manufacturers as well. That's another step.
9 DR. BANDYOPADHYAY: In the
10 refrigeration systems?
11 MR. STRAUB: Right.
12 DR. BANDYOPADHYAY: All
13 refrigeration systems manufacturers, they are
14 kind of very large enterprises. And they have
15 got various market segments. I think the
16 answer to your would be we are considering
17 only that portion of the refrigeration system
18 manufacturers only for the segments for the
19 walk-in coolers because they might be selling
20 also to other intermediaries.
21 MR. STRAUB: I guess what I'm
22 getting at is if this is the envelope, then

1 there is one more distribution step where the
2 system manufacturers sell to the envelope
3 manufacturers who sell into all of these
4 groups because about half of our business goes
5 through OEM box manufacturers.
6 DR. BANDYOPADHYAY: Yes.
7 MR. STRAUB: The other half goes
8 through the other distribution channels you're
9 showing here.
10 DR. BANDYOPADHYAY: Yes.
11 MR. STRAUB: So there's one more
12 step in this process.
13 DR. BANDYOPADHYAY: Yes, okay. I
14 think for the refrigeration system, we would
15 consider that as an input cost for the
16 envelope manufacturers, the system integrators
17 primarily. So I think that step we have not
18 really included it.
19 I'm sure your comment is well
20 appreciated. We'll see how this could be
21 modified.
22 MR. BROOKMAN: Thank you. That's

1 the reason we paused here for this.
2 Yes? Harmon?
3 MR. LEWIS: Also on this, the
4 design consultants really aren't between the
5 dealer and the operator. Going down that
6 arrow is really the operators are telling the
7 consultants what products they're interested.
8 It's then specified and then that
9 arrow really comes back to the walk-in cooler
10 and freezer manufacturer for the equipment
11 we're providing. But the consultant does not
12 buy from the dealer and sell to the operator.
13 DR. BANDYOPADHYAY: No, they
14 don't. In this slide, that is why it shown in
15 a different kind of box. As you can notice,
16 the people who are really trading in those
17 goods, they are in a different color
18 rectangular box. And these have got some
19 other roles.
20 I mean just to explain the whole
21 process but they really don't have any
22 implications in the value chain.

1 MR. BROOKMAN: That's a good
2 comment, a useful comment.
3 Other thoughts on these graphic
4 representations of the distribution channels?
5 Did -- I thought I saw someone else. No?
6 Okay. Everybody's comfortable with this
7 before we get into more detail?
8 (No response.)
9 MR. BROOKMAN: Okay.
10 DR. BANDYOPADHYAY: Thank you.
11 Okay. DOE estimated that the
12 market could be quite different for the
13 multiplex condensing equipment because it goes
14 to, primarily, to the supermarkets and the
15 grocery segments. So we have these pie charts
16 which would show the share -- the estimates of
17 the shares of the various distribution
18 channels.
19 And for multiplex condensing
20 equipment, we believe -- DOE believes that the
21 large portion of that is moving through the
22 national accounts. And the rest of the market

1 is shared equally between the distributor and
2 the contractor.
3 And for the dedicated condensing
4 equipment, the whole market is split between
5 these two subsegments. We have the
6 convenience store and the small grocery stores
7 that account for half of the market. And for
8 the food service, the rest half is accounted
9 for by the food service.
10 And so, again, from the pie chart,
11 we can see that for convenience stores,
12 grocery stores, the market is roughly split
13 three ways. But for the food service segment,
14 the dealers have a large role, 80 percent of
15 the market moves through the dealer. The rest
16 is shared between the e-commerce resellers and
17 the contractors.
18 So DOE has not hard data to really
19 back it up but DOE has discussions with a few
20 manufacturers and also the feedback which DOE
21 got during the framework meeting, all this was
22 kind of aggregated and this is what DOE thinks

1 is the market picture.
2 So now DOE is inviting comments on
3 these two issues. We have first whether it is
4 okay to state these distribution channels
5 depending on the market segment, issue number
6 one.
7 And the second issue is that
8 whether -- about the accuracy and the
9 completeness of the distribution channels and
10 the channel shares.
11 MR. BROOKMAN: So we've had good
12 comment on this already. Additional comments
13 particularly on the shares? Yes, Harmon?
14 MR. LEWIS: I'm not sure if this
15 is the right spot but in your Chapter 5, you
16 show that -- or state that you've figured
17 there were 288,000 refrigeration equipment
18 shipped in Table 3.2.8 and only 102,000 walk-
19 in envelopes each year.
20 And it seems like that, you know,
21 almost three refrigeration systems to each
22 walk-in.

1 DR. BANDYOPADHYAY: Yes.
2 MR. LEWIS: I know there's
3 replacements but it seems very high. And then
4 even more off track is ten multiplex systems
5 to every one dedicated system. And within our
6 realm, I don't see that and I don't think some
7 of the refrigeration manufacturers themselves
8 see that. So I'm wondering where that data
9 originated.
10 MR. BROOKMAN: How would you
11 correct it? What would you -- how would you
12 recharacterize it?
13 MR. LEWIS: Well, I'd like to
14 understand where it is. I can't tell you how
15 they made the bomb. I can just tell you it
16 went off.
17 (Laughter.)
18 MR. BROOKMAN: Go ahead, yes,
19 please. Please say your name. Turn in on,
20 there you go.
21 MR. McCORMICK: Thank you. Gavin
22 McCormick, Pacific Northwest National Lab.

1 I just thought we should reserve
2 that for the shipments chapter. We have an
3 entire section on that later. So -- but we do
4 welcome the comment in just a little bit.
5 MR. LEWIS: I mean and that's
6 going to address where your numbers came from?
7 MR. McCORMICK: We'll provide the
8 best we can and talk about it then I think is
9 the best answer.
10 MR. BROOKMAN: Okay. So when we
11 get there, yes.
12 Can anybody comment just globally
13 on how the Department has characterized these
14 shares? Are they in the right ballpark here?
15 What would you say about it, Harmon?
16 MR. LEWIS: I don't want to be the
17 only one that talks but I think it is fairly
18 accurate. And until the last couple years
19 within the food service distribution there,
20 you'd have national accounts such as major
21 chains. But in the last couple of years,
22 they've kind of quit building as the economy

1 went in the tank.

2 So this is probably accurate for

3 now. Hopefully in the next couple years,

4 they'll bounce back. And they'd probably be

5 part of that 20 percent might be between the

6 non-dealer would probably be split three equal

7 ways rather than the two you now show just

8 from my experience.

9 DR. BANDYOPADHYAY: Thank you.

10 MR. BROOKMAN: Good. Thank you.

11 Yes, Daryl?

12 MR. ERBS: Daryl Erbs. My only

13 other comment would be I'm surprised to see

14 ten percent going through e-commerce. That

15 seems high to me. It's gaining but I don't

16 think it is at ten percent.

17 DR. BANDYOPADHYAY: Yes. This is

18 just an estimate. So we really don't have a

19 real feel for that number. I mean this is a

20 totally ballpark figure. So --

21 MR. ERBS: And my other comment

22 would be a lot of times e-commerce consists of

1 one of our dealers selling it into someone
2 else's territory. And we can still look at
3 that as a distributor sale.
4 MR. BROOKMAN: Yes. Harmon, you
5 used your hands to flash up a numeral. Yes.
6 You think it is how much?
7 MR. LEWIS: I think e-commerce is
8 probably two percent in its strictest sense.
9 If somebody put something -- if somebody shows
10 something on the internet and sells it, there
11 are a few dealers, Restaurant Equipment World
12 in Orlando and such, but I think at least
13 within our base of what we manufacture, it's
14 two percent or less. I don't know what other
15 people are seeing but it is typically still
16 through the food service equipment dealer
17 almost --
18 MR. BROOKMAN: Thank you. Okay.
19 Thanks.
20 DR. BANDYOPADHYAY: Well, I think
21 I'll respond to that. It is primarily a
22 visibility effect because the moment you

1 search for food service equipment, they show
2 up so you tend to feel that it is high.
3 But I think we really appreciate
4 your comments and we will modify our figure.
5 MR. BROOKMAN: Final comments on
6 these chains and shares?
7 (No response.)
8 MR. BROOKMAN: Okay.
9 DR. BANDYOPADHYAY: Thank you.
10 So these are the results DOE
11 obtained from the markup analysis. Figures in
12 the -- I don't know what is the color -- call
13 it now green is actually the baseline markup
14 multipliers and the figures in the blue are
15 the incremental markup multipliers.
16 Now to explain what it is, is that
17 let's follow the figure in the first column
18 under the distributor heading. And the first
19 figure which appears in green is 1.45. That
20 really means that the markup multiplier is
21 1.45, which means that the distributor is
22 adding 45 percent markup on the manufacturer's

1 selling price for his price to the final
2 customer.
3 And the figure next to that in
4 blue that is 1.12, that implies that they are
5 adding -- I mean they're not adding really --
6 I mean they might add twelve percent more when
7 you have a higher efficiency equipment or the
8 equipment which costs a bit more because it
9 has energy-saving features.
10 So this incremental analysis is
11 very important. I mean this is standard
12 procedure that the DOE has used for all other
13 rulemaking processes.
14 So we have the figures, various
15 figures under various distributor types. And
16 all these figures are aggregated to find out
17 the overall markup multiplier which is used in
18 the downstream calculations.
19 So the figures which you see here
20 in the second row, the first row is multiplied
21 by a universal sales tax multiplier, 1.07,
22 which means that there is seven percent sales

1 tax. That is kind of a national average.
2 So DOE has studied the sales rates
3 for all the states and found out what could be
4 considered as a national average. So that
5 figure gets multiplied by the first row figure
6 to the overall markup percentage.
7 So DOE seeks comments on these
8 values, whether they look high, or they look
9 low, or they look reasonable, or they are just
10 right.
11 MR. BROOKMAN: Go ahead, Harmon.
12 MR. LEWIS: I didn't follow the
13 math to get to the overall weighted average
14 markup from the first three columns. Can you
15 explain how those became like 1.41 and 1.83
16 from the other three numbers like the top row?
17 DR. BANDYOPADHYAY: The top row
18 figures are multiplied by 1.07 only to get the
19 second row figures like 1.45 multiplied by
20 1.07, that's 1.56.
21 MR. BROOKMAN: He's talking about
22 going across.

1 MR. LEWIS: Yes, up in the top row
2 there, you've got the three yellow numbers on
3 the left.
4 DR. BANDYOPADHYAY: Oh, okay. I'm
5 sorry. Yes, sorry. I misunderstood.
6 MR. LEWIS: All right. How did
7 those become the 1.41 for multiplex?
8 DR. BANDYOPADHYAY: Yes.
9 MR. LEWIS: And how do they become
10 the 1.83?
11 DR. BANDYOPADHYAY: Exactly.
12 MR. LEWIS: What's that?
13 DR. BANDYOPADHYAY: Yes. The
14 process involved here is that we have to refer
15 back to the pie chart, which showed that for
16 multiplex equipment, we had various
17 percentages assigned to the various three
18 types of distribution channels. So those are
19 the weighting factors which are used to derive
20 this 1.41 figure.
21 MR. LEWIS: Okay.
22 MR. BROOKMAN: So, yes, David

1 Winiarski?

2 MR. WINIARSKI: Hi, David

3 Winiarski from Pacific Northwest Laboratory.

4 I wanted to emphasize a point here

5 for the team's benefit. These markups are

6 applied to the costs from the engineering

7 analysis as you're walking through the chain.

8 So to the extent that shipping

9 costs are included in the engineering costs,

10 they will be marked up. So we heard earlier

11 that some of the shipping costs may be borne

12 at the customer side, so if you have data on

13 shipping costs and you can disaggregate by

14 similar distribution channels, that would be

15 very useful for the team.

16 MR. BROOKMAN: Okay. Thank you.

17 We're still waiting to hear, I

18 believe, if the numbers here in Chart 51,

19 these markups, if you think they are on target

20 or if you could suggest how to make them

21 better.

22 No comments? Harmon, start with

1 us, yes?

2 MR. LEWIS: Again, the obvious is

3 none of us are those people. So I don't know

4 what my customers sell it for. I would think

5 the average dealer markup that I'm familiar

6 with is probably ten to 12 percent, you know,

7 not 80 percent.

8 So I just know that the dealers

9 are in great competition with each other. If

10 they've got a job that nobody else is bidding

11 on, they can do anything. But most everything

12 else is, you know, in this economy ten people

13 bidding the same job at the dealer level, and

14 they're taking jobs at five percent --

15 MR. BROOKMAN: Okay. That's

16 helpful.

17 MR. LEWIS: -- above our costs.

18 So --

19 MR. BROOKMAN: Thank you.

20 MR. LEWIS: -- I think they're

21 high.

22 DR. BANDYOPADHYAY: Yes, thank

1 you, yes.
2 MR. BROOKMAN: Okay.
3 DR. BANDYOPADHYAY: I mean these
4 are based on secondary data so we'll examine
5 your observation and whether we get any
6 evidence of that.
7 MR. BROOKMAN: I was wondering how
8 old is your data?
9 DR. BANDYOPADHYAY: This, from the
10 2008.
11 MR. BROOKMAN: Okay.
12 DR. BANDYOPADHYAY: Yes. For
13 HARDI, that is the 2008 profit report that we
14 have used.
15 MR. BROOKMAN: Okay. Final
16 comments on these markups? These markup
17 numbers?
18 DR. BANDYOPADHYAY: Okay. Thank
19 you.
20 So we now move on to the energy
21 analysis and energy use characterization. The
22 objective of this exercise is to provide

1 estimates of annual energy consumption of
2 walk-in equipment at the various levels of
3 efficiency.
4 For the walk-in equipment with
5 outside condensers, DOE also estimated the
6 statewide energy consumption figures. That is
7 primarily to analyze the impact of the climate
8 variable on the performance of the walk-in
9 units.
10 So the results of these exercises
11 are the complete system energy consumption,
12 which combines both the envelope with a
13 matched refrigeration system. And, of course,
14 the whole thing has been detailed out in our
15 TSD Chapter, Chapter 7, which gives details
16 about what is there.
17 So DOE analyzed the same 12
18 representative envelopes, which we discussed
19 in the engineering analysis. That was four
20 equipment classes then three sizes each, each
21 of them the large, medium, and small, and the
22 four classes of products were the usual

1 dedicated -- I'm sorry, the freezers and the
2 coolers, display and non-display. So that
3 gave us the number 12.
4 And these were combined, in turn,
5 with either a dedicated indoor system of
6 refrigeration or with a dedicated system but
7 with an external condenser, and also the
8 multiplex system. So this made the complete
9 system. These are the pairing options.
10 DOE has shown product loading,
11 which I'm going to discuss in detail, what
12 product loading we do. And also the duty
13 cycle.
14 Then the direct electrical energy
15 consumption for the envelope was obtained
16 using the proposed test procedure for the
17 walk-in envelopes. And the refrigeration
18 energy was computed using the AHRI 1250 test
19 procedure. So this gave us the total energy
20 consumption for the complete system.
21 So this is the overall flow of
22 data and the procedure which DOE has used.

1 First we had these green-colored boxes. Each
2 represents some kind of grouping of energy use
3 points.
4 Like first we have got the
5 envelope direct energy consumption. Then we
6 have the components of the refrigeration
7 system which are inside the box like the
8 evaporator fan. So electric consumption due
9 to those, they are captured in this second
10 box, green box.
11 And then finally we have got the
12 third box, which is the refrigeration system
13 energy consumption outside envelope, primarily
14 the condensing unit, the compressor, and the
15 fan, condensing fan which accounts for the
16 large share of the overall energy consumption.
17 So these three are added together
18 to obtain the aggregate system energy
19 consumption.
20 And the other boxes, the white
21 colored -- I mean the transparent boxes, they
22 are really referring to the test procedure

1 which is generating the data like to our left,
2 we have got the envelope test procedure, which
3 is under discussion just now. And we capture
4 the data from there and they feed into the
5 envelope load calculations and also the
6 envelope direct energy consumption.
7 So in addition to this envelope
8 load, we have got the other two loads coming
9 up. There is a product load based on some
10 assumptions. And we have the heat load, which
11 is because of the presence of the
12 refrigeration system components inside the
13 box, which is really the evaporator fan
14 primarily but there may be other things.
15 So this is the whole scheme and
16 the data flow for our energy calculation
17 model.
18 Okay, so first we take up the
19 assumptions DOE made for the product load. I
20 mean DOE didn't have any systematic study on
21 this. So DOE actually studied various
22 manufacturers' technical literature about what

1 is seen as the average load.
2 In those technical literature, we
3 find there is a reference to an average load
4 where a product specific loading is not known
5 and the product is not known.
6 We looked at those figures. Of
7 course there are not many of them. And we
8 concluded that this could be possibly a
9 reasonable assumption for computing the
10 overall load for the box.
11 First the product pull down
12 temperature we took at ten degree Fahrenheit.
13 Then specific heats, 0.9, 0.45, I am sure
14 they are kind of standards -- 0.9 for the
15 coolers where it is above the freezing point
16 and 0.45 for frozen products where it is below
17 the freezing point.
18 And the loading ratio really
19 refers to the loading ratio for the daily
20 cycle. Like to give you an example, let's say
21 a 300-cubic feet system, may really contain
22 even 10,000 pounds of stuff. But on a daily

1 basis, the amount which shall be coming for
2 storage there could be only in the rate of
3 let's say four pounds per cubic feet or only
4 about 1,200 pounds.
5 So what DOE saw from various
6 manufacturers' literature is four pounds per
7 cubic feet for a 24-hour cycle is for the
8 small coolers. Half to a figure of two pounds
9 per cubic feet for the medium and large
10 coolers. And DOE found that for freezer, the
11 loading that shows respectively one pound for
12 small and 0.5 pound for medium and large.
13 So DOE used these figures to
14 compute the product load. This product load
15 was matched -- I mean added to the other two
16 load components, what was shown earlier, and
17 that really gave the whole total load of a 24-
18 hour-cycle and which DOE used for computing
19 the energy consumption for a paired system.
20 So now DOE seeks comments on these
21 assumptions made for computing the product
22 load, whether they are representative or they

1 not. It doesn't look right.
2 MR. BROOKMAN: How about helping
3 us out here? What do you think? Harmon?
4 MR. LEWIS: As we learned from
5 Heatcraft and Russell over the years, I think
6 the cooler numbers, the four pounds and the
7 two pounds are probably a little large that
8 you would normally throw in for a fixed
9 product load. And this is for walk-ins, I
10 presume, that you consider just holding,
11 nothing that you are pulling down a warm
12 product.
13 But the specific heats look right
14 and the ten degrees is what we use.
15 MR. BROOKMAN: What would the
16 numbers be?
17 MR. LEWIS: Probably two and one -
18 -
19 MR. BROOKMAN: Two and one.
20 MR. LEWIS: -- on the coolers.
21 And the freezers, we use one and one.
22 MR. BROOKMAN: One and one.

1 MR. LEWIS: Yes.

2 MR. BROOKMAN: Okay. Okay. Thank

3 you. That's helpful.

4 Other comments on these numbers?

5 (No response.)

6 MR. BROOKMAN: They're building

7 these up from assumptions, right? So every

8 step in that link, it's helpful to have real

9 numbers.

10 (No response.)

11 MR. BROOKMAN: Okay.

12 DR. BANDYOPADHYAY: Thank you.

13 DOE had to match a refrigeration

14 system with a box. So these equations explain

15 the methodology which DOE used to match the

16 refrigeration system with the box. And DOE

17 was guided by what has been provided in AHRI

18 1250.

