

U.S. DEPARTMENT OF ENERGY  
+ + + + +  
ENERGY CONSERVATION STANDARDS FOR  
COMMERCIAL AND INDUSTRIAL PUMPS

+ + + + +

PUBLIC MEETING

+ + + + +

WEDNESDAY, FEBRUARY 20, 2013

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

PRESENT

DOUG BROOKMAN, Meeting Facilitator, Public  
Solutions, Inc.

JOHN CYMBALSKY, Department of Energy

BETSY KOHL, Department of Energy

CHARLES LLENZA, Department of Energy

ALSO PRESENT

ROBERT ASDAL, Hydraulic Institute

ALEX BOESENBERG, National Electrical  
Manufacturers Association

ROB BOTELER, Nidec Motor Corporation

DONALD BRUNDAGE, Southern Company

MARK BUBLITZ, The New York Blower Company

KITT BUTLER, Advanced Energy

GREG CASE, Pump Design, Development &  
Diagnostics

JORDAN DORIA, Ingersoll Rand

TOM ECKMAN, Northwest Power and Conservation  
Council

NEAL ELLIOTT, American Council for an Energy-

Efficient Economy

RANDAL FERMAN, Ekwestrel Corp  
GARY FERNSTROM, California Investor Owned  
Utilities  
AARON GOTHAM, Greenheck  
MARK HANDZEL, Xylem, Inc  
DAN HARTLEIN, Twin City Fan Companies, Ltd.  
JOHN HAZEN WHITE, Jr., Taco, Inc.  
SARAH HOWELL, Grundfos  
ALBERT HUBER, Patterson Pump Company  
MICHAEL IVANOVICH, Air Movement and Control  
Association International  
SANAEE IYAMA, Lawrence Berkeley National  
Laboratory  
TIMOTHY KUSKI, Greenheck  
CHRISTOPHER LAU, Navigant Consulting  
ALEX LEKOV, Lawrence Berkeley National  
Laboratory  
JON LEMMOND, Air-Conditioning, Heating, and  
Refrigeration Institute  
BRUCE LUNG, Alliance to Save Energy  
JANE LUXTON, Pepper Hamilton LLP  
JOANNA MAUER, Appliance Standards Awareness  
Project  
DAVID MCKINSTRY, Colfax Fluid Handling  
RODNEY MRKVICKA, Smith & Loveless, Inc.  
KEN NAPOLITANO, Xylem, Inc.  
LAURA PETRILLO-GROH, Air-conditioning,  
Heating, and Refrigeration Institute  
CALLIE REIS, Navigant Consulting  
MICHAEL RIVEST, Navigant Consulting  
GREGG ROMANYSHYN, Hydraulic Institute  
ALLISON ROSE, Artemis Strategies  
GREG ROSENQUIST, Lawrence Berkeley National  
Laboratory  
STEVE ROSENSTOCK, Edison Electric Institute  
STEVE SCHMITZ, Grundfos  
ARNOLD SDANO, Pentair  
WADE SMITH, Air movement and Control  
Association International  
LOUIS STARR, Northwest Energy Efficiency  
Alliance  
MARK STEVENS, Air Movement and Control  
Association International

JOHN STEVENS-GARMON

GREG TOWSLEY, Grundfos

DANIEL TROMBLEY, American Council for an  
Energy-Efficient Economy

BOB VALBRACHT, Loren Cook Company

MEG WALTNER, Natural Resources Defense Council

DANIEL WEINTRAUB, Navigant Consulting, Inc.

SARAH WIDDER, Pacific Northwest National  
Laboratory

ALISON WILLIAMS, Lawrence Berkeley National  
Laboratory

DAVID WINIARSKI, Pacific Northwest National  
Laboratory

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Charles Llenza

Department of Energy

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

9:07 a.m.

MR. BROOKMAN: Good morning,  
everyone. Welcome.

This is the U.S. Department of  
Energy's public meeting on Energy Conservation  
Standards for commercial and industrial pumps.  
Today is Wednesday, February 20th, 2013, here  
at the Department of Energy, the Forrestal  
Building, in Washington, D.C.

My name is Doug Brookman from  
Public Solutions in Baltimore.

Good to see you here this morning.  
Thanks for being here on time. We have a full  
day ahead of us.

We are going to start this morning  
with welcoming remarks from John Cymbalsky.

MR. CYMBALSKY: Thanks, Doug.

I am John Cymbalsky. I am the  
Program Manager for Appliance Standards and  
Building Codes.

I want to be the first to welcome

1 you here to our framework meeting on pumps.

2 I note in the room we have a lot of  
3 first-timers to the regulatory process. So,  
4 hopefully, this isn't too scary an experience.  
5 We are going to try to take things slow. We  
6 have a lot of material to cover. Much of it  
7 is, in my opinion, a little dense, but let's  
8 take our time and get through it.

9 I also want to plant a little seed,  
10 prime the pump, however you want to say it,  
11 but we have a meeting next Tuesday, so a week  
12 from yesterday, for the new Advisory Committee  
13 that we formed here at the Department. It  
14 would be nice if a few of the pumps guys  
15 showed up, guys or gals, whichever it might  
16 be, to the meeting. I think pumps might be an  
17 area to explore for a negotiated rulemaking,  
18 and the ASRAC Committee will be tackling  
19 issues in terms of forming working groups to  
20 do negotiated rulemakings. We definitely  
21 think pumps might be a product to explore in  
22 that frame of mind.

1                   So, with that, let me send it back  
2 to Doug, and let's have a productive meeting.

3                   MR. BROOKMAN: Thank you.

4                   It is our tradition here to start  
5 with doing introductions around the room, and  
6 it gives you a chance, also, to get in the  
7 habit of turning these microphones on and off.

8                   So, I would like to start to my  
9 immediate left. If you would say your name  
10 and organizational affiliation, and we will  
11 just proceed around the table here. Good job.

12                  MR. HANDZEL: I'm Mark Handzel. I  
13 am with Xylem, Incorporated.

14                  MR. BROOKMAN: Okay.

15                  MR. SCHMITZ: Good morning.

16                                 Steve Schmitz with Grundfos.

17                  MR. ROSENSTOCK: Steve Rosenstock,  
18 Edison Electric Institute.

19                  MR. NAPOLITANO: Ken Napolitano  
20 with Xylem, Incorporated.

21                  MR. HUBER: Albert Huber, Patterson  
22 Pump Company.

1 MR. ELLIOTT: Neal Elliott, ACEEE.

2 MS. MAUER: Joanna Mauer, Appliance  
3 Standards Awareness Project.

4 MR. BOESENBERG: Alex Boesenberg,  
5 National Electrical Manufacturers Association.

6 MR. FERNSTROM: Gary Fernstrom,  
7 representing the California Investor Owned  
8 Utilities, which would be PG&E, the Southern  
9 California Edison Company, San Diego Gas and  
10 Electric, and the Southern California Gas  
11 Company.

12 MR. ECKMAN: Tom Eckman, Northwest  
13 Power and Conservation Council.

14 MR. ASDAL: Good morning.

15 Bob Asdal, Executive Director, from  
16 the Hydraulic Institute.

17 MS. WALTNER: Meg Waltner, Natural  
18 Resources Defense Council.

19 MR. LUNG: Bruce Lung, Alliance to  
20 Save Energy.

21 MS. KOHL: Elizabeth Kohl,  
22 Department of Energy General Counsel's Office.

1 MR. LLENZA: Charles Llenza, the  
2 Project Manager for the rulemaking.

3 MR. CYMBALSKY: John Cymbalsky,  
4 DOE.

5 MR. BROOKMAN: Please stand.

6 MR. WEINTRAUB: Daniel Weintraub,  
7 Navigant Consulting, Inc.

8 MS. WIDDER: Sarah Widder, Pacific  
9 Northwest National Laboratory.

10 MS. WILLIAMS: Alison Williams,  
11 Lawrence Berkeley National Laboratory.

12 MR. ROSENQUIST: Greg Rosenquist,  
13 Lawrence Berkeley National Laboratory.

14 MR. RIVEST: Mike Rivest, Navigant  
15 Consulting.

16 MR. WINIARSKI: David Winiarski,  
17 Pacific Northwest National Laboratory.

18 MR. BROOKMAN: We are going to do  
19 the same thing in the back of the room. So,  
20 you can stand or sit, whatever, but speak  
21 loudly. And we will start in the front.

22 (Laughter.)



1           The individuals at the table, we  
2 captured all that on the record. And since  
3 everybody is signed in, we will have a  
4 complete listing of who has attended. But, as  
5 a matter of courtesy, I will start with you.  
6 Please say your name and organizational  
7 affiliation.

8           (Off-microphone introductions.)

9           MR. BROOKMAN: Okay. Thank you.

10           So, thanks to all of you again for  
11 being here and for getting us a good start on  
12 the day already.

13           All of you received a packet of  
14 information as you checked in this morning,  
15 both an agenda and a packet of PowerPoint  
16 slides. I am going to run through the agenda  
17 briefly.

18           Immediately following this agenda  
19 review, there is an opportunity for anybody  
20 that wishes to do so to make brief summary  
21 remarks about issues that are important to  
22 you, as a precursor, as an early start to the

1 content that will be presented in these  
2 PowerPoint slides as we go on through the day.

3 And immediately following those  
4 summary remarks, we will have an introduction  
5 and rulemaking process overview by Charles  
6 Llenza, as reflected in your agenda, if you  
7 are looking at it.

8 Going from there, the legislative  
9 history and scope of coverage.

10 We will take a break mid-morning  
11 about 10:30 or so.

12 Following that, regulatory regimes  
13 and metrics.

14 Immediately following that, test  
15 procedure.

16 We will have lunch round about  
17 noon, whenever we get there.

18 And returning from lunch, market  
19 and technology assessment; screening analysis.

20 Following that, engineering  
21 analysis; manufacturer impact analysis.

22 Then, markups analysis; energy use

1 analysis.

2 We will take a break mid-afternoon.

3 And then, immediately following the  
4 break, life-cycle costs and payback period  
5 analysis; shipments analysis; national impact  
6 analysis.

7 Finally, NOPR analyses.

8 And then, closing out the  
9 afternoon, next steps and closing remarks.

10 At the end of the day today, there  
11 is another opportunity for anybody that wants  
12 to do so to make comments, things that have  
13 been missed, things that haven't been covered  
14 efficiently or effectively. So, there is yet  
15 another opportunity to do that.

16 Questions and comments on the  
17 agenda?

18 (No response.)

19 There is a lot of material here,  
20 and some of it is quite new to all of you. We  
21 are going to try our very best to make sure  
22 that everybody stays with us. And if you have

1 questions as we are going along, please let me  
2 know and we will try to make sure they get  
3 answered as we go.

4 I would ask for your consideration.  
5 As you see up here on the flipchart, please  
6 speak one at a time. Please say your name for  
7 the record each time you speak. You can say  
8 your organization or affiliation, if you want;  
9 just your name is probably sufficient.

10 There will be a complete transcript  
11 of this meeting available, and we will talk  
12 about how you can access it.

13 I am going to be recognizing  
14 individuals to speak by name as best I can.  
15 So, there will be a queue of individuals.

16 I also wish to encourage comment  
17 back and forth between individuals. Sometimes  
18 that follow-on is very, very useful for the  
19 Department as it considers this information.

20 If you would keep the focus here,  
21 please turn your cell phones on silent and  
22 limit sidebar conversations.

1                   Please make sure to turn these  
2 microphones on and off each time you speak.  
3 You will get in the habit shortly.