19 So for the coolers, the column

20 under the coolers, if you look at that, you'll

21 see that the BLH there, which is really the

22 high box load, then you have got the low box

1 load, and the duty cycle DOE has shown is that
2 eight hours, the system run on the high box
3 load and 16 hours it runs on the low box load.
4 So the average total load is
5 actually derived by using that equation in the
6 third row, BLA, that eight is for eight hours,
7 the 16 for 16 hours. And we're dividing the
8 whole thing by 24 to get the average box load.
9 So actually first we compute the
10 average box load using the test procedure
11 data. And from there we move on to compute
12 the BLH and the BLL. And then it uses those
13 equations, where actually it is linked to the
14 capacity, to determine the actual capacity
15 which will be required for the refrigeration
16 system to match with the box.
17 So primarily these are all based
18 on AHRI 1250 assumptions. And DOE seeks
19 comments on the duty cycle assumptions and the
20 rationale to use the duty cycle assumptions
21 same as what is there in the proposed
22 refrigeration system test procedure, which is

1 AHRI 1250-2009.
2 So this is really a very key step
3 in this whole analysis because the whole
4 analytical assumption and the cost of the
5 system, everything is depending on how we do
6 the matching.
7 MR. BROOKMAN: So what about eight
8 and 16, for example? Harmon?
9 MR. LEWIS: I'd like to hear from
10 Russell and from Bohn. But I would think it
11 would almost reversed. And, again, we're food
12 service. So looking at the average
13 restaurants, a lot of those are serving three
14 meals a day.
15 So your are going to have more
16 like 16 hours on the high box load and eight
17 on the other.
18 So I think at least an average of
19 12 and 12 might represent the country. But
20 eight and 16 seems real light.
21 MR. BROOKMAN: Did you have data?
22 How did you arrive at your eight and 16 as a

1 starting point?

2 DR. BANDYOPADHYAY: Yes, these

3 figures have been used in AHRI 1250.

4 MR. BROOKMAN: Yes.

5 DR. BANDYOPADHYAY: So we are

6 really being guided by AHRI on this issue.

7 MR. BROOKMAN: Okay.

8 Yes, please, Mike? I see Mike.

9 Go ahead. Call that guy out, go ahead.

10 MR. STRAUB: Mike Straub,

11 Heatcraft.

12 I was on the engineering committee

13 that actually developed -- worked on the AHRI

14 1250 and that is a good representation of

15 across the country --

16 MR. BROOKMAN: The full spectrum.

17 MR. STRAUB: -- if you think about

18 the daily use, you know, if you've got

19 restaurants that are closed over the weekends,

20 you've got specific restaurants that don't

21 open on Sundays and stuff like that. So it is

22 a pretty good representation.

1 And I agree that there are some
2 that would have, you know, probably a balance.
3 But I think it gives you a better weighted by
4 doing the one-third, two-thirds.
5 MR. BROOKMAN: Your committee
6 sought to -- you sorted through that full
7 distribution of use profiles.
8 MR. STRAUB: Correct.
9 MR. BROOKMAN: Okay. Thank you.
10 Daryl, go ahead.
11 MR. ERBS: Just to add to that
12 comment. I mean it is an over-simplification
13 of what really happens. But, you know, we
14 rationalized that -- you know, a lot of
15 restaurants actually are going to 24 hours.
16 But they typically have periods -- I mean the
17 walk-in is long-term storage.
18 They have basically whip storage
19 that are all of the reach ins. And so what
20 you will find is based on meal times, they
21 will load up their work stations with the
22 products for that meal time period.

1 So they will be going in and out
2 of the walk-in but it is only for that period
3 of time. And then maybe some replenishment.
4 And then you have to then look at
5 display cases where you tend to get peak
6 periods where people are, you know, if it is a
7 convenience store, it's lunchtime, right. The
8 doors are flying open for a couple of hours.
9 And then it is all quiet clear to stocking
10 period.
11 So it is the best we could come up
12 with in terms of just sort of trying to show
13 that there are some times when the doors are
14 opened a lot and times when they are not
15 opened a lot.
16 MR. BROOKMAN: So, Mike, do you
17 think it is more like eight and 16? Or do you
18 think it is more like 12 and 12?
19 MR. STRAUB: The eight and 16.
20 MR. BROOKMAN: Okay.
21 MR. STRAUB: That's a better
22 representation.

1 MR. BROOKMAN: Okay. Thank you.
2 Nationwide?
3 MR. STRAUB: Yes.
4 MR. BROOKMAN: Okay.
5 DR. BANDYOPADHYAY: Okay. Thank
6 you.
7 Well, the other issue which was
8 considered in DOE's process of matching the
9 capacity is something like a rounding off
10 factor because DOE thought that what is really
11 happening in the field over there in the lower
12 sizes of the refrigeration equipment, the
13 designer really may not really get the right
14 size because the box load might show that if
15 it is 10,000 pounds -- sorry, 10,000 BTUs per
16 hour is what you need but the market may not
17 offer exactly 10,000 pounds -- 10,000 BTUs per
18 hour system.
19 So what the designer would do is
20 that probably he would specify a system with
21 12,000 BTUs per hour system, which is a one-
22 ton system.

1 So what DOE did is DOE defined
2 what we called as an oversize factor for
3 matching the required capacity. And the
4 closest refrigeration system capacity in the
5 market.
6 So what DOE did, DOE actually made
7 an estimate that -- got these data points
8 based on some assumptions saying that okay, if
9 this is a required capacity, to what extent
10 this could be oversized, and drew this data
11 points across this chart where the required
12 capacity in on the X axis and the oversize
13 factor to the right.
14 And one can see that as you move
15 to the higher required capacity, let's say
16 120,000 Btu which is really about a very high
17 ten-ton system, there the oversizing issue
18 really is not there because in your required
19 capacity on the market, available capacity is
20 nearly the same.
21 So what DOE did, DOE got these
22 data points and then drew a trend line across

1 these data points. And used that trend line
2 equation to determine what is the right
3 capacity which may be available from the
4 market for all other sizes and requirements.
5 MR. BROOKMAN: Jon, let's start
6 with you.
7 MR. McHUGH: So I look at this and
8 it seems almost contradictory to the
9 assumptions for the duty cycle. I mean we're
10 assuming that under a high box load, that that
11 load is approximately 70 percent. Now that's
12 the average over the high load.
13 The other thing is is that if
14 people were only oversizing by five percent,
15 there would be a lot of sick and dead people
16 in the country. You know the fact of the
17 matter is is that there is a lot of food
18 safety issues at stake. And so the oversize
19 factor is going to be huge.
20 MR. BROOKMAN: Even -- and is the
21 shape of the curve right? Or do you just
22 question that as well?

1 DR. BANDYOPADHYAY: Wait -- sorry.
2 MR. BROOKMAN: Daryl is going to
3 do that. Go ahead.
4 MR. ERBS: First one thing I want
5 to clarify, my understanding was this was an
6 additional oversizing --
7 DR. BANDYOPADHYAY: Yes, exactly.
8 MR. ERBS: -- above and beyond the
9 30 percent or 20 percent --
10 DR. BANDYOPADHYAY: Absolutely.
11 MR. ERBS: -- that was standard
12 practice for the safety factor.
13 MR. BROOKMAN: Okay.
14 MR. ERBS: And so there will be
15 some of that. I'm a little surprised to see
16 that, you know, at 20,000 BTU per hour and
17 below, it goes up almost exponentially.
18 I mean there are fairly small
19 increments of capacity, you know, down below
20 20,000. So I mean I haven't done the math.
21 But I don't think you should have
22 to oversize by 30 percent if you need -- I

1 don't know -- 8,000 BTU per hour or 6,000
2 even. There are small enough increments. I
3 don't think it is quite as bad as you are
4 portraying it.
5 MR. BROOKMAN: Harmon, go ahead.
6 Same thing?
7 MR. LEWIS: Yes, I agree. I think
8 your chart -- in fact, our experiences up at
9 some of the higher BTUs because, again, we're
10 buying 80 percent Copeland condensing units.
11 And that's a plug for Emerson.
12 But there's only certain models
13 available. And they are going to be in bigger
14 increments. But the percentage, because you
15 are dividing by a big number, might be the
16 same.
17 But down in the small increments,
18 we'll start off with a half-horse at 5,000
19 BTUs, and then the three-quarters 7,000, and
20 then 9,000, or 10,000. So it's probably more
21 like 15 percent is your max.
22 And then at some point, you drop

1 down. But then you're going to have blips --
2 MR. BROOKMAN: Sure.
3 MR. LEWIS: -- just because there
4 is a system that is 15,000 apart probably
5 starting at 45,000.
6 MR. BROOKMAN: Let's hear from
7 Warren.
8 MR. BEETON: Warren Beeton. Just
9 a question.
10 Would you indeed add this oversize
11 factor to the standard oversize factor?
12 DR. BANDYOPADHYAY: Yes.
13 MR. BEETON: Because if you know
14 that you need 20 percent oversize and your
15 closest system were 35 percent oversized
16 anyway, why wouldn't you stop there? Why
17 would you add two factors together?
18 MR. BROOKMAN: Okay. Well, the
19 way this curve -- go ahead, David, you want to
20 add in here?
21 MR. WINIARSKI: Sure. I think
22 we've got some good comments on this. I will

1 say that I think one of the implicit
2 assumptions in this curve was that at the low
3 end, you were really purchasing things in like
4 half-ton increments.
5 So if you imagine you -- if you
6 were in half-ton increments and your sizes
7 were six to 12, the average might be nine.
8 And you would oversize it by, you know, 33
9 percent to get to 12.
10 MR. BROOKMAN: So let's hear --
11 MR. WINIARSKI: But you're saying
12 that there's closer increments.
13 MR. BROOKMAN: Daryl?
14 MR. ERBS: I mean we'll go like by
15 quarter horsepower increments.
16 DR. BANDYOPADHYAY: Yes.
17 MR. ERBS: Really the compressors
18 drive the steps. And when you get down into
19 fractional horsepower, you can get them in
20 quarter horsepower increments, which is more
21 like -- I don't know -- 1,000, 1,500 BTU
22 increments.

1 MR. WINIARSKI: Yes, I think this
2 was based on looking at catalogue data which
3 showed condenser and compressor sizes in those
4 half-ton increments. But if it closer
5 matching, that's perfect.
6 MR. BROOKMAN: Okay. Good thank
7 you. And I would just note for the record
8 that a couple of other manufacturers just
9 agreed with Daryl by shaking their heads yes.
10 Okay. Thank you. That's helpful.
11 Okay. So then other final
12 comments on this chart, which I think
13 stimulated a lot of good information for the
14 Department? Because we're going to keep moving
15 on.
16 (No response.)
17 MR. BROOKMAN: Okay.
18 DR. BANDYOPADHYAY: Yes. So I
19 think this that the comments are very valuable
20 and DOE would modify this chart to accommodate
21 the market realities.
22 So here we have the final energy -

1 - annual energy consumption figures for a
2 combined system. This is just an example for
3 a medium, storage-type cooler with a dedicated
4 medium temperature outdoor system.
5 And the figures you see here, the
6 first line -- the line at the top in green,
7 that represents a baseline efficiency
8 refrigeration system paired with a box. And
9 box efficiencies are improving as we move
10 along the X axis.
11 So one can see that the baseline
12 system, the baseline envelope were paired with
13 a baseline refrigeration system, it started
14 with energy consumption of 16,000 kilowatt
15 hour per year and it dropped down to let's say
16 about 6,000 kilowatt hours per year when all
17 the energy-saving features, what has been
18 considered in the design and engineering
19 analysis are implemented.
20 And same way when the boxes is
21 paired with a refrigeration system, which has
22 got a higher efficiency, the median

1 efficiency, the efficiency levels fall from --
2 let's say from -- it goes up also drastically
3 from 16,000 to with a baseline system it falls
4 down to 8,000.
5 And then we have got the max tech
6 option where the refrigeration system is the
7 highest efficiency. It is also paired with a
8 system moving from the baseline efficiency
9 level to the highest efficiency level for the
10 envelope. And that is the blue line.
11 So I mean obviously this captures
12 what really is the full scope of energy saving
13 technologies in both envelope and also the
14 refrigeration system.
15 MR. BROOKMAN: Is this actual
16 data? Or is this an illustration?
17 DR. BANDYOPADHYAY: No, this is
18 actual data what DOE has computed at this
19 stage of the analysis. But this is very
20 preliminary. I mean we have heard all these
21 questions about infiltration and other issues
22 which is involved in engineering analysis.

1 But this is really taking all the
2 data from the engineering analysis and using
3 this methodology which I just explained to
4 capture the energy consumption for this box
5 and the refrigeration system, whole system,
6 integrated.
7 MR. BROOKMAN: Do do you want them
8 to comment on the shape of the curves?
9 DR. BANDYOPADHYAY: Well,
10 actually, I think this is the food for thought
11 or not food for thought or it is shocking or
12 it is not shocking.
13 (Laughter.)
14 MR. BROOKMAN: John McHugh?
15 MR. McHUGH: So I think it was
16 briefly described earlier but maybe not made
17 so explicit. But on the larger walk-ins,
18 really the base case is semi-hermetic
19 compressors. And so that baseline efficiency
20 is pretty darn high.
21 And I don't know what's being
22 proposed -- you know first off, is that what

1 is being assumed for large walk-ins? And then
2 if that is, what are your measures to get
3 beyond that?
4 MR. BROOKMAN: So what, is that
5 your assumption?
6 DR. BANDYOPADHYAY: Assumptions, I
7 think are from engineering side because here
8 the data is coming in from there.
9 MR. BROOKMAN: Rebecca Legett?
10 MS. LEGETT: The answer to your
11 question is no. Semi-hermetic was not
12 considered as baseline. And if you recommend
13 that it should be, that is good for us to
14 know.
15 MR. BROOKMAN: That's in broad
16 distribution?
17 MR. McHUGH: In broad
18 distribution, yes.
19 MR. BROOKMAN: Okay.
20 MS. LEGETT: And what sizes of
21 equipment does that apply to?
22 MR. BROOKMAN: And you're talking

1 beyond California?

2 MR. McHUGH: Well, most of my

3 experience is from there but we've got quite a

4 few people around the table that could respond

5 to that.

6 MR. ERBS: Well, I mean we

7 actually -- we do both in some sizes. That's

8 more customer driven. I mean there is a price

9 premium associated with semi-hermetic.

10 It gives them that ability though

11 to maintain the equipment over a longer period

12 of time. So it depends, I guess, on the

13 perspective of the customer.

14 \ But the other thing that I would -

15 - the interesting observation for me is as you

16 make the envelope more efficient, the gains

17 from improving the refrigeration system

18 efficiency are diminished and vice versa.

19 And also even if you started with

20 semi-hermetic in your base, by the time you

21 get down to better or best envelope and better

22 or best refrigeration, you are back into

1 hermetics. And they are less efficient.
2 And I suspect that again that's
3 something you may not have included in your
4 analysis is that as you drive the loads down,
5 you will actually, just by virtue of the
6 nature of the components, lose some
7 efficiency.
8 MR. BROOKMAN: Yes, because
9 they're not working as hard.
10 MR. ERBS: Well, no, they're just
11 -- the smaller they get, the less efficient
12 they get.
13 MR. BROOKMAN: Oh, I see. Okay.
14 And, John, did you find that
15 number?
16 MR. McHUGH: I don't see the
17 number but I know for the size that was looked
18 at was like a 1,200 square foot walk-in so --
19 MR. BROOKMAN: Okay.
20 MR. STRAUB: This is Mike.
21 For a size perspective, I think
22 when you did the analysis, it was like 12,000

1 BTUs, 24,000 BTUs. So, again, you're talking
2 about small systems, maybe convenience stores.
3 In that range, you might be talking about
4 two, three horsepower.
5 Semi-hermetics, for us, typically
6 play over five to six horsepower. And that
7 becomes a dominant compressor. And you
8 wouldn't find very many scroll compressors in
9 sizes about that through the marketplace.
10 MR. BROOKMAN: Okay. Thank you.
11 Harmon?
12 MS. LEGETT: Thank you.
13 MR. LEWIS: Yes, for at least the
14 last 20 years, hermetics are 95 percent of our
15 refrigeration sales versus five percent are
16 semi-hermetic. And, again, it is a cost point
17 -- again, five horsepower and below are the
18 predominant ones there.
19 Also out in the service world, the
20 mechanic at 100 dollars an hour doesn't go out
21 and change the reeds out of the semi-hermetic
22 compressor. Just like a hermetic, he takes it

1 off, goes to the wholesaler and gets another
2 one, bolts in on and away he goes.
3 The semi-hermetic serviceability,
4 it isn't there. And we self-insure the last
5 four years of our five-year compressor
6 warranty and track it. And the hermetics are
7 more efficient as less likely to fail than the
8 semi-hermetics.
9 So, again, we may just have too
10 small a semi-hermetic sample size. But over
11 20 years, that has held true.
12 MR. BROOKMAN: That they -- that
13 would be in the baseline?
14 Mike?
15 MR. LEWIS: Well, yes, I don't
16 know which -- whether you've got semi-
17 hermetic, hermetic, whatever. But you've got
18 to look within the marketplace.
19 Semi-hermetics at below five
20 horsepower don't have a hold in the
21 foodservice industry because of the price.
22 MR. BROOKMAN: Okay. Okay. These

1 are very helpful comments.
2 Final comments on this chart on
3 page 59?
4 (No response.)
5 MR. BROOKMAN: Okay.
6 DR. BANDYOPADHYAY: Okay. Thank
7 you.
8 So now I would hand over to Gavin
9 McCormick, who will be discussing the
10 remaining sections of this analysis.
11 MR. McCORMICK: Yes, good
12 afternoon. Again, my name is Gavin McCormick
13 from Pacific Northwest National Laboratory.
14 And I'm here to discuss with you
15 today three of the economic sections or, as I
16 like to think of it, all of the hard work has
17 actually been completed at this point. And
18 I'm just going to be tallying up the
19 implications of the costs of energy.
20 So that means the life-cycle cost
21 and payback period analysis, shipments
22 analysis, and national impacts analysis.

1 So the life-cycle cost and payback
2 period analysis takes place from the point of
3 view of the consumer. It is designed to
4 answer the question that revolves around a
5 typical case where more efficient equipment
6 costs more than baseline equipment but uses
7 less energy over time. And, therefore, saves
8 you money over time.
9 So the basic question this
10 analysis is trying to answer is, is that a
11 good deal for the consumer given the details?
12 And so there are two different
13 ways in which the analysis tries to answer
14 this question. The first is by looking at
15 life-cycle cost.
16 So we simply add up all the costs
17 that a consumer might spend on a walk-in over
18 its lifetime, starting with the initial
19 purchase cost and the going through the energy
20 costs. And so there what we're looking at is
21 the savings between the base case and a more
22 efficient walk-in.

1 And entirely separate way you
2 could answer the same question is what is the
3 payback period on the extra cost of a more
4 efficient walk-in? So the life-cycle costs,
5 we're essentially adding up all of the costs
6 over the lifetime and just subtracting between
7 a more efficient walk-in and a baseline walk-
8 in to see whether it is a positive or negative
9 cost change.
10 And the payback period is answered
11 in terms of how many years would it take to --
12 of lower costs to gain our initially higher
13 cost. So it is more like dividing. And all
14 of this methodology is present in Chapter 8 of
15 the TSD.
16 I don't think it is worth going
17 into too much detail of this diagram, which is
18 also presented in the TSD. But the key part
19 here is just that the blue sections you see,
20 the payback period, PBP, and life-cycle costs,
21 LCC, are two entirely independent outputs of
22 this analysis but all the same inputs go into

1 them, all of the different costs that we were
2 able to quantify. The installation cost of
3 installing a walk-in, the end user equipment
4 price of that walking coming out of the
5 previous analysis like the markups analysis,
6 the cost of electricity and several other
7 costs.
8 So one of the most important costs
9 that we consider here is the electricity. And
10 we use a fairly common DOE procedure for
11 estimating future electricity prices. We
12 start with EIA Form 861 data, which collects
13 prices that have been actually charged by
14 different utilities in different states.
15 And the advantage of that data
16 source is that it is very up to date and very
17 detailed. But, of course, since it is actual
18 data, it doesn't go into the future.
19 So then we estimate future
20 electricity prices by growing the Form 861
21 data prices by the Annual Energy Outlook
22 forecasts for the next 30 years. And those

1 are produced by the Energy Information
2 Administration.
3 We use average prices for this
4 analysis. We don't look at time-of-use
5 pricing because a walk-in is typically on all
6 day. And we don't look at marginal prices or
7 anything like that.
8 Once we have the electricity
9 costs, we also look at repair, maintenance,
10 and replacement costs. We assume that the
11 repair cost scales with the cost of a walk-in.
12 So we represent the repair cost as a
13 percentage of the purchase cost.
14 And so a more efficient walk-in
15 that costs more money would have a higher
16 repair cost. And that would be captured in
17 our analysis.
18 By contrast, our maintenance costs
19 we assume are flat over any efficiency level.
20 So while we do look at different costs that
21 go into maintaining a walk-in, for example
22 cleaning it, because those don't vary between

1 different efficiency levels, they actually
2 have almost no impact on the analysis. So
3 maintenance costs here are not terribly
4 important.
5 And then separately we account
6 replacement costs. It was DOE's assumption
7 that a refrigeration system typically does not
8 last as long as an envelope. So over the
9 lifetime of one envelope, you have to account
10 for multiple refrigeration systems.
11 And so we include the cost of
12 buying one or more additional refrigeration
13 systems over the lifetime of one box.
14 And so at this time we would
15 welcome any comments, if there are any, on
16 maintenance or repair costs. In particular,
17 would they be greater with more efficient
18 walk-ins?
19 MR. BROOKMAN: So you can see a
20 lot of -- that was a good explanation and a
21 lot of what is embedded here.
22 So Warren, you want to start?

1 MR. BEETON: Warren Beeton. A
2 couple of points on the maintenance costs.
3 First of all, you assumed the same maintenance
4 cost.
5 One factor that you might -- I
6 think would want to pay attention to for the
7 future is if we get a cap-and-trade bill,
8 refrigerant costs are going to be maybe five
9 to ten times more than they are today. And
10 there is some leakage rate.
11 And so the cost of replacing
12 refrigerant, it could -- that is a scenario.
13 Don't know that it will happen. But it could
14 be a very significant factor down the road.
15 And it would be -- secondly, it
16 would be a function of efficiency because more
17 efficient systems will have more refrigerant
18 charge. And that charge will be much more
19 expensive in that scenario.
20 And then another possible factor
21 is that maintenance cost could also be higher
22 with greater refrigerant charge due to more

1 issues in the system.
2 So there are multiple things
3 there.
4 MR. McHUGH: Thank you. Those are
5 very helpful.
6 MR. BROOKMAN: Warren, do your
7 scenarios include that if refrigerant costs go
8 up that you'll find a way to do leakage less?
9 MR. BEETON: I think that would be
10 an offset. I honestly think there would be a
11 factor there but I don't think it would be a
12 complete offset all.
13 MR. BROOKMAN: Okay. Just thought
14 I'd ask.
15 Yes, Jon?
16 MR. McHUGH: So, I've got a couple
17 of questions. First off is what are you using
18 for the life of the envelope versus the life
19 of the equipment?
20 MR. McCORMICK: We'll get into
21 more detail later. But a current assumption
22 is about 15, 16 years for an envelope. And

1 about half that for a refrigeration system.
2 And we will cover that more later.
3 MR. McHUGH: And then also related
4 to discount rates, what are you using as your
5 -- well, for the ASHRAE standards what they do
6 is they actually wrap that all together, use a
7 period of analysis, and the escalation for
8 fuel, and, of course, the discount rate for
9 capital.
10 And they come up with what they
11 call a scalar. Have you folks calculated a
12 similar scalar for these proceedings?
13 MR. McCORMICK: If I'm
14 understanding your question correctly, we
15 have. What I'm going to present in about two
16 slides is information on the discount rates.
17 That should answer that.
18 MR. McHUGH: Okay. Thanks.
19 MR. BROOKMAN: Daryl?
20 MR. ERBS: I don't have data for
21 you. But I guess I'd suggest from an annual
22 maintenance cost, if it is something that is

1 adding additional mechanical parts, then the
2 cost will go up.
3 So some of your technical options
4 will definitely -- I would think like
5 something like strip curtains, I'm not sure if
6 anyone knows how long they will last but I
7 don't think they last the life of the box. I
8 don't know if it is two years. But, you know,
9 you have to replace them.
10 If you add additional controls,
11 they will some failure rates. So it probably
12 needs some analysis but I suggest that there
13 needs to be some relationship between
14 technical options and the annual maintenance
15 costs.
16 MR. McCORMICK: If I can ask a
17 follow-up question on that, I just wanted to
18 be clear. One assumption we have often made
19 is the equipment like, for example, strip
20 curtains, if it broke, it might be replaced as
21 opposed to repaired. And so then --
22 MR. ERBS: Oh, is that not an

1 annual cost?

2 MR. McCORMICK: Right. And this

3 is -- you could --

4 MR. ERBS: We're probably going to

5 warrant them for 30 days.

6 MR. McCORMICK: To just make sure

7 we're addressing your comment properly, I'm

8 distinguishing here and perhaps you could do

9 it another way, between maintenance costs and

10 replacement or repair costs.

11 So I would assume a more expensive

12 strip curtain that had to be replaced, that

13 would all be accounted for in this. Is that

14 what you are getting at?

15 MR. ERBS: Yes.

16 MR. McCORMICK: Okay. Thank you.

17 MR. BROOKMAN: Eric?

18 MR. FITZ: And we're talking about

19 strip curtains. But we would love some

20 information on replacement rates of doors,

21 both glass doors and opaque doors.

22 MR. ERBS: And that is something

1 we can probably dig up.

2 MR. FITZ: Okay. That would be

3 great.

4 MR. BROOKMAN: Okay. Great.

5 Are there other -- yes, please.

6 MR. ANDERSEN: Eric Andersen,

7 Pacific Northwest National Laboratory.

8 Along the lines of that last

9 comment, we would also welcome data that would

10 help us assess leakage rates on particular

11 systems and refrigerant replacement over time.

12 MR. BROOKMAN: Okay. Thank you.

13 Okay, I think that -- any other comments on

14 life-cycle costs, payback period analysis,

15 repair, maintenance, and replacement costs?

16 These have been useful comments.

17 MR. McCORMICK: So we actually

18 covered both of those comments, I believe.

19 MR. BROOKMAN: Yes.

20 MR. McCORMICK: Great.

21 So a separate issue, installation

22 costs. We relied primarily on RS Means'

1 Handbook of Cost Information for installation
2 costs. And we just run a straight regression
3 for each of our equipment classes for which we
4 can find information.
5 Let me restart that. We run a
6 straight regression for each type of equipment
7 such as small unit coolers on installation
8 costs and use that.
9 We would welcome if there are any
10 additional data sources on installation costs.
11 That wasn't a comment box, sorry about that.
12 MR. BROOKMAN: That's good.
13 Yes, Daryl, Daryl, go ahead.
14 MR. ERBS: Daryl, I actually think
15 that where you would find a bigger break might
16 be based on -- I mean we're talking here
17 coolers. So is this the refrigeration system
18 and the box? Or just the --
19 MR. McCORMICK: This is both, yes.
20 MR. ERBS: Okay. So the -- I mean
21 it depends on whether it is indoors or
22 outdoors. That would be one big difference.

1 So, you know, if I put a
2 condensing unit on the roof, I've got to go
3 through a roof, it becomes a much bigger task
4 than setting it on top of the box.
5 And then whether the box is just
6 set inside an envelope or if it is an outdoor
7 box makes a really big difference in terms of
8 the amount of labor.
9 MR. BROOKMAN: Jon?
10 MR. McHUGH: So just giving that
11 we are comparing an outdoor unit to an outdoor
12 unit, those things are going to probably drop
13 out of their analysis. I'm expecting that
14 what you are looking at is the marginal
15 increase in cost when you are increasing the
16 size.
17 MR. McCORMICK: Yes, that's a very
18 good point.
19 MR. BROOKMAN: Yes?
20 MR. LEWIS: On this you've
21 considered the evaporator coil unit cooler
22 separate from the condensing unit. But within

1 food service, those are typically always
2 installed by the same person. So it is kind
3 of disjointed because you don't have two
4 different outfits going out there to do it.
5 And whether your numbers are,
6 there again, I'd have to look at what --
7 MR. BROOKMAN: But they're
8 different functions though.
9 MR. LEWIS: Well, I mean they are
10 different functions but it is the same
11 mechanical contractor that is going to do that
12 work. You don't have one guy that comes in
13 and just mounts the evaporator.
14 They've got to be interconnected
15 with line sets, evacuated, charged, and
16 started up. So it's about one entity
17 typically.
18 MR. LLENZA: This is Charles
19 Llenza from the Department of Energy.
20 It would be beneficial for the
21 Department if we got maybe a better
22 description of the maintenance process that

1 the walk-in coolers go through over a period
2 of time.
3 And if you had some general
4 information you could provide us on what the
5 industry does to maintain this equipment, that
6 would be great.
7 MR. BROOKMAN: What the expected
8 service cycle would be, that's one thing.
9 MR. LLENZA: Right. Costs and
10 what kind of things you do over time to
11 maintain this -- this equipment.
12 MR. BROOKMAN: I see Gopal. Let's
13 hear from you. Get close to that microphone.
14 It's not on.
15 DR. BANDYOPADHYAY: This is Gopal
16 from Pacific Northwest National Lab.
17 In the RS Means Handbook, which we
18 have used for getting this installation data,
19 there are separate tables for the condensing
20 unit and a separate table for the unit
21 coolers. Unit coolers they have given data in
22 both small unit coolers and large unit

1 coolers.

2 And they have used actually in

3 fact different types of crew for installations

4 of these. So this data have been aggregated

5 and have been used in our model.

6 MR. BROOKMAN: Yes. Going back to

7 the maintenance cycle stuff, you -- the

8 manufacturers, you produce a maintenance

9 schedule, right, don't you? Something like

10 that? Okay. So it would be very helpful to

11 provide that, yes.

12 MR. McCORMICK: So another

13 important input here is the discount rate.

14 And there are different ways to talk about a

15 discount rate.

16 For the life-cycle cost analysis

17 what we mean here is the ability of a walk-in

18 consumer to trade money now for money in the

19 future. So if you were to spend a certain

20 amount of money now and get that same money

21 back ten years from now, that would not be a

22 particularly good deal.

1 So the question on the discount
2 rate is how much more money would you have to
3 get back later to make it a good deal?
4 The way that the Department
5 calculates discount rates in this context is
6 based on a weighted average cost of capital
7 calculation. This is a fairly standard
8 industry method.
9 And we get our information from
10 Professor Damodaran of New York University who
11 publishes this information free online. And
12 that's available in the TSD.
13 But what this is saying
14 essentially is that if you look at where the
15 debt and the savings of, for example, a
16 convenience store might be, you can figure out
17 the interest rate they are earning or spending
18 over time.
19 So you can figure out what sort of
20 deal they might be willing to accept
21 financially to trade a more expensive walk-in
22 now for lower costs later.

1 And then the lifetimes, I'm going
2 to get into more in the shipment section. But
3 just very briefly again, we use about a 15-
4 year lifetime for envelopes.
5 And the way we do LCC analysis is
6 over the lifetime of one envelope as opposed
7 to one refrigeration system. Since you are
8 pairing them, we sort of had to make a choice.
9 And so we take the longer lived of the two
10 components.
11 And so over the lifetime of an
12 envelope, that typically comes out to about
13 two refrigeration systems is our assumption.
14 And we'll cover lifetimes more later.
15 So it's rather difficult to
16 summarize the life-cycle cost results because
17 we have so very many equipment classes,
18 efficiency levels, sizes, and so on. So this
19 is a summary statistic we have developed to
20 try to get across the basic implications.
21 And, again, this is a preliminary
22 analysis. Don't pay too much attention to the

1 precise numbers. But the method here is what
2 is important.
3 And what this graph is showing is
4 that for different efficiency levels for the
5 refrigeration system and the box or envelope,
6 you can imagine different matched pairings of
7 efficiency levels going all the way from 0, 0,
8 which would be the base case, to what we call
9 the max tech scenario.
10 You can talk about the life-cycle
11 cost savings of going from the base case to
12 that scenario. And what we typically find
13 with our current inputs is that you often get
14 the maximum savings at a fairly high but not
15 the highest efficiency level.
16 So this graph is coded by a color
17 temperature. So the red numbers are just the
18 lowest and then it goes all the way up to --
19 the pairing 6, 6 has the highest life-cycle
20 cost savings we find. And we have one of
21 these for every equipment class.
22 MR. BROOKMAN: And this is

1 illustrative?

2 MR. McCORMICK: These are our

3 actual outputs.

4 MR. BROOKMAN: Okay.

5 Yes, Harmon?

6 MR. LEWIS: One thing I think you

7 -- I don't know how you factor it in but a

8 non-chain restaurant has a failure rate of

9 about 70 percent in the first year nationwide.

10 So he's not interested in what happens out at

11 year ten. He's worried about what is my

12 lowest cost of equipment to get started up.

13 And if I survive, my second walk-

14 in or my second refrigeration, I can afford to

15 look at what happens over a longer period.

16 And the chain accounts will look

17 opposite. They're going to look for what is

18 going to happen over a ten-year period. But

19 they are going to be, you know, 30 percent of

20 the sales and the mom and pop probably 70

21 percent.

22 So it's just something to look at.

1 The marketplace is looking for lowest entry
2 level on equipment costs and they'll look
3 later for the savings.
4 MR. LLENZA: Charlie Llenza,
5 Department of Energy.
6 That would be reflected in the
7 shipments, right? The shipments that we see
8 on the kind of -- so you would see a lot of
9 shipments of lower end units.
10 MR. LEWIS: Probably.
11 MR. LLENZA: And then that's the
12 way we capture what the market looks like.
13 MR. BROOKMAN: Or they'd be
14 recycled units or used units?
15 MR. LEWIS: Could be. Again, we
16 only sell new so I'm not sure how much the
17 other is.
18 MR. LLENZA: I don't think -- do
19 we take -- we don't take into account used
20 units, do we?
21 MR. McCORMICK: No.
22 MR. LLENZA: No, so we would

1 normally deal with the new units.
2 MR. BROOKMAN: Daryl?
3 MR. ERBS: Yes, actually I would
4 even suggest that the chains, which most
5 chains are franchising operations, and so you
6 still end up with an owner-operator who, you
7 know, typically we find the more progressive
8 of them then will look at a two-year payback.
9 A lot of them one year. There are
10 some cases where the chains will actually, you
11 know, help them with a bit longer.
12 So one of the things I would be
13 interested in seeing is, you know, just what
14 is a simple payback on these scenarios. It's
15 good to see the life-cycle costs. But without
16 understanding the payback, it's not as useful
17 to understand whether we're going to run into
18 some of these options being viable.
19 MR. McCORMICK: Thank you. That's
20 all very helpful. And you're making me wish
21 that I had the next slide be payback periods.
22 But for that, you'll have to look in the TSD.

1 An additional comment or category
2 here is the Monte Carlo simulation. We have
3 not done this yet. This is for the next stage
4 of the analysis.
5 But just to give you a heads up,
6 so far we've talked about the average savings
7 for a particular type of walk-in. But you can
8 imagine that for different consumers they're
9 actually going to experience different
10 savings.
11 In different states, you have
12 different sales taxes. Different people pay
13 different electricity rates. The actual
14 energy use of the walk-in might vary by
15 climate region. Things like that.
16 So for the next stage of the
17 analysis, we're going to conduct a simulation
18 where we look at 10,000 different scenarios.
19 And for those 10,000 scenarios, we'll vary all
20 of these factors and see, on average, how many
21 consumers are coming out ahead or behind
22 rather than on average how much are they

1 coming out ahead or behind by.
2 Any other comments on the life-
3 cycle costs or payback period analysis?
4 DR. AMRANE: Karim Amrane, AHRI.
5 I just -- to answer the question
6 about life-cycle costs or payback, I
7 understand that you would be basing your
8 decision at the end of that day on the LCC,
9 not the payback, right? Is it correct?
10 MR. McCORMICK: Yes, I would say
11 that it is combination of those. It's not a
12 straight procedure whereby we take exactly --
13 DR. AMRANE: Well, my experience
14 anyway dealing with those rulemakings is that
15 DOE has always based -- almost -- most of the
16 time based its outcome on the life-cycle cost.
17 MR. BROOKMAN: Charles Llenza?
18 MR. LLENZA: Yes, it comes down to
19 the dollars and cents.
20 DR. AMRANE: Yes. I don't think
21 we'll be taking this into account at the end
22 of the day.

1 MR. McCORMICK: And just to
2 clarify one more thing on that. The discount
3 rates that were used, because they are based
4 on weighted average cost of capital, that will
5 mean that, for example, a small business,
6 which is more likely to go out of business in
7 its first year, they will have a higher
8 average cost of capital. So they will have
9 higher discount rates. But not, perhaps, as
10 much higher as you were talking about.
11 So thank you for those comments.
12 Anything else?
13 MR. BROOKMAN: Okay, Jon?
14 MR. McHUGH: Going back to the
15 scalar question, so what's the scalar?
16 MR. McCORMICK: Yes.
17 MR. McHUGH: Show them the next
18 section and show the scalar.
19 MR. McCORMICK: Excellent point.
20 And so just to clarify that I understood you
21 correctly, so I'm not misleading you, to get
22 across the discount rates, in our spreadsheet,

1 we translate an X percent discount rate over
2 time into a scalar.
3 Are you asking me what that scalar
4 is? Or have I misunderstood?
5 MR. McHUGH: Yes.
6 MR. McCORMICK: Okay. Sure. A
7 typical discount rate that we use that's in
8 the LCC is between five and seven percent,
9 depending on the building type. Right off the
10 top of my head, I'm not sure what that scalar
11 becomes.
12 MR. McHUGH: And related to that,
13 so a scalar is, though, is a combination of
14 the discount rate and the escalation rate in
15 the period of analysis. So what are sort of
16 the range of scalars that you are looking at
17 for this analysis.
18 MR. McCORMICK: Sure. I'm going
19 to answer you but it looks like Dave Winiarski
20 would like to say something first here.
21 MR. WINIARSKI: Oh, go ahead
22 first.

1 MR. McCORMICK: Okay. Great. So
2 then we don't literally use a scalar in that
3 way. We calculate each of those factors and
4 turn each factor into scalar rate.
5 I would have to point you towards
6 the TSD or the spreadsheet to say what those
7 turn into. Sorry I can't do any better than
8 that.
9 MR. McHUGH: Okay. Thanks.
10 MR. BROOKMAN: Dave?
11 MR. WINIARSKI: Yes, I was just
12 going to follow up a little bit. I know, Jon,
13 you and I both have been involved like in
14 ASHRAE 90.1 work where a scalar has been
15 derived to sort of provide a simplified way of
16 expressing all of these economic issues in
17 sort of one metric.
18 And that typically has not been
19 done for DOE's plant standards rulemaking.
20 But if you take the discount rate and you take
21 the escalation rate, you can effectively build
22 up something like a scalar.

1 MR. McHUGH: So I guess related to
2 that, what is the escalation rate?
3 MR. McCORMICK: So for
4 electricity, for example, the escalation rate
5 is roughly one. So we use the Annual Energy
6 Outlook forecasts. And they don't rise very
7 much over time.
8 MR. McCORMICK: Thank you.
9 MR. BROOKMAN: Thank you.
10 Okay, we're going to keep pressing
11 on here.
12 Daryl, final comment.
13 MR. ERBS: I just wanted
14 clarification on one thing I did see in here.
15 What is this rebuttable presumption payback
16 period? I interpret it to mean if you didn't
17 get a three-year feedback that it wasn't good
18 to go. But is that not correct?
19 MR. BROOKMAN: Is that in this --
20 where is that located?
21 MR. ERBS: It's on 8-20.
22 MR. BROOKMAN: In the TSD. Who

1 would answer that?
2 MR. ERBS: 8.3.2.
3 MR. BROOKMAN: So David, yes, Dave
4 Winiarski, you wanted to --
5 MR. WINIARSKI: I'll give John
6 first opportunity if he wants to.
7 MR. CYMBALSKY: So if you create -
8 - if you do the analysis and it is the three-
9 year payback, you can go ahead with the
10 standard without doing any extra analysis.
11 MR. ERBS: Oh, okay. I had it
12 backwards.
13 MR. LLENZA: But the Department --
14 this is Charlie Llenza, Department of Energy.
15 But in real practice the
16 Department prefers to do the full analysis?
17 MR. McCORMICK: Right.
18 MR. LLENZA: So we don't just stop
19 because we get the three-year payback or
20 three-and-a-half-year payback, whatever it is.
21 So you'll -- we'll --
22 MR. ERBS: It's an option.