4                   Please be concise.     Share the  
5 airtime. There is a lot of content here. We  
6 will try to make this meeting as effective and  
7 efficient as possible.

8                   And for webinar participants, how  
9 many do we have joining us via the web? Ten.  
10 Welcome to the webinar participants.     The  
11 Department is trying very hard to make these  
12 meetings accessible and successful for the web  
13 participants.

14                  Please keep your telephones on  
15 mute, so we don't have feedback here in the  
16 room. And if you wish to speak, we are going  
17 to try to get you that chance. Please raise  
18 your hand via the software that you are  
19 working in, and our web mistress will pass a  
20 note to me, and we will insert you in the  
21 conversation.

22                                           Questions and comments?

1                   MR. LLENZA:  Also, I just want to  
2                   add there are microphones in the back for the  
3                   parties that are sitting in the back to come  
4                   up to the microphone.  We would appreciate  
5                   using the microphones, so you can provide your  
6                   comments --

7                   MR. BROOKMAN:  Okay.

8                   MR. LLENZA:  -- and questions.

9                   MR. BROOKMAN:  So, then, let's  
10                  begin.  We have done the agenda review.  We  
11                  have reviewed norms.

12                  Let's start off, then, with brief  
13                  summary remarks by anyone present who wishes  
14                  to talk about issues that are important to him  
15                  or her.

16                  Who would like to start?  Bob?  
17                  Please say your name for the record.

18                  MR. ASDAL:  Thank you very much.

19                  Bob Asdal.  I am Executive Director  
20                  of the Hydraulic Institute.  On behalf of our  
21                  100 members, I would like to thank the  
22                  Department for providing us this opportunity

1 to meet and discuss the framework document and  
2 beginning the process of a pump efficiency  
3 rulemaking.

4 The Hydraulic Institute,  
5 established in 1917, represents the pump  
6 manufacturing industry in North America. We  
7 are a recognized authority with regard to  
8 pumps and pumping systems, and are an ANSI-  
9 accredited standards-developing organization.

10 HI represents a total of 105  
11 members that are pump manufacturers and the  
12 leading suppliers to the industry. We have  
13 historically led the pump industry in its  
14 approach to energy savings associated with  
15 pump systems optimization consistent with the  
16 strategic goals of the United States  
17 Department of Energy, and particularly the  
18 Energy Efficiency and Renewable Energy Group  
19 within the Department.

20 And we come together today to share  
21 our members' collective knowledge with the  
22 Department and an effort to create a pump

1 efficiency rulemaking that considers the needs  
2 of all parties.

3 In preparation for the meeting, we  
4 had read and, of course, discussed the  
5 framework document in great detail. The  
6 members have focused on several of the  
7 framework's key provisions and sections to  
8 discuss options, offer alternatives, and to  
9 work with the Department to deliver the  
10 greatest energy savings that are  
11 technologically-feasible and commercially- and  
12 economically-justified.

13 So, today we appreciate the  
14 recognition by the Department of the  
15 complexity of this issue for the pump  
16 industry. And the members that are present  
17 here today, all of whom have introduced  
18 themselves, will explain our proposed product  
19 classifications to be covered, concepts  
20 associated with a globally-harmonized Minimum  
21 Efficiency Index, or MEI, as well as our  
22 recommendations for the adoption of a modified



1 version of existing ANSI HI test standards  
2 that could lead, also, to an HI-led labeling  
3 scheme and an HI-led pump test lab  
4 certification program.

5 The greatest energy savings  
6 potential, as reported in my letters to the  
7 Department last year on July 11th and  
8 September 16th, deals with what we call an  
9 extended product approach with an Energy  
10 Efficiency Index, or EEI, for a combination of  
11 products, such as a pump, motor, variable  
12 speed drive, and control and feedback systems.

13 And during today's meeting, we  
14 expect to have many questions for the  
15 Department and DOE consultants that will help  
16 us move through this rulemaking process. We  
17 will make every attempt to provide available  
18 supporting metrics and standards that will be  
19 discussed during today's session or by,  
20 certainly, the May 2nd deadline.

21 So, we remain keenly aware of the  
22 members, of the needs of pump users in the

1 rulemaking process. We have established  
2 standards covering pumps, pump products,  
3 applications, installation, operation and  
4 maintenance, and applications in testing that  
5 are used across a wide selection of American  
6 industry and commercial establishments.

7 HI has provided DOE with  
8 significant input on the Institute's standards  
9 as the basis of our recommendation. We have  
10 also partnered over the last year and a half  
11 with the leading energy-efficiency advocates,  
12 led by the Appliance Standards Awareness  
13 Project, in an effort to develop a consensus  
14 that best serves all parties.

15 We would like to acknowledge the  
16 energy-efficiency advocates present today, and  
17 confirm that we stand ready to continue to  
18 jointly work through this complex rulemaking  
19 process that offers significant energy savings  
20 potential to the country. And the members and  
21 HI look forward to a productive day discussing  
22 this issue with the Department.

1 Thank you.

2 MR. BROOKMAN: Thank you.

3 Additional brief remarks here at  
4 the outset?

5 MR. HUBER: My name is Albert  
6 Huber. I am President of Patterson Pump  
7 Company, and a member of the Board of  
8 Directors of the Hydraulic Institute.

9 The Hydraulic Institute and its  
10 members are committed to improved energy usage  
11 by pumps and pump systems to deliver optimum  
12 energy savings through a balanced approach,  
13 considering the impact to the consumer, the  
14 industry, and the U.S. economy.

15 As the Department of Energy is  
16 aware, HI has been actively working with the  
17 energy efficiency NGO community in this  
18 process. The Hydraulic Institute, along with  
19 the EE NGOs, recommended to the Department of  
20 Energy a two-pronged approach to reduce energy  
21 consumption in the United States related to  
22 pumping.

1                   These two approaches are extended  
2 product, which brings much greater reduction  
3 in energy usage than pump efficiency alone,  
4 and Minimum Efficiency Index, which eliminates  
5 from the marketplace inefficient pumps. They  
6 are not presented as options, but two methods  
7 which should be utilized together in order to  
8 achieve the desired goal of significant energy  
9 reduction.

10                   The following is a summary of our  
11 recommended scope:

12                   The Hydraulic Institute advocates  
13 the pursuit of pump products that will lead to  
14 the reduction of --

15                   MR. BROOKMAN: Albert, pardon me.  
16 Pardon me for interrupting.

17                   MR. HUBER: Sure.

18                   MR.           BROOKMAN:                   Your  
19 recommendations, your content, will it not be  
20 covered quite sufficiently by the PowerPoint  
21 slides that you have had a chance to look at?

22                   MR. HUBER: Well, not completely,

1 no.

2 MR. BROOKMAN: Okay. I am wanting  
3 to provide an opportunity for individuals to  
4 raise important issues and, also, I am wanting  
5 to make sure that the content fits in the flow  
6 of the meeting, because it will be easier for  
7 the Department and everyone else to comment  
8 and stay with it --

9 MR. HUBER: Sure.

10 MR. BROOKMAN: -- if you follow my  
11 logic here.

12 MR. HUBER: I follow.

13 MR. BROOKMAN: I don't want to  
14 diminish your capacity to speak about  
15 important issues. So, you tell me what you  
16 want to do here.

17 MR. HUBER: Well, we can wait.

18 MR. BROOKMAN: You could wait?

19 MR. HUBER: Sure.

20 MR. BROOKMAN: Okay. I am eager --  
21 there is a lot of content here, and I want to  
22 get to it as efficiently as possible. But I

1 don't want to diminish your capacity to say  
2 something --

3 MR. HUBER: As long as we can say  
4 it at a later time, I am happy.

5 MR. LLENZA: This is also Charles  
6 Llenza from the Department.

7 You are more than welcome to enter  
8 statements into the record. So, if you have  
9 detailed statements, we are more than willing  
10 to take your statements.

11 MR. BROOKMAN: We can take that  
12 written statement and just enter it into the  
13 record.

14 MR. HUBER: That's fine.

15 MR. LLENZA: It goes into the  
16 docket.

17 MR. BROOKMAN: Okay. So, I  
18 probably should have been more clear at the  
19 outset about the purpose of this introductory  
20 overview statement. But thank you for your  
21 consideration.

22 MR. HUBER: Sure.

1 MR. BROOKMAN: Other brief  
2 statements here at the outset?

3 Gary Fernstrom.

4 MR. FERNSTROM: Gary Fernstrom  
5 speaking on behalf of the California Investor  
6 Owned Utilities.

7 We would like to express our  
8 appreciation to the Hydraulic Institute for  
9 inviting us and the other advocates to work  
10 with them over the past year in preparation  
11 for this process.

12 MR. BROOKMAN: Thank you.

13 Alex Boesenberg, do you wish to --  
14 I thought you said.

15 Joanna Mauer.

16 MS. MAUER: Thanks.

17 First, we would like to thank DOE  
18 for the opportunity to participate in today's  
19 meeting. Efficiency standards for pumps  
20 represent a significant energy savings  
21 opportunity, and we are pleased to see that  
22 DOE has already put significant effort into

1 developing a foundation to conduct the  
2 analyses for this important rulemaking.

3 Over the past year, efficiency  
4 advocates, including ASAP, ACEEE, Alliance to  
5 Save Energy, Earth Justice, NEEA, NRDC, and  
6 PG&E, have been working with HI to try to work  
7 towards a consensus recommendation regarding  
8 pump efficiency standards.

9 As we have indicated to DOE, our  
10 discussions have focused on clean water,  
11 commodity-type pumps. And we generally agree  
12 with HI's recommended scope of coverage.

13 However, here at the outset, we  
14 wanted to highlight two additional pump types  
15 that we think merit consideration. The first  
16 is the category that DOE has referred to as  
17 double-suction pumps. Our understanding is  
18 that these are typically used for clean water  
19 applications and are commodity-type pumps, and  
20 may, therefore, be good candidates for  
21 coverage.

22 The second category is circulator



1 pumps, including fractional horsepower  
2 circulators. As PG&E will explain in more  
3 detail, we believe that there is a significant  
4 energy savings opportunity in establishing  
5 standards for circulators both in terms of  
6 per-unit savings as well as national energy  
7 savings.

8 Finally, we are pleased to see that  
9 DOE is considering ways to capture additional  
10 energy savings by including categories of  
11 pumps sold with motors and/or VSDs. I think a  
12 goal that we all share is to increase the  
13 market penetration of pumps sold with VSDs,  
14 which has the potential to achieve very large  
15 energy savings.

16 As we will explain in more detail  
17 later on, we believe that one of the potential  
18 regulatory options presented in the framework  
19 document, Option 3, may provide a mechanism to  
20 help achieve the goal of greater market  
21 penetration of pumps sold with VSDs.

22 We look forward to participating in

1 today's public meeting and to working with DOE  
2 and continuing to work with HI as this  
3 rulemaking moves forward.

4 Thank you.

5 MR. BROOKMAN: Other comments here  
6 at the outset?

7 Albert, I am looking at you. Do  
8 you wish to read that into the record? Okay.  
9 Okay.

10 Then, let's proceed, then, with the  
11 content and to Charles. These PowerPoint  
12 slides, we will be referring to these  
13 specifically as we go through the day, and you  
14 will get a chance to see both what we have  
15 covered and what lies ahead.