1 MR. LLENZA: Right. It's an
2 option that's in the legislation, right?
3 MR. ERBS: Yes.
4 MR. LLENZA: Is that correct?
5 MR. McCORMICK: But we do the full
6 analysis.
7 MR. BROOKMAN: Betsy, do you want
8 to add on here?
9 MS. KOHL: No.
10 (Laughter.)
11 MR. BROOKMAN: Okay.
12 MS. KOHL: This is a topic for
13 discussion within the Department but we
14 typically, as Charlie said, do the full
15 analysis.
16 MR. BROOKMAN: Yes. Okay. Dave,
17 briefly.
18 MR. WINIARSKI: Yes, real quick,
19 yes.
20 MR. BROOKMAN: Yes.
21 MR. WINIARSKI: One of the
22 differences in the calculation procedure to do

1 the rebuttable payback is under the
2 legislation, it is the -- I think it is the
3 energy savings in the first year and the first
4 cost of the equipment. So it doesn't take
5 into account things like maintenance issues
6 and stuff like that, which is one of the
7 reasons, I think, the Department likes to look
8 at the full life-cycle cost implications.
9 MR. BROOKMAN: Okay. Thank you.
10 We're going to press on here.
11 MR. McCORMICK: Next is shipments
12 analysis.
13 So the purpose of the shipments
14 analysis is to quantify how many of these
15 walk-ins we're dealing with. So it is very
16 much, in addition to the shipments, covering
17 the installed base of walk-ins at any given
18 time.
19 So a key implication of this
20 analysis, for example, is that if you know the
21 energy savings from each walk-in, you have to
22 know how many are in use to know the national

1 energy savings.

2 So our shipments analysis would

3 ideally have fantastic data, even going out

4 into the future about the shipments are. In

5 practice what we have to do is a somewhat

6 roundabout method. And so we're going to be

7 very much asking for data in this section as

8 well.

9 The best data that DOE was able to

10 start with was historical stock information.

11 So I'll cover that in a moment. But we start

12 with historical stock information. Based on

13 the rate at which the equipment must be

14 replaced, we're able to estimate the shipments

15 that are necessary to get that kind of stock

16 in every year. And, again, I'll talk a little

17 bit more about that.

18 And then once we have a rough idea

19 of the stock and the shipments that are going

20 on now, we can look at market growth rates for

21 the next 30 years of the analysis period. And

22 then we do this analysis for each of the very

1 many possible combinations of equipment
2 classes, efficiency levels, and so on.
3 So we used two data sources to
4 look at the currently installed base of walk-
5 ins. The Commercial Building Energy
6 Consumption Survey, which is the survey that
7 provides quite good information about the
8 number of appliances and the type of
9 appliances that buildings use. But has a
10 relatively small sample size. I think it is
11 about 5,000 buildings.
12 And so from that we are able to
13 say on average, for different types, such as
14 for grocery store or convenience store, how
15 many walk-ins are there per building.
16 And then as a separate data
17 source, we look at the U.S. Economic Census
18 and the U.S. Agricultural Census to know the
19 number of buildings of these various types,
20 how many convenience stores are there? How
21 many grocery stores? We use the Ag census
22 because dairy farms are one user of walk-ins

1 so we need that information as well.
2 Once we have numbers on the stock,
3 we apportion it by various types, including by
4 equipment classes. This equipment class
5 information is -- I guess it is a little hard
6 to see the bottom there -- oh, yes, you can
7 see it -- so we have about two million
8 envelopes that we see as of the year 2007 as
9 the installed base in America. And then from
10 that, we apportion it into the different
11 equipment classes here. This is just so far
12 the envelopes.
13 And this is very much a process,
14 this next step, of DOE estimation. So the way
15 that this was estimated is that we took our
16 best guess, really, after talking to some
17 manufacturers about what a typical set up
18 might be for a convenience store, what sorts
19 of walk ins bight be typical in a grocery.
20 And then since we knew the number
21 of each type of establishment, we added those
22 guesses really up to get a sense of the spread

1 of different equipment classes in the market.
2 And in addition to envelopes, we did that for
3 refrigeration systems.
4 You can see the total for
5 envelopes and refrigeration systems is the
6 same because they are paired in a one-to-one
7 ratio. And we have the estimates of the
8 spread of equipment classes there.
9 So I believe this is getting back
10 to Harmon's point on where the numbers came
11 from on different types and the ratios. And
12 DOE would very much welcome any input on these
13 numbers, especially these spreads.
14 MR. BROOKMAN: Mike?
15 MR. STRAUB: Mike Straub.
16 You said that there is a one-to-
17 one ratio between refrigeration systems and
18 envelopes. What did you base that on?
19 MR. McCORMICK: Yes, I should
20 clarify that when we talk about a
21 refrigeration system in this context, we mean
22 all the refrigeration going into the envelope.

1 MR. STRAUB: Okay. So it would be
2 multiple units.
3 MR. McCORMICK: Yes. Sorry, I
4 should have clarified.
5 MR. STRAUB: And then what was the
6 basis for multiplex being so high considering
7 that the sweet spot of this refrigeration in
8 envelopes would be really in the direct
9 condensing, smaller horsepower stuff? That's
10 more -- multiplex you'd see in supermarkets,
11 which isn't 30-some-odd percent of the market,
12 the boxes that get sold.
13 MR. BROOKMAN: What would you
14 suggest that number be, Mike?
15 MR. STRAUB: I would think that
16 the 30 percent would be more in line with the
17 direct condensing spread across the outdoor.
18 MR. BROOKMAN: Well, what about
19 multiplex condensing?
20 MR. STRAUB: I wouldn't think it
21 would be more than 15 percent.
22 MR. BROOKMAN: Okay. And that's

1 based on what you know to be supermarkets?
2 MR. STRAUB: Supermarkets.
3 MR. BROOKMAN: Okay. Thank you.
4 MR. McCORMICK: Thank you.
5 MR. BROOKMAN: Yes, Harmon?
6 MR. LEWIS: Harmon, American
7 Panel.
8 This chart goes in direct conflict
9 with your Table 3.2.8 that shows multiplex
10 statements at ten-to-one over dedicated. And
11 here you only show them at 46 percent.
12 So it would versus dedicated ought
13 to be one-to-one. So something is just wrong.
14 MR. McCORMICK: Thank you for that
15 but I can't answer off the top of my head what
16 that would about. But we're very interested
17 in looking at that further.
18 MR. BROOKMAN: Well, what -- among
19 those numbers, what would you choose?
20 MR. LEWIS: Well, what I'm saying
21 is if multiplex here is 46 percent, which
22 people that make those units say that's even

1 too high, that's about half, then you'd sell
2 one dedicated to one multiplex, not ten
3 multiplex to one dedicated in the Table 3.2.8.
4 They'd be about equal sales. It just doesn't
5 seem right.
6 MS. GAGNE: I don't have a firm
7 answer for you, Harmon, but -- Claire Gagne --
8 but one distinction to make sure we keep in
9 mind is that this right now is stock, not
10 shipments. They are quite distinct.
11 MR. BROOKMAN: Jon? Jon? Let's
12 hear from another manufacturer.
13 MR. McHUGH: Okay, sure. That's
14 fine.
15 MR. BROOKMAN: Yes, Mike, go
16 ahead. And then I'll return to you.
17 MR. STRAUB: Just a quick
18 clarification, what is stock?
19 MR. McHUGH: That's what I was
20 wondering.
21 MS. GAGNE: Currently installed.
22 MR. STRAUB: Installed, okay.

1 MR. BROOKMAN: Okay, Jon, please.
2 MR. McHUGH: Just to clarify, when
3 you say envelope stock, is that individual
4 walk-ins or is that individual buildings
5 containing walk-ins?
6 MS. GAGNE: We meant it to mean
7 individual walk-ins. We understand that there
8 are certain constructions where a freezer and
9 a cooler may be joined at a panel.
10 MR. BROOKMAN: Okay. Dave, did
11 you want to add something here?
12 MR. WINIARSKI: No.
13 MR. BROOKMAN: Okay.
14 MR. WINIARSKI: But I have a quick
15 clarifying question.
16 MR. BROOKMAN: Dave Winiarski.
17 MR. WINIARSKI: Yes, Gavin, I
18 don't know if you will be able to answer this
19 off the top of your head. When we talk about
20 refrigeration stock, in the development of
21 that, is that representative of individual
22 units? Or is it something more like BTUs of

1 capacity of units?

2 MR. McCORMICK: Thank you for that

3 clarifying question. And the answer is that

4 when we talk about both envelopes and

5 refrigeration systems here, as Claire was

6 starting to get at, we're talking about for

7 any a single walk-in any refrigeration

8 equipment associated with that we would call

9 one refrigeration system. So it is a separate

10 question from how many BTU are we looking at

11 in the market. And I suppose even multiple

12 refrigeration systems attached to multiple

13 walk-ins. We are counting how many walk-ins'

14 worth of refrigeration is in the market.

15 Is that a useful clarifying

16 answer?

17 MR. WINIARSKI: It may be for the

18 manufacturers.

19 MR. BROOKMAN: I thought so. And

20 speaking of clarifications, Harmon got us

21 started with multiplex condensing.

22 I'd really like to get some

1 additional comments on the numbers here, on
2 the percentage of the stock as represented by
3 these different classes.
4 Yes, Daryl?
5 MR. ERBS: My reaction is the
6 direct condensing indoors seems low to me.
7 MR. BROOKMAN: But what would it
8 be, Daryl?
9 MR. ERBS: Well, I don't have
10 data.
11 MR. BROOKMAN: Give us a range.
12 MR. ERBS: But I would think it
13 would be in the high single digits at least
14 just based on a lot of the smaller boxes are
15 going into, you know, mom and pop and -- well,
16 of course they put theirs outside sometimes.
17 But there are a lot of individual
18 boxes and little refrigeration systems. And
19 typically those people are so first cost
20 focused that they buy an indoor unit because
21 it is the lowest cost option.
22 So that looks a little low to me.

1 And I don't know that it is 15 percent. But
2 I think it might be closer to ten.
3 MR. BROOKMAN: Yes? Okay.
4 And then any other comments on
5 what you see represented in this table?
6 MR. LEWIS: Doug, I've got one.
7 Harmon.
8 The NAFEM, through Service
9 Equipment Manufacturers Association, ask us
10 these questions each year, not broken by
11 display and non-display but between numbers of
12 coolers and freezers and how much
13 refrigeration we've sold. And we've reported
14 that -- I've been there 32 years and I do that
15 report every year.
16 So if you went to them, they may
17 be able to give you some numbers that might be
18 closer to validating some of the
19 distributions.
20 MR. BROOKMAN: That's good.
21 MR. LEWIS: They won't know
22 between display and non-display. But it will

1 give you a spectrum.
2 But I'd figure 70 percent cooler
3 to 30 percent freezer is a historical number
4 that I couldn't disagree with. I think that's
5 in line. But again, the multiplex isn't in
6 our experience but Heatcraft and Russell, the
7 people that make both types of systems could
8 comment on that maybe to you in the time
9 period.
10 MR. BROOKMAN: Well, would you
11 expect it on condensing? If I add those
12 numbers up, I think they add to 54 percent.
13 Do you think that's in the right --
14 MR. LEWIS: Well, 54 and 46, yes.
15 But our experience would be, as was mentioned
16 earlier, that the multiplex, the 31 there
17 seems real high. Those adding to 46, maybe
18 you ought to add to 30 and the direct ones add
19 to the other because there are lots more
20 restaurants than supermarkets.
21 MR. BROOKMAN: Yes, okay. These
22 are very helpful comments. Any other comments

1 on this slide before we move on?
2 (No reply.)
3 MR. BROOKMAN: Okay. Let's do
4 that.
5 MR. McCORMICK: So the next step
6 once we know the number of units that are in
7 use in the market at any given time is to
8 estimate what shipments would be required to
9 lead to that. Now ideally we would also have
10 information on the number of shipments
11 nationwide. And, once again, we welcome any
12 data that you would like to provide on
13 shipments.
14 And in the absence of that, our
15 current approach is to look at the replacement
16 rates for different units and to calculate the
17 shipments from that. So on a very high level
18 here, the assumption is that if you had to
19 replace about ten percent of the units a year,
20 there would be about ten times as -- the stock
21 would be about ten times as large as the
22 shipments.

1 And here is an illustrative
2 example. So for the envelopes, we're just
3 showing in this chart that the replacement
4 rate directly affects the number of shipments
5 that DOE would estimate in the absence of
6 actual shipments data since we now have stock
7 data.
8 So here we're seeing that if five
9 percent of walk-ins have to be replaced every
10 year, the envelopes, and you have about two
11 million walk-ins in the installed base, you
12 would expect to see about 100,000 units
13 shipped a year. And the five percent number
14 is the assumption that DOE actually did use.
15 It comes out to about 20 years.
16 A hypothetical might be ten
17 percent. And we're just showing in this case
18 what that would mean in terms of the
19 shipments. So that's envelopes.
20 And then for refrigeration
21 systems, we assume a shorter lifetime or a
22 more rapid replacement rate, which would mean

1 that to get the same amount of stock, to have
2 the same number of refrigeration systems as
3 envelopes, you would need many more shipments
4 per year because they are breaking more often
5 or being replaced more often.
6 I'm seeing a confused look or two.
7 Is there anything I can clarify before we go
8 on?
9 (No response.)
10 MR. McCORMICK: Okay. So at this
11 time, we would love any input on either the
12 historical shipments or the information that
13 we use to estimate that, which is the average
14 lifetime. So because the shipments are
15 directly related to the lifetimes, we would
16 welcome comment on either of those at this
17 time.
18 MR. BROOKMAN: Charlie Stephens?
19 MR. STEPHENS: Charlie Stephens.
20 MR. BROOKMAN: Why don't you take
21 us back to the preceding slide, could you, 78?
22 MR. STEPHENS: Yes, just a

1 clarifying question. When you say
2 refrigeration shipments, you're talking about
3 whole systems, which might consist of multiple
4 compressors and unit coolers for a single box,
5 right?
6 MR. McCORMICK: Yes, that's what
7 we're talking about, thank you.
8 MR. STEPHENS: Okay. Thanks.
9 MR. BROOKMAN: Can we verify the
10 numbers here?
11 MS. GAGNE: I would -- this is
12 Claire Gagne -- I would add maybe not such a
13 focus on the number exactly but the order of
14 magnitude or a rough estimation. We
15 understand that at least for the envelope
16 manufacturers, a lot of you may calculate your
17 shipments in board feet. And so it is not a
18 direct transfer to units.
19 But perhaps you have some
20 understanding of how this would look when put
21 into a unit scale and aggregated across the
22 industry.

1 MR. BROOKMAN: Karim, does AHRI
2 aggregate this data?
3 DR. AMRANE: Karim Amrane.
4 Unfortunately not. So we don't have any
5 shipment data.
6 MR. BROOKMAN: Okay. Thank you.
7 Is that in the ballpark? 2007
8 stock, 2,010,000? Don't know? Hard to say.
9 Scaled by ten times.
10 MR. LLENZA: This is Charlie
11 Llenza, Department of Energy.
12 Again, we were struggling trying
13 to find information. So if anybody can at
14 least point us in the right directions, we're
15 good to get out.
16 MR. BROOKMAN: Are there other
17 data sources, for example, Charlie?
18 MR. STEPHENS: Yes. Have you guys
19 looked at the NAFEM data? N-A-F-E-M?
20 MR. McCORMICK: I don't believe
21 so.
22 Gopal, can you comment? Or

1 Claire?

2 DR. BANDYOPADHYAY: I haven't

3 looked at it yet, no.

4 MR. McCORMICK: I don't think so.

5 That's very helpful. Thank you.

6 MR. LLENZA: Okay. I think more

7 than just telling us NAFEM has data is

8 actually to provide us a point of contact or a

9 reference document or --

10 MR. STEPHENS: Why don't I just

11 ship you what I have? I've been using it not

12 necessarily for walk-ins but for other kinds

13 of commercial refrigeration equipment. But

14 the walk-ins were definitely in there.

15 The one thing that is in there is

16 that there is only a certain fraction of the

17 manufacturers for any given piece of equipment

18 that actually report. And then they estimate

19 based on market share was best they understand

20 it as to what the total shipments might be.

21 So it is still an estimate but at

22 least in some categories, a fairly big

1 fraction is reported shipments. And as was
2 pointed out earlier by Harmon, it's not broken
3 down the way you might like to see it but it
4 can definitely, I think, get you an order of
5 magnitude that would ground you. And I think
6 it goes back far enough so you can get a
7 picture over time. At least it does that for
8 me, so --
9 MR. BROOKMAN: Jon, California has
10 typically got data on many things that others
11 do not. Do they have?
12 MR. McHUGH: This is something we
13 don't have data on. We have information from
14 the various efficiency programs. And we're
15 trying to do our own estimates for our
16 rulemaking proceeding.
17 We'd be happy to share any and all
18 of that information.
19 MR. BROOKMAN: And I'm looking at
20 the average replacement rate, 15 percent, in
21 this table. And I'm asking the manufacturers
22 can you -- does that fit? Is that a

1 reasonable number from your perspective?
2 Harmon?
3 MR. LEWIS: Yes, Harmon, American
4 Panel.
5 Most end users aren't going to
6 come back to us if they need to replace the
7 compressor or the condensing unit once it is
8 out of the five-year warranty period. So we
9 won't necessarily know.
10 Similarly within the walk-ins,
11 unless our computer system kicks out that we
12 made that walk-ins 18 years ago or whatever,
13 when somebody says I need a walk-in for this
14 school or this restaurant, we don't know if it
15 is original equipment or a replacement at the
16 time we build it necessarily. So it's hard to
17 say.
18 Now we do know for chains, things
19 of that nature. That yes, 15 years on the
20 walk-ins is a reasonable number. That makes
21 sense.
22 As I mentioned earlier on

1 replacement doors though, we're only replacing
2 five percent of annual shipment numbers of our
3 doors. And most people they are going to have
4 to come back to us for the door to fit the
5 walk-in because my door is like Manitowoc, not
6 like Nor-Lak or Kysor's. And their doors
7 don't fit our frame either. But that's
8 numbers I looked up last week.
9 MR. BROOKMAN: What about
10 refrigeration systems?
11 MR. LEWIS: Again, we don't have a
12 way to know because they don't come to us.
13 MR. BROOKMAN: Mike?
14 MR. STRAUB: About half of our
15 business goes to wholesale distribution. And
16 once it gets there, we have really no idea
17 where it goes because the contractor can buy
18 it for a new installation or they could be
19 buying it for a replacement. So we really
20 don't have any good data for that.
21 MR. BROOKMAN: I see. But their
22 shipment rates, they're not -- that stuff is

1 not sitting on their shelf for more than a
2 year, is it?
3 MR. STRAUB: Oh, no.
4 MR. BROOKMAN: Right.
5 MR. STRAUB: I mean it can be just
6 replenishing their inventory at a wholesaler.
7 And then, you know, a contractor comes in and
8 buys the equipment. He may be doing a new
9 installation or he may be replacing equipment
10 at an installation.
11 MR. BROOKMAN: Okay, okay. Is
12 that in the ballpark though? Fifteen percent?
13 PARTICIPANT: I have no idea.
14 MR. BROOKMAN: You don't know,
15 okay.
16 Claire?
17 MS. GAGNE: Claire Gagne. Just
18 getting quickly back to what you mentioned.
19 I'd like to make a clarification about the
20 term replacement rate at least from the
21 context of envelopes, we select that
22 terminology to capture the idea that

1 envelopes, unlike a mechanical system, don't
2 necessarily fail. At least they may fail from
3 an energy perspective but you couldn't
4 necessarily tell that from looking at them.
5 So really what we're interested in
6 with that number is getting a sense of what an
7 average lifetime might look like. And just
8 anecdotally, I understand that there are end
9 users who have walk-ins of 38, 40, 45 years
10 still on the market functioning, you know, in
11 a sense that they still hold product.
12 So information to that extent
13 would be very useful for the envelopes. We
14 understand that it is not quite as cut and dry
15 as a mechanical piece stopping its function.
16 MR. BROOKMAN: Okay. Yes, Fred?
17 MR. MINELLI: I think it depends
18 more on the application for the replacements.
19 And if you are driving lift trucks in and out
20 of a large walk-in every day, those
21 replacement cycles are eight to ten years.
22 If you're using pallet jacks,

1 which is typical in supermarkets, you're still
2 in eight to ten years. But if you are walking
3 in and out or maybe hand trucks, you are going
4 to last a lot longer.
5 MR. BROOKMAN: Kenny?
6 MR. OWEN: In my opinion, I think
7 the replacement rate is quite high. I don't -
8 - we ship a good bit of what I call repair
9 items. But to say the whole is going to be
10 replaced twice as often as the envelope, I
11 think that's probably at least twice as high
12 as it really ought to be.
13 I think it is more comparable to
14 the life of the envelope. Will they replace a
15 compressor on five percent of the units in ten
16 years? Yes. But it won't be the complete
17 system being replaced. It will be just mainly
18 one component.
19 MR. BROOKMAN: Thank you.
20 Okay, we're going to press on
21 here.
22 MR. McCORMICK: So the next item

1 here is much more speculative. So I'm sure
2 there is a little bit less comment we can get
3 on this but just to touch on the future growth
4 of the industry.
5 We have assumed that this is a
6 mature market. And so one thing you often see
7 in mature markets is that as the number of
8 establishments that use this product grow, the
9 size of the market will grow.
10 So if there are two percent more
11 restaurants next year, you might expect to see
12 two percent more walk-ins. So we have used
13 this assumption for the preliminary analysis,
14 looking at the growth rate of actually square
15 footage of buildings in America and they will
16 likely grow over the next years. And using
17 that as our first cut at the growth rate of
18 this market.
19 But one reason this is worth
20 highlighting is that we have noticed in the
21 few years that we do have data for in the
22 stock, it appeared that this market was not

1 really growing. We were seeing .1 percent
2 growth rates.
3 So here is a little illustrative
4 graph. The preliminary analysis assumptions
5 we do make about the future growth of the
6 industry are the blue line you see here. It
7 is about 1.6 percent growth per year. Just
8 the same as the growth in establishments that
9 use walk-ins nationwide.
10 But if the couple of years that we
11 have data for are representative, possibly the
12 market is not really growing. The red line
13 you see here is a .1 percent growth rate,
14 which is what we saw between 1993 -- 1997 and
15 2007.
16 So we would welcome any comment on
17 did something happen in those particular
18 years? Is it expected that this market will
19 have no growth? Is it expected that there
20 will be any particularly dramatic events
21 effecting the future growth or lack therefor
22 of this market?

1 MR. BROOKMAN: Surely someone does
2 these forecasts, right? Yes? Harmon?
3 MR. LEWIS: Yes, Harmon, American
4 Panel, my standard of living is based on a ten
5 percent growth. And so I don't know if that -
6 - I don't think that we're at one percent
7 growth. But, you know, our company has been
8 growing at ten percent for the last ten years.
9 So we've doubled in size over that time.
10 And I don't know if it is market
11 share or what, we don't worry about that. We
12 worry about --
13 MS. GAGNE: Okay.
14 MR. LEWIS: -- what do we make at
15 the end of the year.
16 MS. GAGNE: -- Claire Gagne. That
17 would be my follow-up question is whether you
18 think that that trend applies across the
19 industry or whether other market players are
20 dropping out and you are taking their, you
21 know, the business slack that they leave, et
22 cetera?

1 MR. LEWIS: Again, I think NAFEM's
2 number, and again, theirs is based on whoever
3 responds, but it would be a bigger picture of
4 walk-ins in that they would have that going
5 back for many years. But probably the last
6 ten years is the only thing that makes any
7 sense.
8 MR. BROOKMAN: Charlie Stephens?
9 MR. STEPHENS: Charlie Stephens.
10 At the risk of, you know, being a
11 heretic here, but part of my work has to do
12 with macroeconomics. And this kind of
13 forecasting.
14 And I'd be surprised to see much
15 of any growth over the next ten years anyway.
16 I think much of the growth we're seen,
17 according to all the sources I've been able to
18 gather, is largely due to an enormous credit
19 bubble, which I think we understand is kind of
20 imploding about now.
21 And so I would be very cautious
22 about using growth rates beyond more than

1 about one percent given the circumstances that
2 I think we're in financially right now.
3 Outside of Wall Street.
4 MR. WINIARSKI: Thank you.
5 Okay. Final comments on this
6 slide?
7 (No response.)
8 MR. McCORMICK: Okay. And so one
9 more slide in the shipments analysis is the
10 distribution of different sizes. So we've
11 already seen, I believe -- yes, if you want to
12 turn back to slide 32, you might be interested
13 to see the breakdown of different sizes for
14 our equipment classes.
15 And here is just the Department's
16 estimates of how many of each size we're
17 looking at. So as I believe Eric already
18 mentioned, the most useful way that in a
19 perfect world we could get our data would be
20 to know the different shares of many different
21 sizes so we could sort of characterize the
22 market overall.

1 But any comments on just this
2 either rough assumption or sizes in general
3 would be very welcome in written form or right
4 now off the top of your head, either one would
5 be wonderful.
6 (No response.)
7 MR. BROOKMAN: It's -- what do you
8 think? Comments? Harmon?
9 MR. LEWIS: Yes, I'll send you
10 those statistics. It probably won't be next
11 week. Maybe that week after. But we could
12 pull them.
13 But I would think the large being
14 twice the number of small wouldn't be
15 accurate for walk-ins the food service
16 spectrum. Those numbers would probably be
17 reversed more.
18 MR. BROOKMAN: Really?
19 MR. LEWIS: But I can pull out the
20 historical stuff.
21 MR. BROOKMAN: Okay. Thank you.
22 MR. McCORMICK: Thank you.

1 MR. BROOKMAN: Okay. Other
2 comments on the share of shipments?
3 (No response.)
4 MR. BROOKMAN: I'm going to
5 suggest we take a short break. It's three
6 o'clock. We're still -- I think somewhere
7 between a half an hour and 45 minutes behind.
8 I think we still have the capacity to catch
9 that up and get out of here before dark.
10 So let's take a ten-minute break.
11 Don't go far. If you're going to find a
12 vending machine, do it quickly. And we'll
13 resume at 3:15.
14 We're making good progress. And I
15 really appreciate the quality of the comments.
16 We're really getting a lot of good
17 information here today.
18 See you back here to start at
19 3:15.
20 (Whereupon, the foregoing matter went off the
21 record at 3:05 p.m. and went back
22 on the record at 3:15 p.m.)

1 MR. BROOKMAN: We're going to
2 proceed. We're on National Impact Analysis,
3 and we're back with Gavin McCormick.
4 MR. McCORMICK: Thanks. So, the
5 National Impact Analysis, I promise, will be a
6 little quicker. It is, essentially, the life-
7 cycle cost information for one walk-in times
8 the number of walk-ins that you're talking
9 about, so it's a little bit of a crude
10 characterization, but, basically, we've gone
11 from looking at one walk-in, the financial
12 impacts, to the nationwide impacts, once
13 you've added up all 2 million per year.
14 So, there's two different outputs
15 of the National Impact Analysis, the National
16 Energy Savings, which is simply if you look at
17 the energy savings from going to more
18 efficient walk-ins, times the number of walk-
19 ins that you're talking about, you can look at
20 a Nationwide Energy Savings. And the next
21 step is the Net Present Value. A word of
22 clarification here. We often find people get

1 a little confused because Net Present Value
2 often means in a cost benefit context all of
3 the costs and benefits of switching to this
4 rule. And, in this context, this is the Net
5 Present Value just to consumers of walk-ins.
6 So, you could imagine this rule, for example,
7 might have environmental benefits, and those
8 are not included in this Net Present Value.
9 This is the cost savings, if any, of going to
10 more efficient walk-ins for consumers. So, for
11 the National Energy Savings, just a quick
12 little diagram here. You can look from the
13 shipments analysis, you know the number of
14 units, the stock, and you know the energy
15 savings for each unit. You can multiply those
16 to get the National Energy Savings.
17 A similar thing is going on for
18 Net Present Value. In the shipments analysis,
19 you know how many of these things there are,
20 and of what type. You can look over on the
21 right here, we have the total equipment cost
22 increase, if increase, in fact, of going to

1 more efficient equipment. And over on the
2 left, we have the operating cost savings.
3 Again, we're just adding up walk-ins that use
4 less electricity given the price of
5 electricity and things, how many dollars does
6 that come to saved.
7 So, key inputs here are various
8 different numbers from the previous analyses.
9 The Shipments Analysis tells how many walk-ins
10 are we expecting to see in each year, both in
11 terms of the number shipped, which affects
12 what you spend on them, and the number in use,
13 which affects how much electricity you're
14 spending on them each year. And then other
15 electricity cost information from the Life-
16 Cycle Cost Analysis I covered a moment ago,
17 and other cost information like that.
18 Here we use discount rates, again,
19 but one thing to clarify is that the National
20 Impact Analysis takes place, because it is not
21 from the point of view of one consumer, it's
22 from the point of view of all of society.

1 Those consumers will not, necessarily, have
2 the same preference for money now versus
3 benefits later, as all of society, so
4 consistent with the Office of Management and
5 Budget's guidance, we use a straight 7 percent
6 and 3 percent discount rate in this analysis.
7 So, it's a different discount rate from the
8 Life-Cycle Cost Analysis. And what that is
9 being applied to is any shipments in the
10 future that cost more because units are more
11 efficient, that extra money is discounted.
12 Any cost savings that occur in the future,
13 that's discounted. And, actually, any energy
14 savings that occur in the future by DOE
15 Standard Procedure are discounted, as well.
16 So, I'm going to present to you the energy
17 savings discounted over time.
18 We also use site-to-source
19 conversion factors. Walk-ins obviously run on
20 electricity, but what this rule is really
21 looking at is saving source energy, such as
22 the coal that you burn to get electricity, so

1 we do an analysis of how much coal, natural
2 gas, and so on, energy is turned into the
3 electricity we use. So, what you essentially
4 do is you multiply the electricity by a number
5 to get the primary energy savings.
6 Two inputs that do not factor
7 importantly in this analysis, but it's worth
8 pointing out, because they do for other
9 products. HVAC interactions, you can imagine
10 that more efficient equipment might interact
11 differently with the cooling of the building,
12 or the heating of the building. In our
13 analysis, we found that this was not a
14 terribly significant effect in the case of
15 walk-ins, so for the preliminary analysis, we
16 assumed no change in interactions with HVAC
17 systems for more efficient equipment in walk-
18 ins.
19 And a second factor that sometimes
20 matters is the rebound effect. More efficient
21 equipment, which costs less to use, people
22 might use more. So, a common example is a

1 thermostat that -- excuse me, a house that you
2 can heat more efficiently, you might turn up
3 the heat and be a little bit more comfortable
4 because it's cheaper. We assume that in the
5 case of walk-ins that doesn't apply, because
6 you have health and safety reasons for
7 maintaining a particular temperature at all
8 times. You're not going to use it more
9 because it's more efficient, you're going to
10 use it the same amount. So, we assume that
11 these two factors do not have any significant
12 impact in this analysis.
13 Any comments on this right here,
14 the HVAC interactions, or rebound factors?
15 MR. MANOLE: I'm not sure what
16 will be the impact, but, after all, if you
17 have a better insulation and have less heat
18 going through the walls in the walk-in, all
19 that heat will have still to go to the air
20 conditioning, so we're not going to place that
21 load on the refrigeration system of the walk-
22 in freezer, but that load will go to the air

1 conditioning. So, overall, the building is
2 not going to save much.
3 MR. McCORMICK: Thank you. And we
4 will look at this more also for the NOPR
5 stage.
6 MR. BROOKMAN: For the record,
7 that was Dan. Go ahead.
8 MR. LLENZA: Charles Llenza,
9 Department of Energy. We look at that, and
10 also you'll end up in winter, that heat will
11 end up heating your building, so it's usually
12 offsetting. That's what we found in the past,
13 so it all depends on how much of a delta it
14 is, but I don't think it's going to matter
15 much at the end of the day because of that.
16 MR. BROOKMAN: Okay.
17 MR. McCORMICK: As with the Life-
18 Cycle Cost Analysis, there are too many
19 scenarios to characterize easily here, so this
20 is one attempt at a summary statistic to tell
21 the whole story. And, again, these are
22 preliminary numbers for the whole preliminary

1 analysis. But what this graph is showing is
2 two things at once, the National Energy
3 Savings, and also the Net Present Value. So,
4 this summary statistic says what are the
5 greatest energy savings you can get while
6 still saving consumer's money, instead of
7 costing them extra money over the long term?
8 So, the numbers that you see presented are the
9 National Energy Savings that you might see at
10 each different efficiency level.
11 So, if, hypothetically, DOE were
12 to require the maximum possible efficiency
13 level for both types of equipment, you would
14 get 0.54 quads of energy saved per year,
15 excuse me, not per year, that's over the
16 analysis period. That would be the savings
17 for this equipment class. But that would be,
18 likely, very costly, so the colored squares
19 you see here are the cases in which the Net
20 Present Value is greater than zero. So, if
21 you want the full technical details in the
22 TSD, we actually show each and every scenario,

1 what are the NES numbers, and the NPV numbers.
2 And this graph is just attempting to show
3 simultaneously that if you only look at the
4 colored squares, these are the squares in
5 which -- the scenarios in which you have
6 positive cost impacts overall, so you might
7 want to talk about the greatest energy savings
8 you can get of those, which is the -- we've
9 highlighted that orange just for clarity.
10 MR. BROOKMAN: Jon McHugh.
11 MR. McHUGH: So, when you say the
12 Net Present Value is greater than equal to
13 zero, are you actually going back up the J-
14 curve? It's not the maximum life cycle cost
15 savings, but rather the life cycle cost
16 savings is zero, essentially, to get to that--
17 the maximum energy savings to get to a life
18 cycle savings equal to zero?
19 MR. McCORMICK: Yes. This is not
20 the point with the highest life cycle cost
21 savings. This is the last positive.
22 MR. McHUGH: Thank you.

1 MR. McCORMICK: Again, our results
2 are preliminary, but we thought it was worth
3 showing one slide, in that many of our
4 equipment classes with the current set of
5 assumptions, this particular summary statistic
6 would actually imply that you are looking at
7 the very maximum efficiency level. So, for
8 this equipment class, Medium Non-Display
9 Coolers with large dedicated indoor
10 refrigeration system, we saw that in all but a
11 few cases you have a net savings of money
12 nationwide over the 30-year analysis period.
13 So, assuming it is - well, it's accurate to
14 all our assumptions, then you would be looking
15 at saving the most energy, and enough money in
16 the maximum case here. So, this is analogous
17 to the slide we saw a little bit earlier that
18 Rebecca showed on Slide 42, and this is
19 getting back to how we are not seeing dramatic
20 cost increases at the highest efficiency
21 levels for some products.
22 Just a quick summary of some of

1 the results from the National Impact Analysis.
2 We often are looking at very high efficiency
3 level combinations giving us this summary
4 statistic of the highest energy savings, still
5 save some money. And, occasionally, it's even
6 at the maximum level. We're seeing a little
7 more variation in the Net Present Value than
8 the National Energy Savings. In almost every
9 case, more efficiency means higher energy
10 savings. That part is obvious.
11 And the bottom line, also, is that
12 we are looking at considerable savings for
13 this equipment class. This is looking at 13
14 quads of energy saved over the 30-year
15 analysis period, if you discount it at 3
16 percent a year, and tens of billions of
17 dollars. So, assuming that all our
18 engineering assumptions are accurate, and we
19 will, of course, be revising at least some of
20 them, I'm sure, that's the kind of savings
21 we're looking at over the analysis period.
22 MR. BROOKMAN: So, comments on

1 these last few slides? And, perhaps, the
2 results, as well. Yes, Joanna.
3 MS. MAUER: Joanna Mauer. I
4 didn't see the undiscounted quads reported
5 anywhere in the GSD. Is that something that
6 will be reported at the NOPR stage, the
7 undiscounted -
8 MR. McCORMICK: We certainly can
9 provide that, yes.
10 MR. BROOKMAN: Thank you.
11 MR. McHUGH: I'll just make a
12 similar comment, that units of energy, you
13 really can't discount them. It's a financial
14 tool, so it doesn't really make sense to
15 discount quads.
16 MR. McCORMICK: Thank you for your
17 comment.
18 MR. BROOKMAN: Okay.
19 MR. McCORMICK: This was the
20 comment about discounting energy savings over
21 time. Would you like to repeat it?
22 MR. McHUGH: Yes, because it's a

1 financial tool. It doesn't have any physical
2 sense related to energy.
3 MR. CYMBALSKY: Well, I mean, one
4 quad of energy now is one quad of energy in
5 2035. Right?
6 (Off mic comment.)
7 MR. CYMBALSKY: I'm sorry. I
8 thought we only discounted the financial part
9 of this, but I'm not -
10 MR. McCORMICK: Charlie, do you
11 want to repeat that, or should -
12 MR. LLENZA: Are we discounting
13 this because of the OMB guidance? Is that
14 what we're doing?
15 MR. McCORMICK: Yes, that's right.
16 MR. LLENZA: Okay. So, this is --
17 that's why we're discounting it. And while it
18 doesn't, necessarily, make sense to everybody,
19 it makes sense to OMB.
20 MR. BROOKMAN: Joanna asked the
21 initial question. Go ahead, Joanna.
22 MS. MAUER: Well, just to - in

1 other TSDs that I've looked at, they report
2 the discounted quads, but also the
3 undiscounted quads, so I don't, necessarily,
4 have a problem with reporting the discounted
5 quads, but I'd request the undiscounted quads.
6 MR. BROOKMAN: Okay. We got that.
7 MR. McCORMICK: And next I'm
8 turning over to Rebecca. Thank you.
9 MR. BROOKMAN: A few individuals
10 approached me at the break wanting to make
11 sure we did get to test procedures, and we
12 will, so hang in there. We're going to get to
13 test procedures. Rebecca.
14 MS. LEGETT: Yes, this is Rebecca.
15 I'm going to be presenting the last two
16 sections, Sections 6 and 7. Section 6 is very
17 brief. I'm going to try to get through it
18 very briefly, and then move on to some of the
19 test procedures used and try to get those in.
20 So, first I'm going to talk really
21 quickly about our methodology for the
22 Manufacturer Impact Analysis. We did a

1 preliminary Manufacturer Impact Analysis for
2 this phase before now, and before the NOPR
3 we'll be conducting the actual MIA, it's
4 called. And the purpose is to assess the
5 impacts of these new standards on -- any new
6 standards that DOE sets on manufacturers,
7 manufacturer subgroups -- examining cumulative
8 regulatory burden on the industry. This is
9 other rules, such as other health and safety,
10 sanitation, other rules that the industry
11 might have to follow that could create a
12 cumulative burden. This is where we consider
13 them.
14 So, DOE's methodology for
15 quantifying the impact is to analyze industry
16 cash flow and NPV through a Government
17 Regulatory Impact Model, or GRIM, and then
18 conduct interviews with manufacturers to
19 refine the inputs to the GRIM, and develop
20 other analyses. And these are the outputs.
21 So, very brief survey of the methodology. The
22 pre-analysis was Phase One, and part of Phase

1 Two. And part of Phase One, and the beginning
2 of Phase Two was conducting preliminary
3 interviews, which we did with some
4 manufacturers last year. And after this
5 meeting in the next stage, we will be
6 conducting further -- more interviews with
7 manufacturers. And this round is different
8 from the last one, in that we're seeking
9 detailed financial data, information, specific
10 engineering data. We do this by conducting
11 on-site interviews, and we sign a non-
12 disclosure agreement with whatever
13 manufacturers we visit, so that when we do --
14 to use the data, we would have to aggregate
15 that from many manufacturers, so that no one
16 manufacturer's data is disclosed in the
17 analysis. And we would like to set up those
18 interviews very soon, so if you are a
19 manufacturer and would like us to conduct an
20 on-site interview to talk about the impacts of
21 this rule, please approach us at the end or by
22 email.