16 Charles Llenza.

17 MR. LLENZA: Okay. So, I welcome  
18 you to the meeting here at the Department of  
19 Energy.

20 Basically, the purpose of our  
21 framework document public meeting is to  
22 present our preliminary analytical approach of

1        what we think the rulemaking should encompass  
2        and, also, to inform the interested parties of  
3        the beginning of the rulemaking and the  
4        process.

5                    It also provides a forum for  
6        discussion here at the Department, and it  
7        provides a process for which the stakeholders  
8        can provide comments to the Department of  
9        Energy.

10                   So, we encourage everybody here to  
11        submit data, information, your comments. And  
12        so, one of the important things you see here  
13        are these little boxes in green. These are  
14        the items that the Department is most  
15        interested in receiving comments on.

16                   So, through the presentation, we  
17        will highlight the discussion of these comment  
18        boxes. There is a comprehensive list of  
19        questions in your framework document. We have  
20        not provided them all in this presentation.  
21        So there are additional questions in the  
22        framework document. Please do not forget to

1 answer those that we don't necessarily  
2 specifically highlight at this meeting today.

3 These item numbers correspond to  
4 those in the framework document, and we  
5 welcome your comments to those specific issues  
6 as we go through this presentation.

7 We have a specific format we would  
8 like to have parties to use while submitting  
9 comments. Docket and RIN number would be  
10 mostly appreciated. We have set up an email  
11 address for you to provide comments to the  
12 Department. It is the preferred method of  
13 delivery for these comments.

14 In addition to that, we were made  
15 aware of the complexity and time elements  
16 involved in reviewing what the Department  
17 provided in the framework. So, we proactively  
18 extended the comment period to May 2nd, 2013,  
19 which is a considerable amount of time.  
20 Hopefully, that would be sufficient time for  
21 all parties to make their comments known to  
22 the Department.

1           The rulemaking process. The Energy  
2 Policy and Conservation Act, EPCA, which is  
3 Public Law 94-163, established the Energy  
4 Conservation Program here at the Department of  
5 Energy for certain commercial and industrial  
6 equipment.

7           Part C of Title III of EPCA  
8 includes pumps as covered equipment and  
9 authorizes DOE to issue standards, test  
10 procedures, and labeling requirements, 42 USC  
11 6311(1)(A). That is just a reference to where  
12 the Code is, if anybody is interested.

13           In addition to that, the primary  
14 direction that the Department of Energy  
15 receives via the Energy Policy and  
16 Conservation Act, EPCA, is to develop new and  
17 amended standards designed to achieve the  
18 maximum improvement in energy efficiency that  
19 is technologically-feasible and economically-  
20 justified. That is an important key element  
21 here in terms of the development of standards  
22 for the Department, and we think we have a

1 good rulemaking process which provides a  
2 schedule and time for analysis to do this.

3 Okay. EPCA also directed the  
4 Department of Energy to consider seven factors  
5 for the analysis. As you can see, the EPCA  
6 requirements are in the first column, and the  
7 corresponding DOE analysis is on the  
8 corresponding column.

9 Our process and schedule is  
10 developed in such a way, so that we can make  
11 the maximum use of developing the DOE analysis  
12 over the three-year time period for the  
13 rulemaking.

14 So, here is our standard test  
15 procedure and standard rulemaking timelines.  
16 As you can see, we are at the framework  
17 meeting, which is this first chevron. We  
18 will, then, continue through a preliminary  
19 analysis period. Then there is the NOPR  
20 analysis period which is Notice of Proposed  
21 Rulemaking, which is a draft of the rule that  
22 we are proposing. And finally we have a final

1 rule, hopefully, within a three-year  
2 timeframe.

3 Subsequently, we have a test  
4 procedure process that is intimately linked to  
5 our Energy Conservation Standard process, and  
6 that usually is about half the timeframe  
7 involved in developing. We have some  
8 flexibility on the movement of how soon or how  
9 fast we would like to get the test procedures  
10 for the Department out, but what I want to  
11 point out about these chevrons is the test  
12 procedures moves within the availability  
13 timeframe of the rulemaking because there are  
14 some requirements that we are mandated to  
15 accomplish in terms of having that test  
16 procedure finalized and published in The  
17 Federal Register in order for the Department  
18 to make use of that test procedure to  
19 establish Energy Conservation Standards.

20 I have provided a link at the  
21 bottom here for everybody to go to, if those  
22 parties that are interested in more detail on

1 our rulemaking process. So, this is just a  
2 quick-and-dirty summary of our process  
3 timeframe.

4 I am going to go through a little  
5 bit of what each one of these steps involves  
6 today. I am not going to focus on the test  
7 procedure necessarily, but mostly on the  
8 Energy Conservation Standard.

9 So, today the framework provides an  
10 overview of the rulemaking process. We have,  
11 hopefully, provided you a good boilerplate as  
12 to what we see or where we see this rulemaking  
13 going for the Department of Energy. We  
14 provided some of our technical thoughts for  
15 the industry to review, and we also inviting  
16 comments on the proposed approach that the  
17 Department has issued. That was executed in  
18 The Federal Register framework notice that we  
19 published February 1st, 2013.

20 So, that is this process now. The  
21 next step in the energy conservation process  
22 would be the preliminary analysis. The



1 preliminary analysis, basically, would take  
2 the comments from the framework public  
3 meeting. We review those comments and we  
4 provide response in the documents that are  
5 provided at the preliminary analysis.

6 Each one of these steps would  
7 involve public meetings and issuing Federal  
8 Register documents with not only the comments  
9 to any of the previous questions that the  
10 stakeholders may have or assertions or  
11 technical direction that they wished the  
12 Department to follow, but also would provide  
13 further details on the analysis process the  
14 Department uses throughout, based on the seven  
15 factors, if you all remember that first slide  
16 I showed you back on EPCA.

17 So, as you can see, the listing of  
18 analysis that is provided at the preliminary  
19 here, it is basically engineering analysis,  
20 manufacturer and user markups, energy use  
21 profiles, consumer life-cycle costs, LCC and  
22 payback periods. We look at shipments, and

1 one of the important things to note about the  
2 shipments is we need to get the shipments  
3 right because the shipments determine how much  
4 of everything we are going to account for, and  
5 that is going to weigh-in in terms of what  
6 savings the Department thinks we can achieve.

7 There is additional analysis,  
8 national energy savings, and the NPV, Consumer  
9 Net Present Value. And then, there are some  
10 manufacturer impacts that we also try to  
11 provide.

12 So, that is the preliminary  
13 analysis. This is in a nutshell. There is a  
14 little bit more meat to this, but not to  
15 panic. Everything gets published in a  
16 document, and we go back to having a public  
17 meeting and having this similar process go  
18 through for the preliminary analysis.

19 The Department will, then, get  
20 comments back from the preliminary analysis  
21 and preliminary TSD, which will be provided in  
22 the preliminary analysis stage, and we will

1 continue fine-tuning the analysis the  
2 Department has presented at the preliminary  
3 analysis stage. And we will also weigh-in  
4 those impacts.

5 We will, then, go back and propose  
6 standard levels for public comment, which  
7 basically it is like a draft rule at that  
8 point. And it will be published in The  
9 Federal Register and submitted for comments.  
10 We will have another meeting about that  
11 particular phase where the stakeholders and  
12 everybody will have time to come back to the  
13 Department and tell us if we are on track.

14 And the goal, of course, of the  
15 Department is to have a final rule which would  
16 encompass any of the comments received for the  
17 draft notice, the Notice of Proposed  
18 Rulemaking. We will revise the analysis to  
19 make sure that the impacts to the standards  
20 and the way the impacts for the final rule are  
21 taken into account, based on stakeholders'  
22 comments. And, based on the DOE analysis and

1 our economic analysis, we will be providing  
2 standards that to be adopted in the final  
3 rule.

4 Of course, as you can see, we have  
5 plenty of time, and we are looking at a  
6 planned spring 2016 issuance of the rule.

7 Okay. So, I am just giving you an  
8 outline here of what the DOE plan is. Here is  
9 the schedule. This is the important slide.

10 We had a timeframe to accomplish  
11 this. We would like to do this in three  
12 years. Sooner would be better, but I know how  
13 this process goes and the complexity of things  
14 not necessary lends itself to this.

15 So we are at the framework public  
16 meeting. As you can see, that is the first  
17 box on the bottom of the slide. And that is  
18 after publishing the framework document. So,  
19 the next part of the process will be the test  
20 procedure NOPR document. And as you can see,  
21 this is not going to happen overnight. We are  
22 going to go back and look at your comments

1 that are provided by May 2nd, and we will be  
2 doing our review and analyses in addition to  
3 the test procedure requirements. The DOE Team  
4 will, then, be providing a Notice of Proposed  
5 Rulemaking based on not only what we have  
6 investigated through the rulemaking process,  
7 but, hopefully, comments that the stakeholders  
8 have provided us on testing and other  
9 requirements.

10 This will be followed by a public  
11 meeting, as you can see. That is planned for  
12 fall of 2014.

13 Subsequently, after the test  
14 procedure NOPR public meeting, we would also  
15 have close to a preliminary analysis document  
16 set up, hopefully, before the test procedure  
17 public meeting.

18 That would follow, by it's  
19 publication in The Federal Register and a  
20 public meeting subsequently. That is the  
21 third box on the bottom of the slide.

22 And then, both are in a parallel

1 process. They are separate rulemakings, but  
2 uniquely tied-in processes here, the test  
3 procedure process and the energy conservation  
4 standard process. We will finalize the test  
5 procedure and, of course, the primary purpose  
6 of the test procedure is to have the  
7 collection of data points that we need to  
8 measure to outline what we need to have  
9 collected in terms of data in order for us to  
10 establish an energy conservation standard.  
11 So, that is why the Test Procedure rule will  
12 get published as a final rule before the  
13 Energy Conservation Standard is published.  
14 These requirements will be rolled at some  
15 point into the NOPR of the Energy Conservation  
16 Standard, and then, into the final rule.

17 One thing to note, that the  
18 effective date of the standard would be three  
19 years after we publish the final rule. So, as  
20 you can see, nothing is going to happen  
21 overnight. So, one of the things to keep in  
22 mind is there is plenty of time and there is

1 also plenty of time for the industry to make  
2 adjustments to the standards set by the  
3 Department.

4 Okay. So, that covers how it is  
5 supposed to work in this overview process.

6 MR. BROOKMAN: Alex Boesenberg.

7 MR. BOESENBERG: Alex Boesenberg,  
8 NEMA.

9 In reviewing the authority, it  
10 wasn't clear to me, is a Tier 2 rule intended  
11 or authorized by the authority that grants  
12 this rule?

13 MR. BROOKMAN: Betsy?

14 MS. KOHL: What do you mean -- this  
15 is Betsy Kohl -- what do you mean by Tier 2  
16 rule?

17 MR. BOESENBERG: I work in lighting  
18 mostly, and we have a lot of stuff that has a  
19 mandatory follow-up.

20 MS. KOHL: I'm sorry, I am still  
21 not understanding.

22 MR. BOESENBERG: You get a first

1 rule, and few years later you get a second one  
2 for the same things.

3 MS. KOHL: Oh, sorry. Yes. The  
4 Energy Policy and Conservation Act requires  
5 us, at least once every six years, to go back  
6 and take a look at these things. So, there is  
7 nothing specific for pumps. There is just a  
8 general go back and take a look at a certain  
9 time interval.