1 And, finally, I'm going to just
2 briefly run through each of the analyses we'll
3 be conducting for the NOPR phase. And,
4 actually, I'm just going to let you read them
5 up here. They're described in brief detail in
6 the TSD. And part of the new -- besides the
7 new analyses, we'll also be revising our
8 previous analyses. And we will address any
9 comments received from the pre-analysis stage,
10 refine our inputs, refine our assumptions, so
11 your inputs are very important to us.
12 MR. BROOKMAN: So, let's just
13 pause. That was really quite quick, and quite
14 efficient. That was well done. I think as I
15 cast my eyes around the room, I think 80
16 percent of you, at least, are familiar with
17 this content. Anybody that's not familiar
18 with it, that would like to ask questions,
19 because Rebecca has done a very nice job of
20 summarizing. Just want to make sure. Yes,
21 Harmon.
22 MR. LEWIS: Just one thing. On

1 the Manufacturer Impact Analysis we were
2 talking about during the break with Eric, some
3 of those numbers that you're distributing, the
4 R&D costs over are, again, off the 8 to 10
5 times factor, so you need to get a better
6 sample size of what all these 40 manufacturers
7 actually produce each year. And I think
8 you're way at the high side.
9 MS. LEGETT: Thank you. That's
10 very helpful. That's a good example of
11 something that we can ask. That's a good
12 example of something that manufacturers might
13 not want to reveal publicly in comments, but
14 we would cover during these confidential
15 interviews and then aggregate the data to get
16 a better picture. So, thank you.
17 MR. BROOKMAN: Okay. So, the
18 invitation, again, is to contact the
19 Department to schedule these interviews, and
20 get this underway.
21 MS. LEGETT: Yes.
22 MR. BROOKMAN: Okay.

1 DR. AMRANE: When are you planning
2 to have those interviews, again?
3 MS. LEGETT: Soon.
4 MR. BROOKMAN: Karim, do you have
5 a -- no.
6 DR. AMRANE: Just curious. I
7 mean, we're talking the next month, or the
8 next two months?
9 (Off mic comment.)
10 DR. AMRANE: Summer. Okay.
11 MR. BROOKMAN: Thank you, Charles.
12 Okay.
13 MS. LEGETT: All right. Now, I'm
14 going to get into a discussion of -- I'd like
15 to start off a discussion, and it'll take
16 however long it takes, about some issues that
17 were raised at the NOPR. Questions we asked,
18 feedback we received, DOE is reconsidering
19 some of these test procedure issues based on
20 stakeholder comments that were received at the
21 NOPR. So, we are considering some new
22 approaches, and we'd like to get some

1 feedback. And there are four major issues
2 here, definition of manufacturer, testing and
3 compliance responsibility, a basic model
4 issue, and some modifications to the test
5 procedure. And we've already covered, I
6 think, the first two in some of the opening
7 statements. So, we do realize that this is a
8 major issue that people have a lot of comments
9 on, a lot of thoughts, so the Department is
10 really trying to reach some consensus, some
11 way forward through all this controversy, so
12 your comments are greatly appreciated.
13 So, first the definition of
14 manufacturer. And people have disagreed on
15 this. First, EPCA provides that this term
16 "manufacture" means to manufacture, produce,
17 assemble, or import. And you see the citation
18 in the U.S. Code right here. At the NOPR
19 public meeting, interested parties requested
20 clarification of the definition of
21 responsibilities associated with manufacturer.
22 So, DOE is considering a way forward through

1 this, applying the term assemble within the
2 definition of manufacture, to cover those
3 entities that design and/or select components
4 for a walk-in, envelope, or refrigeration
5 system.
6 So, what are some implications of
7 this testing and compliance responsibility?
8 In test procedure NOPR, DOE assumed that the
9 manufacturer should be responsible for testing
10 equipment and complying with the standard.
11 There are a couple of problems with this
12 assumption, not least of which was that there
13 was a lot of contention as to who is the
14 manufacturer. So, interested parties
15 submitted comments on the NOPR indicating a
16 strong preference for allowing component
17 manufacturers to test their own products, and
18 also noting that requiring a component
19 manufacturer to test another component
20 manufacturer's products would be burdensome.
21 And I think Harmon raised this point earlier
22 today.

1 So, in response to these comments,
2 DOE is considering that the assembler, and
3 according to the concept of assembler that I
4 mentioned in the previous slide, of the walk-
5 in shall be the manufacturer responsible for
6 demonstrating compliance with a performance
7 standard. And DOE is considering allowing
8 this assembler either to conduct the tests in
9 the test procedure, or to rely on test results
10 provided by component suppliers. In all
11 cases, the testing must have been done
12 according to the DOE test procedure. So, we
13 request comment on these two items.
14 MR. BROOKMAN: Fred.
15 MR. MINELLI: I believe that the
16 component manufacturer should be responsible
17 for testing that component, and that in the
18 procedures there should be a test set up for
19 each component, and a level of compliance for
20 the insulated panels, it should be the C518 R-
21 value, for glass doors I'm sure there's a
22 prescriptive standard in EISA for the glass

1 doors so that the door manufacturers could
2 meet those requirements and label, as such.
3 MS. LEGETT: I'd like to clarify
4 that this -- the testing and compliance
5 responsibility, here we're really getting at
6 compliance with an overall energy conservation
7 standard.
8 MR. MINELLI: Then, again, as I
9 stated earlier, the compliance of the overall
10 box, the assembly of the panels and
11 refrigerations, and lighting, and glass doors,
12 and components that we, typically, have
13 absolutely nothing to do with -
14 MR. BROOKMAN: You'd like to be
15 responsible for your part.
16 MR. MINELLI: Exactly.
17 MR. BROOKMAN: Did you want in
18 here, Mike?
19 MR. STRAUB: Yes, I'd just agree
20 with that 100 percent, that as the panel
21 manufacturer to be responsible for the panels,
22 that's what we control, that's what we build.

1 So, any more responsibility for the different
2 components would be very burdensome.
3 MR. BROOKMAN: Even if the
4 assembly is done by others, you supply the
5 parts, do you stand behind the parts of yours
6 that you create?
7 MR. MINELLI: If I supply glass
8 doors to go in my panelized structure, then
9 the glass door manufacturer needs to verify
10 that that component meets the requirements. I
11 have no design input, or even product
12 knowledge of the doors. What I know is how an
13 opening I need to leave it the box.
14 MR. BROOKMAN: Jim.
15 MR. PERRY: Jim Perry with Crown
16 Tonka. Although I agree with what Fred's
17 saying, I don't think that's what this is
18 saying. I think what this is saying is the
19 person that finally assembles it will be
20 responsible for complying with the performance
21 standards, or demonstrating that you comply
22 with the performance standard. Correct?

1 MS. LEGETT: Yes.
2 MR. BROOKMAN: Yes, thank you.
3 MR. PERRY: They don't have to,
4 necessarily, conduct tests, if the component
5 suppliers give them good enough information to
6 suggest that all the components comply.
7 MR. BROOKMAN: Let's confirm that,
8 as well.
9 MR. LLENZA: Let me speak to that.
10 This is Charles Llenza, Department of Energy.
11 Since we're still in the process of composing
12 this, and putting our test procedure, not only
13 putting our test procedure together, but we're
14 at preliminary stages for the standard, I
15 cannot say that the Department, at this time,
16 would say yes or no. There might be a test
17 that we might require for performance, not
18 necessarily for the component, because the
19 components could be regulated differently, so
20 that we wouldn't -- and the component
21 manufacturers would not be expected to be
22 attesting to the performance requirements of

1 the system. So, at this point -- and we
2 understand the burden of the testing process
3 to the manufacturers, and to the installers,
4 and the distributors, everybody in the
5 industry, basically, so I don't think the
6 Department is interested in making that burden
7 unrealistic.
8 There's going to be some costs
9 with meeting the new standards, and I think I
10 don't want to be blindsiding the industry with
11 saying that there will be no cost. But, at
12 this point, what I can say is that we are
13 trying our best to minimize any kind of
14 additional requirements in terms of imposing
15 those on industry for compliance and
16 certification. So, we're very conscious about
17 it, because we understand the cost
18 implications of this for the industry.
19 MR. BROOKMAN: Charles, if you
20 look at that last bullet on Slide 101, maybe
21 you'd said all that you wish to say. Can you
22 further interpret what that means?

1 MR. LLENZA: This is Charles
2 Llenza, Department of Energy, again. This is,
3 basically, in line with my comment, which is
4 that if we have something that's out there
5 already that we can utilize in terms of
6 certification for the compliance of our Energy
7 Conservation Standard, then we'll use that.
8 But we also may require some additional
9 testing in order to give us a certainty level
10 that the Energy Conservation Standard is being
11 met.
12 MR. BROOKMAN: In this case, that
13 burden would fall, at the first half of that
14 sentence, on the assembler?
15 MR. LLENZA: Correct. As defined,
16 as we define it here.
17 MR. BROOKMAN: Assembler, in this
18 case, you've expanded the definition,
19 assembler is included under the definition of
20 manufacturer.
21 MR. LLENZA: Correct.
22 MR. BROOKMAN: Okay. I'm trying

1 to establish a baseline here. Claire, go
2 ahead.
3 MS. GAGNE: Claire Gagne. Two
4 things, Jim, getting back to what you were
5 asking. In light of what Charles has said,
6 we're still interested in your opinion about
7 the way DOE should go forward on this issue.
8 We just haven't made a decision yet.
9 Secondly, I'd also like for us to be careful
10 about how we're using the term "assembler," or
11 "assemble." In Slide 100, it's defined as to
12 cover those entities that design and/or select
13 components. So, let's just keep that in mind
14 as we discuss the term "assembly, assembler,
15 assemble."
16 MR. BROOKMAN: Okay. Thank you.
17 Any additional comments then? Jim.
18 MR. PERRY: So, Claire, it
19 wouldn't, necessarily, be the person that
20 actually puts it together in the field.
21 MS. GAGNE: Not necessarily.
22 MR. PERRY: Which somehow along

1 the line we need to encompass that, because I
2 think Fred pointed out, we can make panels
3 that are very well made, are compliant with
4 all of the EISA standards, and an installer do
5 a poor job putting them together, and then
6 we've lost all the gains. So, if we include
7 those folks, then I would be in favor of this
8 kind of a definition.
9 MR. BROOKMAN: That's good to note
10 for the record. That's good to have. Karim.
11 DR. AMRANE: Karim Amrane, AHRI.
12 I guess I have a question of DOE. How is DOE
13 planning to verify, to make sure that the box
14 meets the requirement of the regulation in the
15 field?
16 MR. LLENZA: Again, we're still
17 looking at all our options. We have an
18 enforcement activity here at the Department,
19 and we're talking to them closely in terms of
20 trying to make something realistic, because it
21 would make no sense if we just had a
22 requirement out there, and had all these

1 certification requirements, and then not being
2 able to enforce it, it would make no sense, so
3 what we're trying to do right now at this
4 stage, it's a little preliminary because we
5 don't have the scheme completely developed.
6 We have some legal requirements that we can
7 utilize. We have some prescriptive
8 requirements that we have out there that the
9 component manufacturers could certify the
10 components. I think we're still trying to
11 formulate what would be the best way at the
12 least economic impact to the industry for
13 having some kind of certification scheme out
14 there that would satisfy all parties, and that
15 would spread out the responsibility to each
16 element of the industry that's responsible for
17 their particular areas.
18 MR. BROOKMAN: So that if each
19 aspect of the industry, just float a scenario,
20 each person -- company that made something, if
21 that assembler, the designer designed those
22 pieces that came together in a way so that all

1 of the elements in it would meet a performance
2 spec, that, conceivably, that would do it?
3 MR. LLENZA: That could,
4 potentially, be one of the scenarios.
5 MR. BROOKMAN: Okay. One of the
6 scenarios.
7 MR. LLENZA: Yes.
8 MR. BROOKMAN: Okay.
9 MR. LLENZA: So, we don't want to
10 limit ourselves at this point in time, because
11 we've still got another two years to go here.
12 So, what we're trying to do is assemble all
13 the components necessary for us to be able to
14 not only certify the equipment, but also then
15 to certify that it's meeting some kind of
16 Energy Conservation Standard. Because, if
17 not, all this analysis, and all these
18 calculations mean nothing, if we're not having
19 any way of verifying that it's been assembled
20 correctly, or put together correctly, or even
21 designed correctly in the field.
22 MR. BROOKMAN: Right. Then to

1 Charlie. Go ahead, Charlie. Stand up. Fred
2 is first.
3 MR. MINELLI: I just wanted to
4 add, since we're talking about manufacturer,
5 or assembler, or the person that picks the
6 item, so it could be the building architect,
7 or engineer of record, or the owner, so that
8 it could be any one that decided how that unit
9 goes together. It makes more sense, since
10 they're picking the parts. And if each part
11 is then certified, then it's much easier to
12 certify the finished unit.
13 MR. LLENZA: The other fact --
14 this is Charles Llenza, Department of Energy,
15 also. Part of the situation is with the prior
16 experience that the Department has in
17 determining who's at fault is, we always find
18 that there's more than just one party involved
19 in a piece of equipment. And in this case,
20 since the equipment is not an actual
21 production line piece of equipment being made,
22 it's highly customized, and sometimes it's

1 customized in parts, and assembled on site.
2 So, you have a little bit of an iteration of
3 what we normally would be in an enforcement
4 scheme here at the Department of Energy, so
5 what we, as the Department, would like to have
6 is maximum flexibility to do our enforcement
7 activities to make sure that the standards are
8 being met.
9 Now, part of the sensitivity to do
10 this is in such a way so that everybody can
11 continue operating with the minimum amount of
12 cost involved to meet those requirements.
13 And, I guess, that's part of art form of
14 putting one of these standards out. So,
15 that's why we're trying to work closely with
16 the industry here. So, again, your comments
17 would be greatly appreciated on all of this.
18 We're listening.
19 MR. BROOKMAN: Charlie.
20 MR. STEPHENS: Charlie Stephens.
21 I'd like to take us back to some fundamentals,
22 just based on my own long history with these

1 sorts of things. I think it may have been
2 Fred who said earlier in the day, very early
3 in the day, that what we're dealing with here
4 really is a building. And it really is a
5 building more than anything else. It
6 resembles a small building with windows in
7 many cases, with a refrigeration system, just
8 like a house with an air conditioning system,
9 in a way. And the assembler in the case of a
10 house is a builder. And that's normally
11 enforced in the Building Code. And the
12 Building Code is specified not by BTU or
13 kilowatt hours per square foot. It's specified
14 by window U-values at a certain maximum, R-
15 values in the walls at a certain minimum,
16 component, by component, by component, and the
17 assembler, the builder puts it together.
18 But I can tell you from the
19 perspective of my colleagues out where we are
20 who've attempted to characterize the actual
21 kilowatt hours per square foot of the final
22 assembled building, failed miserably to

1 connect the model to building with all of its
2 component specifications with the actual
3 energy use of the thing, in part because they
4 could not account for all the variations in
5 use.
6 And I'm sitting here looking at --
7 I mean, I'm already on the record as not
8 quite believing the infiltration part of the
9 analysis, and the amount of energy that goes
10 into that, but still, it's a fairly large
11 component there, and stopping that requires
12 the installation, and the maintenance in good
13 order of whatever measures are there to stop
14 air from infiltrating into the structure. It
15 also requires that the thing be installed
16 rather well. And I think it's obvious to me,
17 based on my own field experience, that finding
18 somebody who's going to enforce something that
19 looks like a BTU per square foot, or kilowatts
20 hours per day, or something in the field is
21 not going to happen. I don't care how hard
22 you work at it. It ain't happening now with

1 houses, and we've been working at this for 30
2 years. And it's got a long history, so I
3 think, ultimately, I'm not sure that
4 performance in this case shouldn't be brought
5 down to the level of component performance,
6 which a U-value is, which an R-value is. And
7 maybe it looks a little bit like a house, and
8 it's regulated a little bit by the house, but
9 this thing is not an appliance, so I'm a
10 little concerned here that the test procedure
11 falls out based, to some extent, on what's the
12 metrics of the standard you're trying to
13 impose. So, I kind of like C518 as a test
14 method, for instance, because it's fairly
15 simple and straightforward to perform, and you
16 don't have to do it over and over again, and
17 it's scalable. And the math and physics is
18 pretty well established.
19 I like a lot of the -- AHRI has
20 done a fine job with refrigeration testing,
21 and test procedures, and I think those are
22 pretty well in place, as long as the specs are

1 in place. NFRC has got some great window
2 testing regimes that work right now, and have
3 been working very well for windows and doors,
4 patio doors, French doors, all kinds of doors
5 with glass. So, I think there's lot of
6 components already in place that would make
7 this a whole lot simpler for just about
8 everybody if we kind of got back to
9 fundamentals, and thought very carefully about
10 what it is we're trying to do here, and what
11 the practical considerations are of making it
12 happen in the field.
13 I'll expound on this in more
14 detail when I send in my written comments, but
15 I would urge serious consideration of how this
16 is being done at fundamental levels.
17 MR. LLENZA: The Department
18 totally acknowledges your comments, and from
19 the Department's perspective, the statute
20 requires that we come up with an Energy
21 Conservation Standard. And the trick for the
22 Department would be to be able to find a happy

1 medium in between, that we're regulating, we
2 understand that as we're getting more and more
3 involved in this process, we're understanding
4 that we're actually regulating a building of
5 sorts for the larger units, and the difficulty
6 lies here that we're not so concerned with the
7 smaller units that you can assemble and ship
8 out on wheels. We're more concerned with the
9 units that you assemble on site, so part of
10 our function here at the Department will be to
11 try to find a realistic way of doing this
12 within the industry's mode of operation, let's
13 put it that way. So, we're conscious about
14 that. I can't promise anything, but I could
15 say that we're very sensitive to what the
16 industry thinks about the cost implications
17 here if we make a mistake.
18 MR. BROOKMAN: So, let's hear from
19 other industry folks now, if there are
20 additional comments. I think we've covered
21 this pretty good. Karim.
22 DR. AMRANE: Karim Amrane, AHRI.

1 I think I agree with Charlie. I think we need
2 to look at the walk-ins the way we're looking
3 at homes today, and homes are regulated by
4 some prescriptive type of requirements. And
5 what can happen, maybe a happy medium here
6 would be to have the option. You could have
7 no prescriptive requirements coupled with a
8 performance requirement.
9 Today in the code, for example, in
10 the International Energy Conservation Code,
11 for example, you could meet the code by either
12 following the prescriptive requirements, or by
13 following the performance path, which,
14 basically, give you more leeway on what kind
15 of components you can pick, but at the end you
16 have to show that you're building -- that
17 you're designing it as good as a baseline
18 building that's defined within the code. So,
19 I think there is a lot to learn from what the
20 codes have done in the past, and maybe they
21 could apply very well in the case of walk-ins.
22 MR. BROOKMAN: Jon.

1 MR. McHUGH: So, last month I
2 taught a number of classes to building
3 officials, and there's a group that's probably
4 worth interviewing, which is CALBO. I mean,
5 there's other states, but that's the
6 California Building Officials Association. I
7 can give DOE some phone numbers and contact
8 information.
9 The primary thing that I walked
10 away from some of those training sessions is
11 that building officials really do not like
12 performance standards. And the reason is, is
13 that you have a performance standard that you
14 did some kind of computer simulation, you did
15 tradeoffs between different things, and
16 there's nothing that they can actually
17 inspect. They can't actually inspect the wall
18 R-value, because you might have traded it off
19 with the air conditioning efficiency, and vice
20 versa. And they're having a hard time just
21 making sure the SHGC of the windows is right,
22 much less trying to sort through a performance

1 metric.

2 One of the nice things about

3 appliance standards is that the inspector

4 actually doesn't have to check that.

5 Supposedly, DOE has already done that, and is

6 actually regulating the marketplace so that

7 efficient appliances are already in the

8 market, that when you go to the store, you buy

9 the various pieces. You know that it meets --

10 that it has this minimum level of efficiency.