10 MR. LLENZA: So me standards we  
11 issued have what is called a look-back  
12 provision, and also some test procedures. So,  
13 nothing is left static. this requires us to  
14 look back at the test procedure first. Then,  
15 after we complete that, we go back and see if  
16 there is additional savings that the  
17 Department can achieve by getting a higher  
18 standard for pumps. But that is a process  
19 that we will have to determine for pumps and  
20 it takes another three years to get there.  
21 So, it is out in the future.

22 MR. BROOKMAN: Thanks, Charles.



1 MR. BOESENBERG: Thank you.

2 MR. BROOKMAN: Gary?

3 MR. FERNSTROM: Gary Fernstrom for  
4 the California IOUs.

5 I have a comment about the process.  
6 The DOE process is punctuated by these  
7 meetings where you tell us what you are going  
8 to do and ask for our input. And then, that  
9 is followed by a long period of silence.

10 And I think we would all be better  
11 served if there were the opportunity for some  
12 sort of dialog with the analysts in the  
13 interim, so we can flesh-out any  
14 misunderstandings and provide more information  
15 on a more continuous, rather than a very  
16 sporadic basis.

17 MR. LLENZA: The only thing I could  
18 say about that -- maybe I will take a little  
19 liberty; don't panic (laughter) -- is that the  
20 Department is not against technical meetings  
21 with the industry. So, we are more than  
22 amenable to having technical meetings with the

1 industry and parties of interest and with the  
2 technical teams to discuss particular issues  
3 that might be of value to the Department to  
4 get input, additional input from the industry.  
5 So, that is something that can happen.

6 MR. FERNSTROM: So, my feedback is  
7 that would be terrific because I think both HI  
8 and the efficiency advocates would appreciate  
9 the opportunity for a dialog as the analysts  
10 may have questions about the best way to  
11 proceed.

12 MR. BROOKMAN: Betsy?

13 MS. KOHL: This is Betsy Kohl with  
14 the General Counsel's Office. You can also  
15 request meetings with the Department where we  
16 would listen to other things that you have to  
17 say about the rulemaking. And those are filed  
18 under our ex parte meeting guidelines, so that  
19 everyone knows that a meeting occurred and who  
20 was there and what was discussed. And those  
21 ex parte guidelines were published in The  
22 Federal Register, but if you would like them,

1 you can let me know and I will send them to  
2 you.

3 MR. BROOKMAN: John Cymbalsky?

4 MR. CYMBALSKY: Thanks, Doug. John  
5 Cymbalsky, DOE.

6 I would just like to add that, if  
7 this particular product goes the path of a  
8 negotiated rulemaking, it would be covered  
9 under the FACA guidelines, the meetings, and  
10 you would get more of what you are asking for  
11 in that process. So, like what we did with  
12 distribution transformers, which you were on  
13 the Committee, if it is decided that pumps is,  
14 again, prime for that type of activity, the  
15 Department would like to pursue that. And  
16 then, in that space you would get that real-  
17 time back-and-forth, again, because it would  
18 be covered under the FACA guidelines because  
19 ASRAC is a FACA committee.

20 So, otherwise, we would have to do  
21 this ex parte, if there is a fed in the room.  
22 If not, I know we have met with HI, our

1 contractors have met with HI to just discuss  
2 data, and that's okay. That is a separate  
3 meeting.

4 The other thing we will try to do  
5 in these rulemakings -- and we have done it  
6 for a couple now -- is posting spreadsheets of  
7 information on our website. They are not  
8 proposals of any kind. It is just  
9 information. And so, that is another way that  
10 we can information out quicker than waiting  
11 for steps in a public meeting.

12 MR. FERNSTROM: So, John, how is  
13 this determination made regarding which  
14 pathway to follow?

15 MR. CYMBALSKY: So, next week, as I  
16 said at the outset, there will be a meeting.  
17 The first meeting of ASRAC will be on Tuesday,  
18 the 26th, and I encourage the public to  
19 participate in this.

20 The Committee will decide and  
21 discuss which products could go that way, and  
22 the Committee will vote on that.

1 MR. FERNSTROM: Thank you.

2 MR. BROOKMAN: Steve Rosenstock?

3 MR. ROSENSTOCK: Steve Rosenstock,  
4 Edison Electric Institute.

5 Just in terms of following up, when  
6 you were talking about the ex parte meetings  
7 -- and for the record, we have had some with  
8 the Department -- that is just for the  
9 Department. That doesn't cover the analysts.  
10 That doesn't cover any analysts doing work for  
11 the Department. That is a separate issue,  
12 correct?

13 MR. CYMBALSKY: Yes, I believe I  
14 stated that that would be a separate process,  
15 yes.

16 MR. ROSENSTOCK: Okay. And again,  
17 Steve Rosenstock.

18 Yes, I think the issue is that,  
19 again, I think if there is meeting with the  
20 analysts outside of DOE, I think since there  
21 are multiple stakeholders here, I think there  
22 should be some information provided to other

1 stakeholders if there is some sort of meeting  
2 with the analysts outside of DOE that other  
3 stakeholders should be informed, because,  
4 obviously, it could impact the analysis.

5 Thank you.

6 MR. BROOKMAN: Betsy Kohl?

7 MS. KOHL: This is Betsy Kohl.

8 So, meetings with our analysts and  
9 technical folks are only to provide technical  
10 data and discussion. There is no policy  
11 issues discussed. That is what the ex parte  
12 rules are for, so that everyone is aware of  
13 those.

14 And any information that we get out  
15 of those technical meetings is, obviously,  
16 when it becomes part of the rulemaking record,  
17 subject to public comment, and it is out  
18 there.

19 MR. LLENZA: Just want to add that  
20 the Department enters these meetings, any  
21 information, agenda, issues discussed, etc.,  
22 into the docket, so people would have public

1 access to it.

2 MR. BROOKMAN: Thank you, Charles.

3 Other questions here about these  
4 issues? These are important, these access-to-  
5 communication issues.

6 (No response.)

7 Okay, Charles.

8 MR. LLENZA: Okay. I am going to  
9 go to issue 3 on the agenda. This is the  
10 legislative history and coverage for pumps,  
11 scope of coverage.

12 So, currently, DOE has no Energy  
13 Conservation Standards for commercial and  
14 industrial pumps. The authority provided in  
15 EPCA provides DOE, Part C, Title III of EPCA,  
16 includes pump coverage and authorizes DOE to  
17 issue test procedures, standards, labeling  
18 requirements, whatever the Department  
19 determines through this process that is  
20 necessary for this rulemaking.

21 So, we published back in June 2011  
22 with an RFI and received comments from

1 stakeholders. Those comments were rolled into  
2 our framework. We did not provide responses  
3 at the time, but we hoped that our framework  
4 document has provided, put to the forefront  
5 some of these issues and provided some clarity  
6 as to what the Department wants to do with the  
7 information received from the RFI.

8 As you were talking about technical  
9 meetings, we have had several technical  
10 meetings here at the Department, not only  
11 technical meetings, but we have had meetings  
12 here at the Department with the Appliance  
13 Standards Awareness Project and the Hydraulic  
14 Institute in December 2011 regarding the  
15 potential Energy Conservation Standards for  
16 commercial and industrial pumps. And there is  
17 a letter, ex parte letter/memo in our pump  
18 docket.

19 Also, as of today, we had a  
20 technical meeting, I believe, in Colorado. I  
21 believe it was May last year. And so, we have  
22 these in the docket, if people might be



1       curious about these.

2                   We like to keep them strictly  
3       technical.     Let's stick to the technical  
4       issues.   We are more than willing to attend  
5       and think these are a good thing.   We are  
6       being educated, basically, and you guys are  
7       the experts.   So, you are more than welcome to  
8       tell us the way things are supposed to be.

9                   And so, today this meeting has been  
10       called based on the framework notice that went  
11       out February 1st.

12                   Okay.   So, here we go with some of  
13       what we think this rulemaking is going to look  
14       like.     These are the pumps that DOE is  
15       considering for standards.   So, we have looked  
16       at all sorts of pumps.   There is a lot out  
17       there.   And the Department has now zeroed into  
18       a few categories, and I this is what we are  
19       asking for you to provide your comments and  
20       input.

21                   So, we have clean water pumps.   We  
22       have looked at the EU regulations, and we

1 define clean water as per what we have seen  
2 from the EU, pumps designed for clean water.  
3 And part of what we will be doing, also, is  
4 trying to provide definitions for these for  
5 which we don't have any. So, part of this  
6 process is that we have provided drafts on  
7 what we think the definitions should be. The  
8 input from the stakeholders should be if that  
9 is a good definition or not a good definition,  
10 and then provide us what they think it should  
11 be with examples.

12 At this time we are not considering  
13 covering wastewater, slump, slurry, solids-  
14 handling, AP1610 pumps. Possibly consider  
15 covering ANSI chemical pumps, pumps for other  
16 liquids with no solids that behave similarly  
17 to water.

18 The other type of pumps is  
19 rotodynamic, clean water pumps. Again, we  
20 have looked at some EU regulation that is out  
21 there. I think they have had the lead on this  
22 for a while in terms of the regulatory

1 environment. So, we have sort of borrowed  
2 from their playbook a little until we get our  
3 footing with this rulemaking and  
4 the stakeholders input in the U.S. industry.

5 Clean water pumps represents about  
6 70 percent of sales by value and 90 percent of  
7 pump energy use. We are not considering  
8 positive displacement pumps at this time.

9 So, we come to our first chevron.  
10 Are there questions first?

11 MR. BROOKMAN: Yes, questions?  
12 Steve Rosenstock?

13 MR. ROSENSTOCK: Steve Rosenstock.

14 Yes, a question on the -- well, you  
15 are going to get to that. I will wait until  
16 you go over your Request for Comments, and  
17 then I will have a question on that last  
18 slide. Thank you.

19 MR. LLENZA: Okay. So, these are  
20 the Requests for Comments. These are kind of  
21 the questions we have. DOE seeks comments on  
22 the proposal to cover only clean water pumps

1 in this rulemaking. Important: do we have  
2 other things that we want to cover? That is  
3 1-1.

4 Item 1-2, DOE requests comments on  
5 whether it should rely on these definitions  
6 for clean water. It could be -- coverage of  
7 pumps, as the EU does. Or, if, instead, the  
8 definition of clean water pumps should include  
9 physical characteristics that distinguish  
10 pumps designed to clean water or exclude pumps  
11 designed for other purposes. That would be  
12 Item 1-2.

13 Item 1-3, DOE seeks comment on the  
14 list of physical differences that may exist  
15 between pumps designed for clean water and  
16 pumps designed for other substances. That is  
17 important if we are going to try to cover  
18 other substance-type pumps.

19 Specifically, on this is the list  
20 accurate and exhaustive? Do any differences  
21 impact energy efficiency? Do the differences  
22 increase cost? And other things that you

1 might know of that DOE should be made aware  
2 of.

3 MR. BROOKMAN: You can imagine,  
4 since we are creating a complete transcript of  
5 this meeting, to make these comments fairly  
6 systematic, it makes it much easier for  
7 everybody to follow a couple-hundred-page  
8 document.

9 So, I would like to proceed with  
10 Item 1-1, and then to 1-2 and 1-3. So, let's  
11 receive comments on those.

12 Yes, please, Steve.

13 MR. SCHMITZ: Thank you.

14 Steve Schmitz, Grundfos,  
15 representing the Hydraulic Institute.

16 The Hydraulic Institute believes  
17 that, in order to capture the largest  
18 population of potential energy savings, HI  
19 recommends aligning with the European Union  
20 Directive 547, 2012. This Directive focuses  
21 on non-engineered, non-specialized pumps and  
22 standard design, as you have already

1 mentioned, applied in clean water  
2 applications.

3 Later on, we will get into some of  
4 the specifics. So, I won't jump to that, in  
5 the essence of time.

6 I would like to point out that  
7 there are two additional areas in the EU  
8 Directive that exclude two types of pumps  
9 which you did not mention here, which is fire  
10 pumps and self-priming pumps. We are  
11 recommending that those be excluded as well  
12 within part of the EU Directive.

13 MR. BROOKMAN: Thank you. Thank  
14 you.

15 Steve Rosenstock?

16 MR. ROSENSTOCK: Steve Rosenstock,  
17 Edison Electric Institute.

18 If you could scroll back to the  
19 previous slides, just again, it says DOE may  
20 define clean water or use a separate  
21 definition. Again, that could be kind of  
22 critical in terms of, depending on how you

1 define it, in terms of parts per million of  
2 certain particles. That could make a  
3 difference in terms of what is covered under  
4 that category. And again, I am not familiar  
5 with the EU definition, but if they have  
6 different standards, that can make quite a  
7 difference compared to U.S. standards in terms  
8 of, quote, "how it is defined by EPA," for  
9 example under the Clean Water Act.

10 The second thing I wanted, because  
11 I am a numbers person, in the second part it  
12 says, "Represents 70 percent of sales by value  
13 and 90 percent of pump energy use." That is  
14 within the Clean Water Pump Category?

15 MR. BROOKMAN: Alison, I think so,  
16 right?

17 MS. WILLIAMS: Alison Williams,  
18 LBNL.

19 MR. BROOKMAN: Alison, find a  
20 microphone. I'm sorry. Alison? Thank you.

21 MS. WILLIAMS: So, the 70 percent  
22 and 90 percent are for rotodynamic pump types

1 that are used for clean water, but they are  
2 not all necessarily clean water pumps. They  
3 are types that can be used for clean water.  
4 And we have further numbers later.

5 MR. ROSENSTOCK: Okay. And again,  
6 Steve Rosenstock.

7 I appreciate that clarification.

8 Again, it was just kind of written  
9 out there as if it wasn't -- I wasn't clear.  
10 This is just under the Clean Water Category?  
11 It is not a chemical pump or the other liquid  
12 pumps that are out there. It is just 70  
13 percent and 90 percent of the clean water  
14 pumps?

15 MS. WILLIAMS: Yes, I mean, it is a  
16 little more. First of all, it is an estimate,  
17 just to try to get an overview. But it is  
18 also, again, rotodynamic pump types that could  
19 be used in clean water. So, it may include  
20 some ANSI chemical process pumps because a lot  
21 of them can be used in clean water.

22 There are further slides with a



1 little bit better desegregation.

2 MR. ROSENSTOCK: Thank you.

3 MR. BROOKMAN: Steve, go ahead.

4 MR. SCHMITZ: Thank you.

5 Just to clarify, Steve, to your  
6 question about clean water, and to jump to the  
7 1-2, there is an ISO 9906 standard out of  
8 Europe that defines clean water. There is a  
9 difference between clean water and drinking  
10 water as defined by the EPA. And we are  
11 encouraging the use of the definition from the  
12 ISO standard.

13 MR. BROOKMAN: Okay. Thank you.

14 Gary Fernstrom?

15 MR. FERNSTROM: Could we ask HI to  
16 clarify what is meant by self-priming? In my  
17 view, there are a lot of clean water pumps  
18 that are to some extent self-priming. The EU  
19 and you would want to exclude those? What  
20 exactly do you mean by self-priming?

21 MR. BROOKMAN: Steve?

22 MR. SCHMITZ: Thank you.

1 Well, self-priming pumps are pumps,  
2 of course, that have to pull substantial NPSH  
3 to pull the water up and recirculate the  
4 pumps, to, in essence, energize the pump, so  
5 it can begin moving the water. And so, there  
6 is a category of pumps specifically applicable  
7 to the self-priming that, because of that very  
8 nature, the high water recirculation and the  
9 NPSH lift, it is by nature very much less  
10 efficient.

11 MR. FERNSTROM: So, to fit into the  
12 term "self-priming," there is some significant  
13 net suction pressure that these pumps are  
14 dealing with. And ones that deal with minimal  
15 suction pressure are not deemed self-priming?

16 MR. BROOKMAN: Steve, please. Go  
17 ahead.

18 MR. SCHMITZ: Thank you.

19 No, you can have pumps that are low  
20 suction pressure that are not necessarily  
21 self-priming, pumps as in boiler feed,  
22 domestic hot-water-type applications, of

1 course. But there are other pumps that are  
2 specifically designed, and the intent and the  
3 usage is for self-priming to fill the line and  
4 energize it for the system.

5 MR. FERNSTROM: Okay. Well, my  
6 observation is we want to be careful not to  
7 exclude an important segment of pumps that may  
8 deal with some minimum suction pressure, but  
9 are not deemed to be self-priming.

10 MR. BROOKMAN: Ken?

11 MR. NAPOLITANO: Ken Napolitano,  
12 Xylem and the Hydraulic Institute.

13 I think maybe just a little  
14 clarification. Self-priming pump, as we are  
15 defining it, is not an application. It is a  
16 specifically-designed machine for certain  
17 types of applications; namely, when water is  
18 below the surface of the pump.

19 And so, because it is designed  
20 specifically to draw water from below, there  
21 are certain design characteristics that have  
22 to be met to make it function as it is

1 intended, which don't necessarily correspond  
2 with efficiency. So, in other words, you make  
3 some tradeoffs between the ability to suck  
4 from below the ground and the efficiency.  
5 Otherwise, they don't work properly. And it  
6 is a relatively-small -- I don't know the  
7 number off the top of my head -- but it is a  
8 relatively-small portion of the population.  
9 So, that was the thought process.

10 MR. FERNSTROM: Thank you.

11 MR. BROOKMAN: Thank you.

12 I would like to proceed with these  
13 question box items, 1-1, 1-2, and 1-3. So,  
14 maybe look at what is there on your PowerPoint  
15 slide and let's respond to those.

16 Neal?

17 MR. ELLIOTT: Neal Elliott, ACEEE.

18 With respect to the question about  
19 coverage, this 1-3, coverage beyond clean  
20 water, including chemical pumps, from ACEEE's  
21 perspective, it would be I would prefer to see  
22 us at this point focus on clean water and not

1 introduce in the additional issues associated  
2 with chemical pumps.

3 We run into both material with  
4 respect to the pump itself, but also seal  
5 considerations that could have significant  
6 impact on the pump efficiency. I think we are  
7 dealing with what is initially a very complex  
8 rulemaking. And I think simplifying it for  
9 this initial phase and focusing on clean water  
10 would be better than additional complexities  
11 of trying to deal with non-water fluids.

12 MR. BROOKMAN: Steve?

13 MR. SCHMITZ: Yes, I would support  
14 what Neal is saying and reiterate that what we  
15 are proposing as part of the EU Directive does  
16 provide the greatest breadth of unit volume in  
17 the marketplace for the greatest energy  
18 savings. It is the most expeditious path  
19 forward for implementation. It offers the  
20 greatest global alignment with the EU  
21 Directive, as previously noted, and it does  
22 support the Executive Order 13-609 from May of

1 this last year for international regulatory  
2 cooperation.

3 And then, it aligns and supports  
4 the Energy Independence and Security Act for  
5 motor ranges that are already defined by the  
6 DOE.

7 MR. BROOKMAN: Is there someone to  
8 specifically just answer the questions that  
9 are listed in 1-3.

10 MR. HANDZEL: Obviously, HI's  
11 position is to support clean water and to  
12 follow the European standard that already  
13 exists.

14 MR. BROOKMAN: Are you speaking on  
15 behalf of your company or --

16 MR. HANDZEL: I am speaking on  
17 behalf of the Hydraulic Institute --

18 MR. BROOKMAN: Okay.

19 MR. HANDZEL: -- and my company.

20 MR. BROOKMAN: Both?

21 MR. HANDZEL: Okay?

22 So, just to answer the question, in

1 1-3, there is a list of some features of pumps  
2 that are listed. And so, just to answer, no,  
3 the list is not accurate and exhaustive. Yes,  
4 the differences definitely impact  
5 efficiencies. So, the second point of does  
6 these differences impact efficiencies, yes,  
7 they definitely do.

8 And the third point, yes, the  
9 differences will definitely lead to an  
10 increased cost.

11 There are further questions in the  
12 document that we will go into more detail that  
13 will provide some additional detail around  
14 these answers.

15 MR. BROOKMAN: Good.

16 MR. HANDZEL: Okay?

17 MR. BROOKMAN: Okay. And just to  
18 be clear, especially for those of you that are  
19 new to the proceedings, anything that you  
20 haven't covered sufficiently in this meeting  
21 today, the Department welcomes your exhaustive  
22 and detailed comments in writing. Okay?

1 Gary Fernstrom?

2 MR. FERNSTROM: One more quick  
3 comment. Gary Fernstrom.

4 We are interested in asking the DOE  
5 to consider including circulator pumps. If I  
6 understand it, none of these issues on the  
7 screen expressly exclude circulator pumps  
8 because they are clean water pumps.

9 MR. BROOKMAN: Okay. Thank you.

10 Have we covered sufficiently 1-1,  
11 1-2, and 1-3?

12 (No response.)

13 I think for now.

14 Okay. Now so, Charles, walk us  
15 through 1-4 and 1-5, please.

16 MR. LLENZA: Okay. So, 1-4, DOE  
17 seeks comments on whether it should consider  
18 standards for pump design for non-water  
19 liquids -- we are repeating ourselves a little  
20 bit -- that contain limited solids in this  
21 rulemaking. It is important, if we are going  
22 to stick to one type or the other, or if we



1 want both.

2 DOE is specifically interested in  
3 ANSI chemical process pumps, API 610 pumps,  
4 sealless, if I am pronouncing that right,  
5 magnetic drive, canned, and cantilever pumps,  
6 sanitary pumps, refrigerant pumps, general  
7 industrial pumps. And when suggesting pump  
8 types for which standards should not be  
9 considered, please be specific as to the  
10 reason why.

11 So, tell us what you want covered  
12 and tell us what you don't want covered. And  
13 we would appreciate, also, reasons why, pros  
14 and cons.

15 Item 1-5, DOE requests comments on  
16 whether any design changes made to the  
17 standard clean water pumps would carry through  
18 to pumps designed for other applications. So,  
19 this is basically, if we go with the clean  
20 water pumps, what are some of the design  
21 changes that would carry over to the non-clean  
22 water pump types?

1 MR. BROOKMAN: And it looks like  
2 Mark is ready, and that is on behalf of HI,  
3 right?

4 MR. HANDZEL: Yes, that is correct.

5 Mark Handzel, Xylem, Incorporated,  
6 and a member of the Hydraulic Institute.

7 The members of the Hydraulic  
8 Institute feel that pumps designed for non-  
9 water liquids should be exempt from the  
10 efficiency regulations because they are  
11 typically designed to comply with other key  
12 requirements, such as safety and reliability.

13 For example, to assure better  
14 safety and reliability, these pumps could be  
15 designed with wider internal clearances,  
16 oversized shafts, and oversized bearings. All  
17 of these could lead to reduced efficiencies.