11 So, to some extent, a standard that says oh,

12 we're going to pass this onto to the states,

13 and pass it onto their building officials to

14 check, actually might take some of the burden

15 off the manufacturers to some extent, because

16 they'll be allowed to trade off between

17 certain things, and potentially have less

18 efficient components than if they had a

19 component standard. But it actually adds a

20 bunch of cost to the states, and if you look

21 at the history of building departments trying

22 to enforce something as complex as

1 refrigeration, the quads that might be posted
2 on the screen might seem large, but the
3 realized savings might be substantially less.
4 MR. BROOKMAN: Thank you.
5 MS. LEGETT: I have a -- actually,
6 go ahead.
7 MR. BROOKMAN: Yes, Dan.
8 MR. MANOLE: Dan Manole. Just to
9 share a current experience, let's see how --
10 with something similar. We manufacture like
11 houses with -- so, they are treated also like
12 a building. And UL, for example, has a
13 program today to certify the building as an
14 appliance so they can test -- we have a file,
15 we place a mark, a UL mark, and the building
16 inspector eventually will -- not eventually,
17 will accept that product. However, even UL,
18 we discontinue that program at the end of this
19 year. UL considers that this kind of product,
20 a building, which is like a mobile house,
21 mobile home, they will not be able to certify,
22 so instead they will provide a certificate, so

1 they will have -- they are required to inspect
2 every house.
3 MR. BROOKMAN: What's causing them
4 to withdraw that UL certification?
5 MR. MANOLE: You need to contact
6 UL to get it. It is not something
7 confidential, it's just for the details. What
8 they informed us is that the building
9 inspectors are not feeling comfortable with
10 having this kind of UL mark on the house, and
11 that is a safe product. They would rather
12 have a testing per unit.
13 MS. LEGETT: Yes. We can move on
14 in just a second. Just to get back to these
15 two questions, and encourage people to respond
16 to these questions. What we're looking at,
17 ideally, would be that say you agree with all
18 this, the assembler conducts the tests and
19 labels their components. Then whoever is
20 putting them together has all that label data,
21 feeds it into the test procedure, and comes
22 out with a number. If the number is good, it

1 complies. I mean, that's -- ideally, we're
2 moving towards a test procedure that's made up
3 of a series of component tests. And this is
4 just hypothetical, considering a way to move
5 forward given all these issues.
6 MS. GAGNE: Claire Gagne, just
7 quickly. Did you mean to say that the
8 assembler conducts the tests?
9 MS. LEGETT: Assembler, or --
10 either the -- the component manufacturer
11 could conduct the component tests for their
12 own components, which is -
13 MR. BROOKMAN: So, that's one
14 pathway.
15 MS. LEGETT: Yes. It's a pathway
16 that -
17 MR. BROOKMAN: Yes. Jim.
18 MR. PERRY: So, you would feed it
19 into some kind of a computer simulation. Is
20 that what you're trying to say?
21 MS. LEGETT: Well, the test
22 procedure would be a calculation methodology

1 that took all these inputs and gave a result
2 of energy consumption.
3 MR. PERRY: And it's going to give
4 you some kilowatt hours per day, or year,
5 something like that?
6 MS. LEGETT: Potentially, yes.
7 MR. PERRY: You're not going to go
8 back out and look, and say well, gee, you're
9 getting -- it said 25, but you're getting 27,
10 because we assume they open the door, whatever
11 it was, 60 times a day, but in reality this
12 particular walk-in is being opened 100 times a
13 day.
14 MS. LEGETT: Yes. You would only
15 judge the energy conservation as it was tested
16 by the test procedure.
17 MR. PERRY: At the onset.
18 MR. LLENZA: Charles Llenza,
19 Department of Energy. Just for clarification,
20 usually, we come in and do one test for the
21 entire lifetime of the equipment, and we walk
22 away. Once we certify that it's met the

1 requirements, we don't go back and retest.
2 So, part of the thing is -- and the issue of
3 use, also, as far as I know, most of our test
4 procedures, and standards are not based,
5 necessarily, on the use at this time. It may
6 change in the future, but it's not heavily
7 weighted that way. So, there's an average use
8 that the industry has. We use those numbers,
9 but you could have, theoretically, an operator
10 that has a walk-in, and he doesn't care in
11 using the hinged doors, so he leaves them
12 open. He doesn't care how much he spends on
13 electricity. We can't really monitor that, so
14 he just has to pay the bill.
15 MR. BROOKMAN: Whoever puts it
16 together, though, has got to do it right.
17 MS. LEGETT: So, in a sense that -
18 - I don't want to spend too much more time on
19 this, but in -- if you can either comment in
20 written comments, speak to these questions, or
21 if you disagree with the approach, then
22 suggest another approach, that would be

1 helpful to the Department.

2 MR. BROOKMAN: Yes, Joanna.

3 MS. MAUER: Joanna Mauer. I'm

4 just trying to understand. It sounds like

5 assemblers would comply by saying, basically,

6 they know the performance of the panels they

7 have, and the doors, and refrigeration

8 equipment, and so on, and they can calculate

9 some overall performance based on that. I'm

10 trying to understand kind of what the real

11 difference is between that and just having

12 component performance standards, and DOE would

13 conduct analysis to determine with those

14 separate component performance standards kind

15 of what the overall performance would be.

16 MR. LLENZA: This is Charles

17 Llenza, Department of Energy. It's, actually,

18 the happy medium. We have to develop an

19 Energy Conservation Standard so that the

20 formula, the computer program helps us by

21 setting some standard as the results. That

22 may help us get our Energy Conservation

1 Standard. At the same time, going back to
2 industry, and having industry set component
3 standards, maybe that's the way it's going to
4 end up. But, at this point, it's not really
5 proper for me to say we're going to go one way
6 or another, because we're not at that
7 crossroad yet. And we've had some
8 difficulties understanding the industry. The
9 information and numbers are not that easy to
10 get, and I think the dialogue here now is a
11 good place where we're getting the feedback
12 that we need in order to understand better
13 what we're doing.
14 So, what we've done with these
15 slides is, we've gone -- we're at a level at
16 the test procedures that we've heard what the
17 industry said, we're coming back with some
18 questions that are very pointed, because based
19 on how we resolve this is how the test
20 procedure is going to end up. So, it's
21 critical that we get your feedback.
22 MR. BROOKMAN: Yes, and we're

1 going to move on here shortly. Dan first, and
2 then to Charlie. Go ahead.
3 MR. MANOLE: Dan Manole. I believe
4 this program with a check sheet will be good,
5 and if we have it, that all can be applied
6 ahead of time right at the design stage, so
7 the installer, what he'll have to do is to
8 make sure that he has a list of this is what
9 it was in design, these other components, so
10 it's not that he will have to test anything.
11 So, we're not even going to start building
12 unless we have the right components, and we
13 are in compliance with the regulation.
14 MR. BROOKMAN: Yes. Jim, go
15 ahead.
16 MR. PERRY: And then to follow-up
17 on Dan's comments, it tends to be self-
18 regulating.
19 MR. BROOKMAN: Yes.
20 MR. PERRY: Because if the
21 installer leaves a gaping hole in one of the
22 seams, then it creates issues, and make us

1 come back and fix it.

2 MR. BROOKMAN: Charlie.

3 MR. STEPHENS: Charlie Stephens.

4 I just wanted to add that one of our big

5 concerns is that the order of magnitude of the

6 assumptions that you would place in your

7 calculation having to do with door openings,

8 and infiltration rates, and just the physical

9 location of the thing, whether it's in Alabama

10 or Seattle, are going to overwhelm most of the

11 incremental energy savings we're talking about

12 here with regard to measures on the shell,

13 based on the fact that we already have

14 prescriptive standards that are in place. We

15 are moving from that point forward.

16 And I look at the order of

17 magnitude here of how these things are used,

18 and the standard deviation around the number

19 you're going to get in whatever calculation

20 method you come up with is going to be huge.

21 So, the actual energy use -- I mean, one of

22 the things that's been there in the standards

1 for a long time is that we try to at least
2 make the test procedure, and the number you
3 get out of this thing come fairly close to
4 estimating what the actual energy use of this
5 thing might be in the field. Refrigerators,
6 historically, have come pretty close, a lot of
7 the air conditioning systems. There's some
8 assumptions there, but they come out somewhat
9 close, the models are somewhat predictive.
10 But in this case, you've got some rather large
11 standard deviations here just based on the
12 nature of the beast, and how they're used, and
13 the incredible variety that you see out there
14 in the field. So, it concerns us that even if
15 you come up with this nice calculational
16 method based on prescription, the standard
17 deviation is going to be huge.
18 MR. LLENZA: This is Charles
19 Llenza, Department of Energy. The most
20 important thing at this phase for the test
21 procedure is that we make sure that we have
22 tests for everything that we're going to go

1 test for, because if we can't test it, we
2 can't give you credit, or if we can't measure
3 it, we can't allocate it to the standard.
4 Since the standard still has another two years
5 to go, part of our job will be to maybe even
6 go out there and do some field tests. I mean,
7 if that's what it's going to take for us to
8 get to some kind of metric, the Department is
9 not tied not to go out there and do the job.
10 So, we are going to go conduct manufacturer
11 interviews, and interviews with the industry,
12 so we're going to be out there asking for more
13 input, and we will have another general
14 meeting next year. But, at this point, this
15 is not a static process, and I just want to
16 make sure that people don't get alarmed.
17 We're tackling the issues one-on-
18 one here. These are the ones that we -- the
19 most critical ones we see for the test
20 procedure, which we're trying to complete, and
21 we're behind schedule, by the way, but once we
22 have the metrics in the test procedure, then

1 the standard would be our major focus. And,
2 again, our commitment is here to work with the
3 industry to help get the best standard
4 possible due to the fact that this is just not
5 an appliance.
6 MR. BROOKMAN: So, this exchange,
7 I think, has been very constructive, very
8 useful, and a lot of clarity coming from this.
9 I want to make sure we address the other
10 issues that Rebecca has queued in her slides.
11 Mike, do you have a comment before we move
12 on?
13 MR. PERRODIN: More of a question.
14 Has there been any thought on where the
15 burden would fall to create a software
16 modeling program to calculate the energy
17 usage?
18 MS. LEGETT: At the moment, it's
19 the test procedure, the proposed test
20 procedure is the calculation methodology.
21 MR. BROOKMAN: So, that would be
22 widely available.

1 MS. LEGETT: Well, it's -- I mean,
2 the proposed test procedure has been
3 published. And, eventually, we're going to
4 have a final test procedure at some point.
5 MR. BROOKMAN: Joanna.
6 MS. MAUER: Joanna Mauer, just a
7 quick question. Does DOE have any idea how
8 many people would fall into this category of
9 assemblers, some kind of rough number?
10 MR. BROOKMAN: It's a lot of
11 potential different people. Right? Yes.
12 MS. MAUER: It just seems like it
13 would just make -
14 MR. BROOKMAN: Are there other
15 issues to be addressed? Yes.
16 MS. LEGETT: Yes, there's three
17 more.
18 MR. BROOKMAN: Let's deal with
19 these other three issues.
20 MS. LEGETT: Okay.
21 MR. BROOKMAN: Then we could
22 double back at the end, as required. Let's

1 make sure we get coverage on this.
2 MR. LLENZA: Charles Llenza, also.
3 My suggestion is that these are great
4 suggestions and questions and to send your
5 questions and suggestions, because these are
6 the things that we need to understand that
7 people have questions on, so that we can
8 develop answers.
9 MS. LEGETT: All right. Let me
10 move on. There's some implications of this
11 way forward that DOE may be considering for
12 other aspects of the test procedure. One of
13 these is on the way DOE is defining basic
14 model envelope. Here you see the definition
15 that was proposed in the NOPR, and we received
16 comments that this was too vague. So, basic
17 model means all units of a given type of walk-
18 in equipment, et cetera. Envelopes which do
19 not have any differing construction methods,
20 materials, components, or other
21 characteristics that significantly affect the
22 energy consumption characteristics. And there

1 was not consensus on what significantly affect
2 would mean, so DOE is considering changing the
3 definition in order to be consistent with some
4 other changes to the test procedure.
5 The original definition, the goal
6 was to provide flexibility for manufacturers,
7 but with the new approach that DOE is
8 considering, that flexibility is actually
9 provided in other aspects of the test
10 procedure. And the next slide details those,
11 so the revised definition means that basic
12 model means all envelopes which do not have
13 any differing features that affect normalized
14 energy consumption. And the proposed test
15 procedure said normalized energy consumption
16 was energy consumption per square foot of
17 surface area, but I'd rather not get into that
18 right now, because -
19 MR. BROOKMAN: Wait, wait.
20 MS. LEGETT: Sorry.
21 MR. BROOKMAN: Let's just give
22 them a chance to read the revised definition,

1 bottom of page 103, just give a chance for
2 that to sink in.
3 MS. LEGETT: All right.
4 MR. BROOKMAN: Are you able to
5 simply interpret how any differing features,
6 how that's a change from the previous proposed
7 definition?
8 MS. LEGETT: Are you asking me?
9 MR. BROOKMAN: Yes.
10 MS. LEGETT: So, in the NOPR
11 presentation, we showed two envelopes, and
12 they look the same, except one was larger.
13 And we said they would be the same basic
14 model, because you could apply certain scaling
15 factors.
16 What we're saying is that for now
17 what we're considering is, for those to be the
18 same basic model, they would have to have the
19 same normalized energy consumption, as tested,
20 which the example in the NOPR, they may or may
21 not have. Does that makes sense?
22 MR. BROOKMAN: Okay. So, now

1 continue with your slides.

2 MS. LEGETT: Okay. The

3 justification for changing the definition is

4 to provide a way to distinguish envelopes that

5 vary in normalized energy consumption from

6 those that differ only cosmetically. For

7 instance, they're a different color. Those

8 shouldn't be considered different basic models

9 because they would have the same tested

10 normalized energy consumption.

11 And, as I said before, previously,

12 the intent of the definition was to reduce

13 manufacturer testing burden, but the burden-

14 reducing measures proposed elsewhere in the

15 test procedure would, DOE believes, accomplish

16 the same goal. And one of those is adding

17 language to the test procedure that would

18 allow manufacturers to calculate energy

19 consumption by scaling results of physical

20 testing. And the distinction here is that

21 this actually takes place within the test

22 procedure. It's not, necessarily, part of the

1 basic model definition. The other, as we just
2 discussed a couple of slides ago, was allowing
3 manufacturers to rely on supplier's test data.
4 There may be another burden associated
5 with the definition of basic model. That's a
6 compliance and reporting burden, but that is,
7 actually, established - compliance,
8 certification, and enforcement regulations are
9 actually established in another rulemaking in
10 which DOE will consider burden-reducing
11 measures.
12 So, I don't know if people have
13 comment that's different from comment that was
14 made earlier, but to the extent that you do,
15 please comment.
16 MR. BROOKMAN: Jon.
17 MR. McHUGH: This is Jon. Could
18 you explain a little bit the future rulemaking
19 that establishes compliance certification and
20 enforcement, since that seems to be kind of
21 the nub of what we've been talking about
22 today?

1 MR. LLENZA: Yes. This is Charles
2 Llenza, Department of Energy. Part of the
3 regimen here is that we do test procedures, so
4 there's a rulemaking for that. We do
5 standards, there's a rulemaking for that. So,
6 at some point, we have a compliance scheme.
7 Based on the compliance scheme, is what you
8 can execute for an enforcement scheme. It's a
9 separate track, and so far, historically, the
10 Department has put a separate document out,
11 which provides the information on the
12 enforcement of details for the different
13 appliances.
14 Up to today, we have put out the
15 EPACT 2005 Compliance and Certification
16 document. That has to be updated to EISA
17 2007. This an EISA 2007 product, therefore,
18 the scheme for that would be in the next
19 document. And that's not expected to be
20 published, I don't think any time soon. We're
21 probably talking next year, late next year.
22 MR. McHUGH: Is it possible to do

1 something concurrent so that the efficacy of
2 the enforcement regime is something that flows
3 into the structure of the standard, and the
4 structure of the test method?
5 MR. LLENZA: This is Charles
6 Llenza, Department of Energy, again. The way
7 this flows is the test procedure flows into
8 the standard. The standard sets up the
9 enforcement schemes for the compliance of
10 certification rule. And then the enforcement
11 activity, which is controlled out of our
12 General Counsel's office, would then have the
13 policies that set up the enforcement activity
14 within the Department based on whatever
15 policies the administration carries at this
16 time. So, that's kind of the way it is, so
17 we're on track for this. And I know this is a
18 little bit difficult to understand, because
19 most people -- this is the first time you guys
20 are being regulated, but it sort of has a
21 sequence that we're following. And we're not
22 there yet, again, as I said. We're a year or

1 two out before--. But what we do in the
2 Department is, as we go through the standards
3 process, we will put in there whatever is
4 necessary to start establishing the compliance
5 and certification scheme, which then the
6 compliance and certification rule will pick up
7 to clarify it, and to help the implementation
8 of the rule in terms of getting the compliance
9 of certification documents.
10 MR. BROOKMAN: Because it's a
11 three-year, typically, window for the
12 effective date.
13 MR. LLENZA: Right.
14 MR. BROOKMAN: Right.
15 MR. LLENZA: And that's why you
16 have a three-year window. It's not only
17 because of implementing of the standard, but
18 it's also so the Department can get all the
19 different components that they set up in order
20 for it to do the enforcement activity in the
21 future.
22 MR. BROOKMAN: Betsy.

1 MS. KOHL: This is Betsy Kohl. I
2 don't want to -- just to clarify. We don't
3 have to do it in that order, test procedure,
4 standard, enforcement, but we have the option
5 to combine things if we want to, but we have a
6 number of different ways we could do it.
7 MR. BROOKMAN: Okay. Thank you.
8 I would like to get comment on this Slide 104.
9 And I'd like to make sure you couple it with
10 Slide 103, which provides the revised
11 definition, and see if anybody's got anything
12 else to say about that before we move on.
13 Nothing additional?
14 MS. LEGETT: And feel free to
15 submit your comments in writing, if you have
16 any.
17 MR. BROOKMAN: Okay.
18 MS. LEGETT: I'm going to move on,
19 the last two slides. And these are specific
20 modifications to the envelope test procedure
21 that address stakeholder comments on the NOPR.
22 And, also, kind of flow out of the idea that

1 component manufacturers may be testing their
2 own components. The idea is to incorporate
3 more individual component tests into the test
4 procedure.
5 The first issue is heat conduction
6 through structural members of panels. In the
7 NOPR, DOE proposed to determine the heat
8 conduction only by measuring R-value of the
9 foam. But interested parties during the NOPR
10 stated that DOE must also account for heat
11 conduction through structural members of
12 panels. So, DOE is considering ASTM C1363-05,
13 also known as the hot box method. And, first,
14 manufacturers of the -- whoever is doing the
15 testing of the panel would find the U-factor
16 of the fully assembled panel using ASTM 1363,
17 and then the U-factor of the fully assembled
18 panel would be derated using the R-value of
19 the foam as found by ASTM C1303, which was
20 actually proposed. So, ASTM C1303 was the
21 test procedure proposed in the NOPR for
22 finding the R-value of the foam. So, I want

1 to reiterate that interested parties
2 recommended 1363, this hot box method, as
3 being particularly applicable to walk-in
4 panels, but we'd like to hear your comments on
5 that.
6 MR. BROOKMAN: Yes, Fred.
7 MR. MINELLI: Is there -- I'm
8 familiar with 1363, but I don't remember if
9 there is a certain size limitation or
10 specification. What's the -
11 MS. LEGETT: I'd actually like to
12 defer to Eric on this question.
13 MR. FITZ: So, based on the
14 comments in the NOPR public meeting, DOE is
15 considering setting some kind of size. It
16 hasn't settled on anything specifically yet,
17 but it's something that is being carefully
18 considered based on comments from
19 manufacturers.
20 MR. MINELLI: It makes a huge
21 difference in our business, just in the
22 difference in the types of panels, and the

1 types of products we all manufacture. In a
2 small box typical for restaurants, heavy
3 structural members are not typical. But in 24
4 by 70 by 20 foot tall boxes, you need
5 structure to hold that together. In saying
6 that, a 4 by 8 panel, or two 4 by 8s together
7 run through this test, structural members in
8 that size of a specimen would seriously affect
9 R-value. But in a typical where that would be
10 used in a 12 or 16 by 12 or 16 group of
11 panels, it would be pretty insignificant. It
12 needs to represent some reality.
13 MR. FITZ: Do you have a
14 recommendation, specifically, by different
15 sizes of overall units that are shipped?
16 MR. MINELLI: I don't know, 12 by
17 16, 16 by 20.
18 MR. BROOKMAN: And you can put
19 this in your written comments. I thought you
20 were also suggesting there was maybe some sort
21 of a threshold, also.
22 MR. FITZ: So, you said a 4 by 8,

1 a 12 by 16, and maybe something else, or even
2 larger units?
3 MR. MINELLI: I guess I would have
4 to look at what's really typical in our
5 industry, our part of this industry, and make
6 a suggestion based on that.
7 MR. FITZ: Okay. That would be
8 very helpful.
9 MR. BROOKMAN: Go ahead, Jim.
10 MR. PERRY: Jim Perry, Crown Tonka
11 Walk-Ins. Rebecca mentioned that she wanted
12 to reiterate that this was brought up by an
13 interested party. I think it was brought up
14 by a single interested party, and not by the
15 industry as a whole.
16 I would suggest that the effect of
17 the structural members, which I take to mean
18 the rails of the panels, are insignificant
19 relative to the overall R-factor of the box as
20 a whole. My suggestion would be that we just
21 don't guess on a threshold, or anything like
22 that, but do some initial testing with this

1 ASTM 1363 test to see if there is any
2 significance to the rails, to the overall R-
3 value of the panel. And then that would be a
4 good way of deciding if it should be
5 considered, or not considered.
6 MR. BROOKMAN: Charlie.
7 MR. STEPHENS: Charlie Stephens.
8 That's not a bad suggestion, if people are
9 wiling to go out and test. One of the ways you
10 can guess at it is, and I'm not a
11 manufacturer, so I can't tell you for your own
12 panel systems, but if you take your typical
13 structures, looks at what's called the framing
14 factor, and find out what fraction of the
15 overall surface area has framing through it,
16 and what fraction doesn't, you can sort of
17 guess. And if you can approximate that
18 framing factor, regardless of the sample size
19 that you use in the guarded hot box, as long
20 as you're at about 8 by 8 minimum, you can
21 probably come pretty close to making it
22 negligible, if you can approximate the framing

1 factor.