18 I have a long description of ANSI  
19 pumps and API pumps that I will provide  
20 instead of reading to you. But, basically, it  
21 goes through and designs how these criteria  
22 lead to compromising the efficiency of the

1 pumps in order to be more reliable and more  
2 safe. So, particularly when you are handling  
3 fluids like petroleum products or higher  
4 temperatures that go well beyond the scope of  
5 what has been proposed in the framework  
6 document.

7 MR. BROOKMAN: Okay. And does  
8 that, then, address fairly completely what  
9 should be covered and not covered?

10 MR. HANDZEL: So, the two specific  
11 areas that we are addressing is ANSI chemical  
12 process pumps and API 610 pumps as well as the  
13 variations that are listed after it.

14 MR. BROOKMAN: Okay.

15 MR. HANDZEL: Okay?

16 MR. BROOKMAN: Okay. Thank you.

17 Other comments on that?

18 And then, moving to 1-5, design  
19 changes made to standard clean water pumps  
20 would carry through pumps designed for other  
21 applications.

22 Steve Rosenstock?

1                   MR. ROSENSTOCK:     Just a quick  
2                   question here.  And again, I didn't know the  
3                   definition, but if it is an industrial pump  
4                   that is a clean water pump, an industrial  
5                   facility for an industrial process, what would  
6                   that qualify as a clean water pump if it is  
7                   also classified as an industrial pump?

8                   MR. BROOKMAN:     Alison?

9                   MS. WILLIAMS:     Alison Williams,  
10                  LBNL.

11                  So, DOE is just considering some  
12                  different definitions here.  So, I think the  
13                  answer to that depends on the final  
14                  definitions that are decided.

15                  MR. LLENZA:     So, that is subject to  
16                  further modifications from your interpretation  
17                  or to our interpretation of your  
18                  interpretation.

19                  MR. BROOKMAN:    I am wondering if  
20                  anybody from the industry -- Mark, do you want  
21                  to try with that?

22                  MR. HANDZEL:    So, we struggle with

1 this question as well. Primarily because we  
2 manufacture pumps, we don't necessarily always  
3 know the applications that they are going to  
4 be used in.

5 So, Alison is definitely right that  
6 there could be pumps in these classifications  
7 that could be used on clean water. So, there  
8 is that possibility.

9 Obviously, the point we are making  
10 is that there are many compromises that are  
11 made to handle the more aggressive  
12 applications that these pumps are typically  
13 designed for. So, it makes it very difficult  
14 to apply efficiency rules to them  
15 specifically.

16 MR. BROOKMAN: Thank you.

17 Ken first, and then, to Steve.

18 MR. NAPOLITANO: Ken Napolitano,  
19 Xylem and HI.

20 I think the position that we are  
21 taking is that, first of all, agreeing to  
22 clean water, what that means, and I don't

1 think we are that far off there.

2 And then, using that to determine a  
3 scope of products that are primarily designed  
4 for that application. So, ultimately, it  
5 leads you to a definition of XYZ products, so  
6 that you get away from the application,  
7 because it is virtually certain that you could  
8 take almost any pump, even though it may be  
9 designed for benzene or hydrochloric acid or  
10 heavy slurry, and pump water with it, because  
11 that is easier than the application, if you  
12 will, that it was intended for.

13 So, I think we are making is define  
14 what clean water is. We agree on that, what  
15 pumps are primarily designed for clean water,  
16 and then create the scope that way.

17 MR. BROOKMAN: Okay. Steve  
18 Schmitz?

19 MR. SCHMITZ: Steve Schmitz.

20 To reiterate what Ken said, yes,  
21 pumps in those types of applications could be  
22 used in clean water. Typically, they are

1 going to be two to four times more expensive  
2 than just a clean water pump. So, the  
3 likelihood of that being done on a purposeful,  
4 consistent basis is very remote.

5 MR. BROOKMAN: Okay. So, then,  
6 have we addressed 1-5?

7 (No response.)

8 Okay.

9 MR. SCHMITZ: Just to reiterate  
10 that HI does not believe any design changes  
11 for clean water pumps would carry through to  
12 other applications.

13 MR. BROOKMAN: I would like to say  
14 the quality of the comment is excellent. This  
15 really helps the Department. So, let's keep  
16 on with that.

17 Charles Llenza?

18 MR. LLENZA: Okay. So, we are Item  
19 1-6. DOE seeks comments on its proposal to  
20 consider standards for rotodynamic pumps --  
21 somebody asked about that; -- and not positive  
22 displacement pumps.

1                   In particular, DOE requests  
2 comments on the extent of the overlap between  
3 rotodynamic and positive displacement pumps  
4 and whether there are certain categories of  
5 rotodynamic pumps, pump types and ranges of  
6 flow and specific speed, et cetera, for which  
7 positive displacement pumps could not be a  
8 direct replacement.

9                   MR. BROOKMAN: Yes, Mark?

10                  MR. HANDZEL: Mark Handzel of Xylem  
11 and the Hydraulic Institute.

12                  The members of the Hydraulic  
13 Institute wish to confirm that positive  
14 displacement pumps represent a small  
15 percentage of the overall pump market and are  
16 generally used in niche applications such as  
17 pumping viscous or shear sensitive fluids.  
18 Because positive displacement and rotodynamic  
19 pumps provide different application solutions,  
20 economic issues generally prevent overlap of  
21 these two pump designs.

22                  MR. BROOKMAN: Okay. Thank you.



1                   Are there other comments on this  
2                   one?

3                   (No response.)

4                   Then, we are going to move on.

5                   MR. LLENZA: Okay. So, for the  
6                   pump type for which DOE is considering  
7                   standards here is what DOE has proposed for  
8                   terminology. So, this table basically  
9                   provides a matrix of that.

10                  And I will just go over the  
11                  terminology, and request your better  
12                  terminology,: End Suction Close Coupled, End  
13                  Suction Frame Mounted, In-Line, Double  
14                  Suction, Axial Split Multi-Stage, Radially  
15                  Split Multi-Stage, Vertical Turbine,  
16                  Submersible, and Axial/Propeller and Mixed.  
17                  As you can see, it is specific to the pump  
18                  type.

19                  MR. BROOKMAN: So, this  
20                  classification here, you would like  
21                  confirmation on those listed here in yellow --

22                  MR. LLENZA: Right.

1 MR. BROOKMAN: -- or corrections,  
2 whatever.

3 MR. LLENZA: Based on the pump  
4 type.

5 MR. BROOKMAN: Yes. Albert,  
6 please.

7 MR. HUBER: HI proposes that we or  
8 our proposal is that we stick with the ANSI/HI  
9 nomenclature as we have presented to the  
10 Department, along with the corresponding  
11 descriptions. These are nomenclature and  
12 descriptions that are widely used in the  
13 industry and known by the industry and, also,  
14 by the users in the marketplace.

15 MR. BROOKMAN: And are those  
16 consistent with what is listed here in yellow?

17 MR. HUBER: No. The descriptions  
18 are not, no, they are not.

19 MR. BROOKMAN: Okay.

20 MR. LLENZA: So, the Department  
21 would appreciate great detail on that.

22 MR. BROOKMAN: I see Alison.

1 Please.

2 MS. WILLIAMS: Alison Williams,  
3 LBNL.

4 One of the subsequent comments  
5 specifically asked for the ANSI/HI  
6 nomenclature that would go along with these  
7 because what has been provided so far was not  
8 comprehensive of the categories DOE is  
9 considering. So, DOE is definitely open to  
10 that and is requesting specific comment on  
11 matching those things up.

12 MR. BROOKMAN: Okay. Alex, yes?

13 Pardon me. Albert, yes, okay?

14 Steve Rosenstock?

15 MR. ROSENSTOCK: Steve Rosenstock,  
16 EEI.

17 Yes, clarification on the table.  
18 Where everything is totally blocked out, you  
19 know, again, does that mean you are not  
20 covering those and DOE is not thinking about  
21 covering those? I just wanted to get a  
22 double-check on that.

1 MS. WILLIAMS: Alison Williams,  
2 LBNL.

3 Yes, that is correct. Those are  
4 not currently considered for coverage and, as  
5 far as we understand, are not covered in the  
6 EU, either.

7 MR. ROSENSTOCK: Thank you. That  
8 helps.

9 MR. BROOKMAN: I am looking for  
10 additional input from industry here. Mark?

11 MR. HANDZEL: Mark Handzel with  
12 Xylem and a member of the Hydraulic Institute.

13 So, this is specifically in regard  
14 to Question 1-7. So, I am not sure if we are  
15 ready to go to that.

16 MR. BROOKMAN: I think we are ready  
17 to do that.

18 MR. LLENZA: Yes, we are ready to  
19 go to that one.

20 MR. HANDZEL: So, as you have heard  
21 from a number of our speakers, you know, we  
22 are pretty firmly behind supporting staying in

1 line with the current EU standards. So, a  
2 prepared statement analysis of the U.S. pump  
3 market confirms that the variety of existing  
4 products in numerous market segments, each  
5 with unique requirements, is too wide and  
6 complex, as similar design across multiple  
7 market segments are applied differently,  
8 resulting in a large number of unique product  
9 variations.

10 In order to capture the largest  
11 population of potential energy savings, the  
12 Hydraulic Institute recommends aligning with  
13 the European Directive EU No. 547-2012. The  
14 EU Directive focuses on non-engineered, non-  
15 specialized pumps and standard design applied  
16 in clean-water-only applications for the  
17 broadest scope.

18 Expansion beyond the EU Directive  
19 parameters will add complexity and cost to the  
20 tasks of the manufacturers and create a  
21 significant financial burden for us to gain  
22 compliance.

1                   Specifically related to double-  
2 suction pumps and vertical turbines beyond 6-  
3 inch bowl assemblies, HI recommends that these  
4 products be excluded from the first version of  
5 the DOE ruling to stay in alignment with the  
6 EU specifications and, further, avoid this  
7 financial burden on pump manufacturers.  
8 Double-suction pumps and vertical turbines  
9 beyond 6-inch bowl assemblies could be added  
10 in subsequent Phase 2 addition to capture  
11 additional energy savings.

12                   MR. BROOKMAN: Okay. You are going  
13 to let us know if you are not speaking on  
14 behalf of HI, correct? I am noticing, as I  
15 sit here and observe, that you have got well-  
16 crafted responses there in front of you. So,  
17 let us know if you are not speaking on behalf  
18 of --

19                   MR. HANDZEL: I will.

20                   MR. BROOKMAN: -- HI.

21                   Gary?

22                   MR. FERNSTROM: We are interested

1 in circulator pumps. So, I just hope they are  
2 still on the table.

3 MR. BROOKMAN: Thank you.

4 John Cymbalsky?

5 MR. CYMBALSKY: John Cymbalsky,  
6 DOE.

7 So, in your experience in working  
8 with the EU, is there a succinct answer for  
9 why the EU did not cover certain types? Is it  
10 just the market scope is small or it was too  
11 expensive to do anything with? If you have a  
12 short answer for that, that would be helpful.

13 MR. HANDZEL: They focused on where  
14 they felt the largest possible was -- sorry,  
15 Mark Handzel, speaking for Xylem and Hydraulic  
16 Institute -- they focused on where the largest  
17 potential energy savings were. So,  
18 specifically double-suction pumps, for  
19 example, there is not a broad market in the EU  
20 for double-suction pumps.

21 MR. BROOKMAN: Albert?

22 MR. HUBER: Albert Huber speaking

1 on behalf of the Hydraulic Institute and  
2 Patterson Pump Company.

3 Particularly double-suction pumps  
4 in the market in the U.S., 50 percent, or  
5 slightly more than that, are used for fire  
6 protection, which should not be considered by  
7 the Department of Energy for regulation.

8 Therefore, the total amount of  
9 double-suction pumps used is fairly small  
10 unit-wise as compared to the ones that we have  
11 proposed. And that is why we do not recommend  
12 double-suction pumps at this time.

13 MR. BROOKMAN: Okay. Steve  
14 Rosenstock?

15 MR. ROSENSTOCK: Steven Rosenstock,  
16 EEI.

17 As a clarification, in the table  
18 where it says EU coverage is partial and the  
19 DOE coverage is -- would that be all  
20 categories, not just a partial EU?

21 MR. BROOKMAN: Alison?

22 MS. WILLIAMS: Alison Williams,



1 LBNL.

2 Yes, in the categories where it  
3 says partial for the EU, it is currently  
4 noting that DOE is considering a wider  
5 selection of pumps than then the EU seems to  
6 be covering.

7 MR. ROSENSTOCK: Yes. Thank you  
8 for that clarification.

9 MR. BROOKMAN: So, let's go to the  
10 comment boxes and make sure that we have  
11 covered these.

12 Yes, please, Ken.

13 MR. NAPOLITANO: Just back on that  
14 last slide, I just want to make sure I  
15 understand. So, when you say -- because I  
16 read that as the EU covered greater than one  
17 stage of the vertical turbine submersible.  
18 Was that the question? And when you say  
19 "wider," that would include one stage?

20 MR. BROOKMAN: Alison?

21 MS. WILLIAMS: That is correct,  
22 and, also, with regard to the radially split

1 multi-stage pumps, DOE is considering a wider  
2 variety of those than the vertical in-line  
3 type considered in the EU.

4 MR. BROOKMAN: Okay.

5 MR. LLENZA: So, I just want to add  
6 again, this was the framework. So, everything  
7 is subject to change, hopefully -- hopefully,  
8 not much. Just provide us what you really  
9 think, and we would like supporting data for  
10 any changes in direction.

11 MR. BROOKMAN: So, you can see the  
12 comment boxes listed there on the screen, 1-7,  
13 1-8, and 1-9. You all see quite well-  
14 prepared. Let's make sure you get a chance to  
15 speak to those issues.

16 Joanna Mauer?

17 MS. MAUER: So, regarding the  
18 proposal to consider standards for pumps not  
19 covered in the EU, based on our kind of  
20 initial review, as I mentioned earlier, the  
21 one category that we think is at least worth  
22 considering for standards is the double-

1 suction pumps.

2 MR. BROOKMAN: Okay. Thank you.

3 And, of course, the Department  
4 welcomes counterpoint as well, if there is  
5 such a thing.

6 MR. LLENZA: So, let's move on to  
7 the next section.

8 MR. HANDZEL: So, I have one more  
9 thing on 1-9, just to -- Mark Handzel speaking  
10 on behalf of Xylem and the Hydraulic  
11 Institute.

12 On 1-9, the members of the  
13 Hydraulic Institute wish to clarify that there  
14 are areas with potential categories, but many  
15 are due to economic constraints. This  
16 approach is meant to generally align with the  
17 EU scope and it is designed to focus on off-  
18 the-shelf pumps and to exempt pumps with low  
19 flow and fractional horsepower that have  
20 little opportunity for efficiency improvement  
21 and energy savings.

22 MR. BROOKMAN: Okay. Thank you.

1 Are we finished with this section?

2 John Cymbalsky?

3 MR. CYMBALSKY: Yes, I just want to  
4 make a point here, since some of us are new to  
5 this process.

6 So, coverage does not necessarily  
7 mean that a standard would be set at a higher  
8 level than is already in the market. So, we  
9 could have coverage for a certain type of  
10 pump. Yet, at the same time, that doesn't  
11 necessarily mean our analysis will point to a  
12 standard that you guys already don't meet.  
13 Economic criteria is later in the analysis.  
14 So, coverage could be there, but not  
15 necessarily have a standard that you couldn't  
16 already meet, just to point that out.

17 MR. LLENZA: Right. And to add to  
18 that -- this is Charles Llenza, the Department  
19 of Energy -- we could end up base lining what  
20 the industry has available.

21 MR. BROOKMAN: Thank you, Charles.

22 Neal?

1 MR. ELLIOTT: Neal Elliott, ACEEE.

2 I think one of the important points  
3 -- and this has been mentioned by my  
4 colleagues from industry -- as I had indicated  
5 earlier, we are dealing with a very complex  
6 marketplace for a very complex product.

7 To your point, John, I think  
8 initially focusing on the standards for  
9 products which represent the largest  
10 opportunity and the biggest consistency  
11 represents the target. Considering extending  
12 this standards, actually extending standards  
13 to additional products in subsequent  
14 rulemakings, we think makes a lot of sense.  
15 Let's get our feet wet. Let's get some  
16 standards under our belts before we attempt to  
17 expand the impacts potentially on the  
18 manufacturers from covering a wide range of  
19 products with standards which initially is a  
20 significant liability to the industry. So, I  
21 think moving with deliberateness is an  
22 appropriate approach.

1 MR. BROOKMAN: Ken?

2 MR. NAPOLITANO: Ken Napolitano,  
3 Hydraulic Institute.

4 On that point, and on the whole  
5 basic point of harmonizing with the EU and,  
6 additionally, why we favor that, beyond the  
7 fact that it is aligned with President Obama's  
8 recent executive action to attempt  
9 harmonization, where possible, if I could  
10 state it that way, the vast majority of  
11 Hydraulic Institute members and companies that  
12 would be subject to any DOE rulemaking are  
13 multinational and/or global players in the  
14 marketplace.

15 So, to the extent to which we can  
16 keep as harmonized as possible with what is  
17 out there, so that, one, we can work on the  
18 same products in a concerted, coordinated way  
19 in terms of meeting the regulations. There is  
20 substantial cost to redesign. And then, also,  
21 be designing for the same targets or close to  
22 the same targets.

1                   MR.    BROOKMAN:        Okay.        Any  
2                   additional on this?  We are going to, yes,  
3                   move on.

4                   MR.  LLENZA:  Let's move on.  Okay.  
5                   So.  1-10.  DOE seeks comments on pump types as  
6                   described by ANSI/HI nomenclature that fall  
7                   into equipment categories set forth in Table  
8                   1.1, slide 28.

9                   For example, type OH1 would be  
10                  classified as end suction frame mounted pump.  
11                  For ANSI/HI pump types that would not fall  
12                  into the categories of Table 1.1, please  
13                  provide specific reasons, such as solids-  
14                  handling-only or other descriptors of that  
15                  sort.

16                  MR.  BROOKMAN:  Steve Schmitz?

17                  MR.  SCHMITZ:  Thank you.

18                  Steve Schmitz, Hydraulic Institute.

19                  Again, the pump type categories  
20                  defined by HI as recommended for inclusion in  
21                  this efficiency standard present the greatest  
22                  opportunity for implementation.  And there are

1 other subsegments specific to ANSI chemical-  
2 type applications that can be well-defined  
3 that would be applicable here.

4 MR. BROOKMAN: Okay.

5 MR. LLENZA: Okay, 1-11. DOE seeks  
6 comments on whether wet-running circulator-  
7 type pumps should be covered under this  
8 rulemaking. It is pretty straightforward.

9 MR. BROOKMAN: Mark?

10 MR. HANDZEL: Mark Handzel for the  
11 Hydraulic Institute.

12 The Hydraulic Institute does not  
13 recommend that circulators be included in this  
14 rulemaking. I have a long definition of what  
15 a circulator pump is that I will provide you  
16 in our written comments.

17 But the key thing that we want to  
18 point out is that this question specifically  
19 asked about wet-running circulator types. In  
20 the U.S. market, there are other types besides  
21 wet rotor pumps or wet-running. In  
22 particular, there are standard mechanical seal



1 pumps that are either close coupled directly  
2 to a motor -- we call those compact  
3 circulators -- and there are also mechanical  
4 seal pumps with a flexible coupled to a motor.  
5 We call those 3P circulators.

6 So, there is a difference in the  
7 market. There are other products being sold  
8 here that are not wet-running as described in  
9 this question.

10 So, just to give you some further  
11 explanation on HI's position, comparative to  
12 the European market, the U.S. market for  
13 circulators is very small. Thus, it is not a  
14 large opportunity to save energy.

15 Secondly, the EU methodology being  
16 recommended, the MEI specifically, is not  
17 applicable to circulators because the pump and  
18 specialty motor are integral to each other.

19 The third thing, the investment  
20 required by U.S. circulator manufacturers will  
21 be large to develop high-efficiency levels  
22 with very limited possibility for a solid

1 return on investment.

2 And fourth, in most situations, due  
3 to the higher cost of the high-efficiency  
4 product and the relatively low cost of energy  
5 in the U.S., the return on investments to  
6 consumers would also be very extended.

7 MR. BROOKMAN: Okay. Gary  
8 Fernstrom?

9 MR. FERNSTROM: The California  
10 Investor Owned Utilities are disappointed that  
11 the Hydraulic Institute doesn't recommend  
12 including circulator pumps. The cost of  
13 energy in the United States is now low,  
14 particularly in California. These products  
15 typically have an annual energy use exceeding  
16 550 kilowatt hours. They have a total market  
17 energy use of 10,400 kilowatt hours and a  
18 sales volume of \$1.9 million shipped annually.

19 We will be providing additional  
20 information on the significance of this and  
21 highly recommend that circulator pumps be  
22 included because the manufacturers do have

1 efficient models available, and they represent  
2 a significant energy-saving opportunity for  
3 low cost.

4 MR. BROOKMAN: Thank you.

5 Ken?

6 MR. NAPOLITANO: I would just ask  
7 for clarification from Gary. Do your figures  
8 in terms of energy consumption, number of  
9 units, and so forth, include those installed  
10 in residential applications?

11 MR. FERNSTROM: They include those  
12 installed in multi-family applications, which  
13 we consider to be commercial in accordance  
14 with utility tariffs.

15 MR. NAPOLITANO: But exclude  
16 single-family homes?

17 MR. FERNSTROM: Yes.

18 MR. BROOKMAN: Neal, to further  
19 expand the record here, I was wondering, did  
20 you say before -- maybe I lost track -- what  
21 those of you who have been negotiating or  
22 meeting, what your posture is on circulator-

1 type pumps?

2 MR. ELLIOTT: I didn't make any  
3 comments about circulators.

4 MR. BROOKMAN: Do you wish to do  
5 that now?

6 MR. ELLIOTT: I do not.

7 MR. BROOKMAN: Okay. Ken?

8 MR. NAPOLITANO: I would just make  
9 one more comment relative to the EU. As Mark  
10 stated, we can get more specific numbers.  
11 Because of the type or the propensity to use  
12 hot water for heating in Europe, which is the  
13 norm, and the exception in the United States,  
14 there are over 150 million small circulators  
15 installed in Europe in single- and two-family  
16 townhouse, that type of three-four flat-type  
17 properties.

18 And so, it was a substantial number  
19 for the EU because hot water is how buildings,  
20 especially single-family homes, are heated in  
21 the EU. And so, that was the driver for them  
22 doing it. So, there is a much smaller

1 population in the U.S. And then, of course,  
2 it is our understanding that residential is  
3 not in the purview of this discussion.