2 MR. MINELLI: You can calculate --

3 this is Fred Minelli. You can calculate that

4 number. I mean, we do it all the time, and it

5 typically equates to leaving the door open 10

6 seconds longer in the day time. It's pretty

7 insignificant, but what my concern is, is that

8 it puts frame panel manufacturers at a

9 disadvantage.

10 MR. BROOKMAN: I would simply note

11 - I would call attention to the nature of

12 Eric's follow-on questions. He was looking

13 for specifics, so in your written comments, if

14 you can describe the sizes, describe the way

15 it would be tested, describe where it becomes

16 negligible, and back that up, then that's

17 going to be very helpful to the Department.

18 MR. FITZ: And to respond to your

19 question, if manufacturers are willing to

20 complete testing on their units, and to share

21 that information with the Department, that

22 would be useful, as well.

1 MR. BROOKMAN: I want to make sure
2 we cover this adequately. Rebecca, do you
3 think we have? One more, yes. Harmon,
4 please.
5 MR. LEWIS: The big issue at the
6 March meeting was the long-term R-value using
7 the ASTM C1303-08, is the -09A like the -08,
8 the thin cut samples for the long-term, or is
9 this something totally different? Because it
10 was overwhelmingly, you know, 18 to the one
11 guy that brought it up against doing that,
12 because it wasn't representative of the long-
13 term aging. You've got your metal facing on
14 the installation, and that's how it should be
15 measured. So, I thought that was put to bed.
16 I'm not sure what 1303-09A is.
17 MS. LEGETT: The question -- so,
18 ASTM C1303-09A is an update to 1303-08 that
19 doesn't make any significant changes, so we
20 are still talking about the same test
21 procedure.
22 MR. LEWIS: Everybody but Elliot

1 was against that method of measurement,
2 because the panels had metal facings on them,
3 and to take the foam, slice it thin, and then
4 test it in short-term and say that's what the
5 long-term value is makes no sense. I thought
6 that was a consensus of opinion at that time.
7 I don't know how it's bouncing back up as the
8 test method.
9 MR. FITZ: We agree there are lots
10 of comments that suggested that it was --
11 didn't apply to walk-in panels. But we would
12 still like manufacturers to submit data that
13 supports that statement.
14 MS. LEGETT: Also, the question at
15 hand here is, we're really -- I mean, we
16 understand your concerns about 1303, but we're
17 really asking about the hot box method. I
18 mean, say we use the hot box method by itself.
19 I mean, are you okay with that method?
20 MR. BROOKMAN: Thanks for that
21 clarification. Is it Milen?
22 MR. KIRILOV: Milen Kirilov,

1 Carpenter. I'd like to make two comments.
2 First is concerning ASTM 1363, or the hot box,
3 I would like that the Department run a study
4 to determine a correlation to the current
5 standard C518 with respect to structural
6 members, and create a correlation between C518
7 and the hot box. I'm not very familiar with
8 the hot box test, and I don't know how much
9 the cost will be compared to C518, but that's
10 the standard that's currently used, and that
11 should be considered in the future regulation.
12 And what I'm trying to say is that there may
13 be a more simple test to use instead of the
14 hot box. I don't think we should be jumping
15 on -
16 MS. LEGETT: Can you suggest as to
17 what that test would be?
18 MR. KIRILOV: C518.
19 MS. LEGETT: Okay. Do you have a
20 recommend -
21 MR. KIRILOV: The thermal
22 conductivity of the structural members, such

1 as wood. That's known value, and the foam.
2 So, can we use a more simple method to
3 calculating the overall panel?
4 MR. FITZ: So, are you suggesting
5 using C518 to measure the heat conduction of
6 every single component in a walk-in panel?
7 MR. KIRILOV: Yes. And the
8 Department can run a study as to how it
9 compares to the hot box. And I'm sure the
10 correlation will be there.
11 MR. FITZ: Sure. Do you have a
12 guess at how many unique components are in a
13 single panel, on average?
14 MR. KIRILOV: Well, they can
15 calculate for each panel, the manufacturer.
16 They can calculate the fraction of the
17 structural members, if the Department decides
18 to regulate that.
19 MR. BROOKMAN: Jim is holding up
20 his fingers. How many are you saying?
21 MR. PERRY: Three, typically,
22 foam, wood, and metal.

1 MR. KIRILOV: Sometimes plywood, I
2 guess, if it's a floor.
3 MR. BROOKMAN: Since we're on this
4 point, I'm going to continue. Fred.
5 MR. MINELLI: You wouldn't
6 consider anything that didn't stretch from
7 inside to outside, because it wouldn't be
8 worthwhile. So, all we have is foam and rail,
9 if a rail is used. There's nothing else
10 there.
11 MR. BROOKMAN: Okay. Kenny.
12 Thanks.
13 MR. OWEN: First comment, on the
14 C1363-05, the hot box method, can you give us
15 a quick summary, and tell us what that
16 involves, just a couple of minutes, because
17 I'm not that familiar with it.
18 MR. FITZ: Sure. So, you, for
19 example, if -- the Department will probably
20 specify some kind of size, that's what we were
21 just talking about, of a panel that actually
22 needs to be tested. So, for just,

1 hypothetically, let's say it's a 4 by 8 foot
2 panel. So, you take that 4 by 8 foot panel,
3 you place it in a chamber that on one side it
4 controls the temperature at say 75 degrees,
5 and on the other side it holds a temperature,
6 let's say 55 degrees, or 10 degrees, or minus
7 10 degrees, and then it actually measures the
8 heat flow through that entire composite panel
9 based on that temperature difference.
10 MR. OWEN: I think that is an
11 excellent way of doing it. That is the way it
12 should be done. And my second comment about
13 1303-09, it's the same as we said before. A
14 thin slice method is just not applicable to
15 urethane foam panels that have metal faces on
16 them, so we do not need to consider that at
17 all.
18 MR. BROOKMAN: Thank you. Yes,
19 Fred.
20 MR. MINELLI: I just want to add
21 one more. We're talking about 1303 again. It
22 specifically says spray foam with no barrier,

1 with no impermeable barrier. It does not
2 apply to these panels, whatsoever. I don't
3 know why we're still considering it.
4 MR. BROOKMAN: Okay. Thanks for
5 that clarity. What about this? Let's go to
6 the last point.
7 MS. LEGETT: Sure. There are also
8 some new door tests that DOE is considering.
9 In the NOPR, it proposed certain procedures
10 for testing doors. For testing the U-factor
11 of display doors, either using an NFRC rating,
12 if such rating existed, or a Window 5.2
13 methodology. And for a steady state
14 infiltrate, and Window 5.2 is a particular
15 computer program where you input certain
16 parameters of the glass door, and it gives you
17 some -- a U-factor.
18 The other procedure for testing
19 the steady state infiltration around doors,
20 the proposal was to use the gas tracer method
21 for each individual door. And given the
22 consideration of a few slides ago, where DOE

1 is considering allowing component
2 manufacturers, for example, door
3 manufacturers, to test their products and
4 submit that test data to the assembler, DOE is
5 considering these other tests. For the U-
6 factor of doors, a particular NFRC procedure.
7 NFRC is the National Fenestration Rating
8 Council. And for steady state infiltration
9 around doors, another NFRC test procedure that
10 references an ASTM standard, E283-04, which
11 determines rate of air leakage through
12 windows, walls, and doors under specified
13 pressure differences.
14 And we request comment on these
15 test procedures, particularly on whether you
16 think that they're good test procedures,
17 whether there's any undue burden associated
18 with them, and whether -- I don't know if
19 there are any door manufacturers here, but
20 whether door manufacturers might be willing to
21 complete these tests themselves, and submit
22 that test data.

1 MR. FITZ: Can I just add one more
2 thing? ASTM 283 was a recommended test
3 procedure suggested by manufacturers, and
4 other stakeholders during the NOPR public
5 meeting.
6 MR. BROOKMAN: Thank you. I recall
7 the discussion surrounding doors. Yes. So,
8 comments on this thing that the Department is
9 considering? Fred, go ahead.
10 MR. MINELLI: Fred Minelli. I
11 just wanted to verify that this only applies
12 to glass reach-in doors. Right? Is that what
13 we're talking about here?
14 MS. LEGETT: Which part of it, or
15 both parts?
16 MR. MINELLI: The entire door
17 test.
18 MS. LEGETT: Right. These would
19 be for both display, and non-display doors.
20 MR. BROOKMAN: What about the
21 infiltration around the door?
22 MS. LEGETT: Right, both.

1 MR. MINELLI: You're talking about
2 a walk-through -
3 MS. LEGETT: Either one.
4 MR. FITZ: Yes, a non-glass door.
5 MR. MINELLI: That are
6 specifically designed with wiper gaskets so
7 that they'll allow pressurized air to move in
8 and out, so what good is the test?
9 MR. FITZ: I mean, glass doors are
10 also designed to minimize infiltration.
11 MR. MINELLI: Right, but they're
12 not designed with wiper gaskets to allow
13 pressurized air to move, so I'm just saying if
14 the test is designed for glass doors with
15 fixed gasket four sides, it is not designed
16 for walk-through doors with wiper gaskets on
17 the bottom, because there's nothing to stop
18 the air flow, so what are you testing?
19 MR. BROOKMAN: Go ahead, Charlie.
20 MR. STEPHENS: Charlie Stephens.
21 It'll actually test that all right. The
22 pressure differences that are used in most

1 cases are not large enough to be moving that
2 gasket around. But the fact is a wiper gasket
3 like that does leak some air. It will just
4 simply measure how much it leaks, and give you
5 a rating for the door.
6 MR. BROOKMAN: As closed.
7 MR. STEPHENS: When it's closed.
8 MR. BROOKMAN: Yes.
9 MR. STEPHENS: Exactly. I mean,
10 it won't be as good as, perhaps, a glass door
11 in terms of air leakage that's sealed all the
12 way around, but it at least tells you what its
13 rating is, and what its normal rate of air
14 leakage would be under those conditions. And
15 you take the pressure differential, and you
16 can calculate what it would be at any pressure
17 differential that you might agree is the right
18 pressure differential once you have the test
19 data. So, it's a valid test, but it will
20 definitely, you're right, give you a different
21 rating than it would for, say, a glass door.
22 MR. BROOKMAN: Jon.

1 MR. McHUGH: So, I'm supportive of
2 these two methods, but, in addition, I'd like
3 to see a labeling program, such as NFRC has,
4 so that we start labeling the various
5 components, the walls, the doors, the glass
6 doors, et cetera.
7 MR. BROOKMAN: Okay. Thanks for
8 that. I want to take final comments on
9 perhaps these last two slides, 105 and 106,
10 see if anything else comes out. It seemed to
11 me as though the discussion surrounding heat
12 conduction through structural members, 105,
13 sounds pretty complete to me. I want to make
14 sure 106 is also complete. Yes.
15 MR. LEWIS: One thing, Doug, that
16 was brought out at the March meeting, the air
17 infiltration under the sweep gasket of the
18 walk-in doors infinitesimal compared to every
19 time you open that door, so we'll spend a lot
20 of money to find that out, or some amount of
21 money. I'm not sure of the relevancy of it,
22 as was stated back then. It didn't pass

1 Kenny's smell test in March, I don't think it
2 does in May.
3 MR. BROOKMAN: Okay. Thank you.
4 Do you have any other questions you wish to
5 raise?
6 MS. LEGETT: That's it.
7 MR. BROOKMAN: That's it. As we
8 promised this morning first thing, now is an
9 opportunity for anybody to make additional
10 comments, particularly issues that have not
11 yet been covered sufficiently, because we are
12 moving towards closure of this meeting. Yes,
13 Jim.
14 MR. PERRY: Jim Perry, Crown
15 Tonka. I think most of us manufacturers
16 appreciate the opportunity to participate, and
17 be heard, and get our thoughts and ideas
18 incorporated in this. Not necessarily are we
19 the best at checking the website periodically
20 to make sure that we have knowledge of
21 upcoming festivities. Is there any other way
22 that we might be able to get on a short list

1 of notification, or something like that?
2 MR. LLENZA: Charles Llenza,
3 Department of Energy. We maintain a database,
4 and part of what we do is that little business
5 card thing that's going around, we make sure
6 that those people, at a minimum, are on that
7 database of stakeholders. So, if you feel
8 that you may not be there or that we have the
9 incorrect information, send me a quick email,
10 and I'll make sure that that -- with your
11 digits, your information for you to be
12 contact, and I'll make sure that that gets on
13 the database.
14 MR. BROOKMAN: It's not automatic?
15 MR. LLENZA: Right. The other
16 thing to look for is the website, that's one
17 place. The notification the Department does
18 also, but also anything that comes out of the
19 Federal Register, which is the formal
20 notification process. And I know that's a
21 little more complicated.
22 MR. BROOKMAN: Charles, if they've

1 registered for this meeting, if their name is
2 on that, will they receive automatic
3 notification of upcoming meetings?
4 MR. LLENZA: Well, the Department
5 doesn't notify automatically. We do that as a
6 courtesy. In my case, I think being proactive
7 as opposed to passive is a better approach for
8 this rule we're making, so I usually notify.
9 MR. PERRY: We seem to get this
10 verification of email address email.
11 MR. LLENZA: Right.
12 MR. PERRY: And then nothing.
13 MR. LLENZA: For this particular
14 meeting, since the notice went out with plenty
15 of notice, I did not -- and I'm personally
16 responsible. I did not send any courtesy
17 notification out via email, so there was none.
18 But what I got was a lot of questions from
19 people, why didn't I get personally notified?
20 And it's because we usually don't do that,
21 and I have to take the mea culpa that I did
22 not notify everybody thinking that everybody

1 had sufficient time to pick up the information
2 from the Federal Register, or the website.
3 But because we have substantial amount of
4 things to do with this, I'll make sure that
5 I'm constantly using our notification
6 stakeholders lists with anything in particular
7 that might come up, in order to inform the
8 industry that we're working on things.
9 MR. PERRY: We would appreciate
10 that. And just one more follow-up question.
11 Is there any more meetings anticipated the
12 balance of the year?
13 MR. LLENZA: At this moment in
14 time, I can't really talk about anything that
15 I can think of, other than we will -- we have
16 talked about visiting ASHRAE, some test
17 procedure issues for CRE, but we also we're
18 looking into potentially maybe, since some of
19 the same stakeholders that are at this meeting
20 were at the meeting yesterday, maybe that
21 would be a good opportunity for us to talk
22 some technical issues at ASHRAE, and that's

1 something I need to explore with the team
2 since it came up in the last couple of days.
3 That would be at the end of June, that's my
4 understanding. Right?
5 And in terms of the manufacturer
6 interviews, or any other kind of interviews
7 that the team might have on a technical level,
8 that would probably be done on a one-on-one
9 basis.
10 The other thing that I'm exploring
11 based on some recommendations that I heard
12 across the table here would be to have some
13 kind of technical meeting that would not be
14 part of the -- necessarily, part of the
15 regulatory part of this, the standards
16 process, but a technical meeting to discuss
17 maybe some of the technical issues that we've
18 had back and forth. And one of the things
19 could be the insulation issues that we have.
20 And I'm certainly open to suggestions, and I
21 have to check with GC, because I don't want to
22 get in trouble here. We have issues with

1 disclosure. But we are not -- we would also
2 be amenable to -- if we had to put a
3 notification out into the Federal Register to
4 have this meeting, we would do that to comply
5 with our legal requirements.
6 MR. BROOKMAN: An opportunity for
7 closing remarks, issues that need to be raised
8 that haven't been raised so far. Jon.
9 MR. McHUGH: So, this is somewhat
10 new, but as I mentioned before, California is
11 looking at holding a Title 20 proceeding on
12 walk-ins, as is allowed by EISA, and I'd like
13 to invite any and all people who are here to
14 participate in those proceedings. And related
15 to that, the likely outcome is additional
16 prescriptive requirements in the California
17 standard. I'd like to hear DOE's opinion, if
18 the sort of anti-backsliding sort of
19 provisions that were held up by the Supreme
20 Court would apply to a California standard for
21 walk-ins.
22 MR. KIDO: I'm not going to

1 comment on that right now.

2 MR. BROOKMAN: Thank you. Michael

3 Kido. Thank you. Final comments? So, for my

4 part, I thank all of you. This was very, very

5 constructive. I really appreciate the level

6 of disclosure, the level of candor, and back

7 to Charles Llenza for closing remarks.

8 MR. LLENZA: Again, thank you for

9 all attending this meeting today. I think

10 it's been very informative to the Department.

11 We have a lot to do still, but I think, at

12 this point, I think -- I hope that the

13 stakeholders are a little bit more comfortable

14 with us and this process. And, again, we are

15 working pretty hard here to try to make sure

16 we get this right. We still have a long way

17 to go, and we appreciate your patience up to

18 this point. And we just request a little bit

19 more patience here as we go through in the

20 next couple of months trying to get all the

21 different comments in, and all the issues

22 resolved. So, thank you for attending.

1 Once again, I just want to remind
2 you, the formal comment period ends on the
th
3 28 . I don't want to commit to, necessarily,
4 saying send your comments in a month from now,
5 but if we receive comments within -- a few
6 days after that comment period ending, we
7 should be fine. So, thank you for coming.
8 MR. BROOKMAN: Safe travels.
9 (Whereupon, the proceedings went
10 off the record at 4:46:19 p.m.)
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CERTIFICATE

This is to certify that the foregoing transcript

in the matter of: Energy Conservation Standards

Before: Douglas Brookman

Date: May 19, 2010

Place: Washington, D.C.

represents the full and complete proceedings of the aforementioned matter, as reported and reduced to typewriting.

Benjamin Crane

Benjamin Crane