4 MR. BROOKMAN: Okay. Thank you.

5 Yes, Mark?

6 MR. HANDZEL: And just to further  
7 add to Ken's statements, not only are those  
8 homes in Europe heated with hot water, but  
9 they also use the same device to heat potable  
10 water, which means the circulators are  
11 typically running year-round. And that is not  
12 typically the most common application in the  
13 U.S. So, they would only operate partially  
14 for the year.

15 MR. BROOKMAN: Okay. I got it.

16 We are going to move on.

17 MR. LLENZA: Yes, I just want to  
18 emphasize 1-12, and that is about market size.  
19 You should read the question and provide us  
20 with as much information possible for this  
21 one.

22 MR. HANDZEL: Yes. So, Mark

1 Handzel, speaking for the Hydraulic Institute.

2 The Hydraulic Institute does not  
3 have specific detail on the market size for  
4 wet-running circulators in the U.S. So, that  
5 is something that we will work to try to  
6 develop some more information to share that  
7 with the DOE.

8 The additional question here where  
9 it asked, you know, how is the market split,  
10 this is kind of a consensus shell vote between  
11 the HI members who manufacture circulators,  
12 and we felt -- this is covering all types of  
13 circulators -- that roughly 70 percent are  
14 used in residential applications and 30  
15 percent go into commercial applications.

16 MR. BROOKMAN: You say that was a  
17 "shell vote"?

18 MR. HANDZEL: Well, it was sitting  
19 around a room with a group of manufacturers in  
20 a committee meeting, and we threw out some  
21 numbers and generally agreed on 70/30 was the  
22 split.

1 MR. BROOKMAN: And the Hydraulic  
2 Institute doesn't collect this data  
3 systematically at this point?

4 MR. HANDZEL: Yes, we do not.

5 MR. BROOKMAN: Gary Fernstrom?

6 MR. FERNSTROM: I would like to ask  
7 for a clarification on the difference between  
8 residential and commercial. As I understand  
9 it, these pumps are manufactured and may go  
10 into either application.

11 In general, where DOE has had  
12 commercial rulemakings and commercial products  
13 have coincidentally gone into residential  
14 applications, they are still being commercial  
15 products. It should not matter what the  
16 market share is.

17 MR. BROOKMAN: Comments? Neal,  
18 please. No? Yes, I am looking over here,  
19 this side of the room, if you wish to respond  
20 to that. I am going to Meg next after that.

21 MR. HANDZEL: It sounded like a  
22 question to me to DOE, asking on regulating

1 residential products. Our point was they are  
2 predominantly a residential product.  
3 Circulators are predominantly a residential  
4 product. So, that is the point that we were  
5 making --

6 MR. BROOKMAN: Got you.

7 MR. HANDZEL: -- just because DOE  
8 specifically says that they can't regulate  
9 residential products.

10 MS. KOHL: Just real quick as a  
11 point of clarification, so this is, again, the  
12 issue that John was talking about earlier as  
13 far as what would be considered a pump that is  
14 a type of covered equipment as set forth in  
15 EPCA and what we are looking at standards for  
16 in this rulemaking. I think that is kind of  
17 where the split is coming down.

18 MR. BROOKMAN: Betsy, thank you.

19 Go ahead, Gary.

20 MR. FERNSTROM: Well, I am not sure  
21 I understood that response.

22 MS. KOHL: So, this is Betsy Kohl



1 again.

2 The pump is the covered type of  
3 equipment, right? But what we are looking at  
4 setting standards for in this framework  
5 document at this time is pumps for commercial  
6 applications.

7 MR. FERNSTROM: Well, but my  
8 comment was these pumps are sold into  
9 commercial applications.

10 MS. KOHL: We will need to take a  
11 look at that then.

12 MR. LLENZA: I think it is a little  
13 bit more complicated-- it depends on how they  
14 come off the ``assembly line.'' There is a lot  
15 more that is involved. If it is installed on  
16 the same assembly line for the same pump, we  
17 don't care where you put it. It is going to  
18 be covered.

19 MR. FERNSTROM: Okay. That is an  
20 excellent response to my question. Thank you.

21 MR. BROOKMAN: Okay. Meg, please.

22 MS. WALTNER: Yes, my question is a

1 follow-up question to Mark's, whether your  
2 residential included multi-family or was it  
3 just single-family residential?

4 MR. HANDZEL: So, the best way that  
5 we would break it down is that multi-family  
6 has different classes. If you were in a two-  
7 or-three-flat building, that would still fall  
8 in a residential class. But when you get into  
9 a multi-family high-rise building, that would  
10 be on the commercial side.

11 MS. WALTNER: Okay. Thank you.

12 MR. BROOKMAN: Okay. That was  
13 Mark. Thank you.

14 Neal?

15 MR. ELLIOTT: Related to sort of a  
16 different question -- and this is directed to  
17 the DOE -- is multi-family, how does the  
18 Department view multi-family, commercial,  
19 residential? And do you have a definition  
20 that you can direct us to?

21 MR. LLENZA: Again, I just want to  
22 point out, this is part of what we are trying

1 to do here. Part of what we are asking  
2 industry is to help us define the scope of  
3 covered products. And so, there will be a  
4 section here on definitions. We will go over  
5 that. And the Department is open to input  
6 from the industry.

7 MR. ELLIOTT: Neal Elliott.

8 And I guess a clarification on that  
9 is, my question was, you know, has the  
10 Department in other rulemakings made a  
11 determination of multi-family, as to whether  
12 it is commercial or residential? And it was  
13 just a point of clarification, not with  
14 respect to this rulemaking, but more general.

15 MR. BROOKMAN: John Cymbalsky?

16 MR. CYMBALSKY: So, I am not a  
17 lawyer, but I think I am going to get this  
18 right.

19 (Laughter.)

20 So, the covered product is what  
21 determines. So, for furnaces, for example,  
22 the covered product is the furnace. Whether

1 it goes into an apartment in a multi-family  
2 building or a single-family house, it is still  
3 a furnace.

4 Now, with pumps, we are here to  
5 define the scope of coverage. So, I think we  
6 are asking questions about this, and we are  
7 not going to go on the record to say one way  
8 or another at this point.

9 MR. BROOKMAN: Okay. Louis? And  
10 then, to Tom.

11 MR. STARR: Louis Starr with  
12 Northwest Energy Efficiency Alliance.

13 Might I suggest that you align what  
14 the definition of commercial and residential  
15 with the International Conservation Code or  
16 even some other, maybe 90.1, ASHRAE 90.1. But  
17 they clearly define what commercial is, and it  
18 is kind of this discussion you are having as  
19 to whether a multi-story flat or an apartment  
20 building is commercial or residential. And it  
21 makes a clear definition of what those are.

22 MR. BROOKMAN: Okay. That is worth

1       considering.

2                       Tom Eckman?

3                       MR. ECKMAN:  Yes, I am not sure,  
4       but I suspect that there is a fair amount of  
5       imperfect information about where that pump  
6       ends up, once it is manufactured, if it is a  
7       circulator pump.  And it certainly was the  
8       case when we had other appliances like air  
9       conditions     that     were     single-phased     air  
10      conditioners   that   ended   up   in   commercial  
11      buildings, not three-phase air conditioners.

12                      And so, we, basically, did the  
13      analysis on the presumption that some fraction  
14      would end up in that usage level as opposed to  
15      a commercial building.  And I think that is  
16      probably the likely outcome here, is that we  
17      won't know where most of those pumps go, but  
18      we will have some idea where the fraction  
19      might go.  And they will have a duty cycle  
20      that is different because they are in an X  
21      application as opposed to a Y application.  
22      That is going to change the economics of where

1 you might set the standard. But it is a  
2 covered product, and the distributor and the  
3 manufacturer have no idea where it is going to  
4 end up when someone buys it for installation.  
5 So, we might know the market channel that it  
6 is going to go to, but that is about it.

7 MR. BROOKMAN: Gary Fernstrom?

8 MR. FERNSTROM: I would just like  
9 to make the point that we are having a  
10 discussion here whether these things are  
11 commercial or residential. This is the  
12 Department of Energy. And regardless of where  
13 they go, they have a large energy-saving  
14 opportunity for a low cost. And therefore, we  
15 ought to take advantage of that opportunity,  
16 not quibble over whether they are residential  
17 or commercial.

18 MR. BROOKMAN: Okay. Ken?

19 MR. NAPOLITANO: Ken Napolitano  
20 from the Hydraulic Institute.

21 I don't think our point is -- maybe  
22 we are misstating our point. Our issue is not

1 around commercial or residential. I was  
2 simply making a point that in Europe there is  
3 over 150 million in residential applications,  
4 and that is why the EU chose to regulate it.  
5 There are a lot of them.

6 I think the salient point is, in  
7 fact, what you just said, which is there is a  
8 lot of energy savings at stake and a very low  
9 cost to achieve it. And I would say that we  
10 differ in that opinion. And so, it probably  
11 is useful to ultimately drive to the facts  
12 around that question.

13 MR. FERNSTROM: Thank you. I would  
14 like -- Gary Fernstrom -- to point out that  
15 there is a significant market share, and data  
16 we will supply will show that.

17 MR. BROOKMAN: Thank you.

18 MR. LLENZA: This is Charles Llenza  
19 from the Department.

20 I just want to add that,  
21 statutorily, pumps are not defined. So, it  
22 will be up to this process to define what is a

1 pump, commercial, industrial, whatever you  
2 want to call it, under this rulemaking. And  
3 as part of this process we will try to  
4 cast/cover the largest amount of pumps possible  
5 based on the information provided during this  
6 rulemaking.

7 MR. FERNSTROM: Gary Fernstrom.

8 Thank you. That is great news. I  
9 have confidence in DOE.

10 MR. BROOKMAN: So, let's move on.

11 MR. LLENZA: Okay. So, again, DOE  
12 is considering excluding self-priming pumps  
13 and pumps designed for firefighting  
14 applications. This has been mentioned before.  
15 So, we Request for Comments on this issue,  
16 1-15. DOE requests comments on the technical  
17 features and applications for firefighting  
18 pumps, self-priming pumps, that would allow it  
19 to determine whether these pumps should be  
20 covered or not covered.

21 MR. BROOKMAN: We have touched on  
22 this, but I don't think we got into the



1 details yet.

2 Steve Schmitz?

3 MR. SCHMITZ: Thank you.

4 Steve Schmitz, Hydraulic Institute.

5 I have a longer statement that I  
6 will submit later.

7 MR. BROOKMAN: Thank you.

8 MR. SCHMITZ: But I will give you a  
9 few brief words here.

10 Technical features for fire pumps  
11 are typically not conducive to do optimal pump  
12 efficiency. However, because of minimal  
13 operating times for pumps in this category,  
14 they offer minimal potential energy savings by  
15 requiring optimal design efficiency. And  
16 there is, therefore, no compelling case for  
17 change.

18 To the contrary, requiring  
19 efficiency optimized fire pumps would actually  
20 increase the pump horsepower required,  
21 increasing the size of the motor, controller,  
22 and the wiring. This results in increased

1 costs and power consumption, and increases the  
2 energy consumption for this category. This  
3 defeats the intent of the DOE energy-savings  
4 initiative.

5 Finally, a requirement for fire  
6 pumps to be optimized for efficiency is  
7 projected to have a significant negative  
8 impact due to the approval testing and  
9 approval process cost of approximately  
10 \$100,000 per pump model, exclusive of the  
11 design development cost, in order to replace  
12 existing models.

13 MR. BROOKMAN: Okay. Thank you.

14 Additional comments, the specifics  
15 related to firefighting pumps? Yes, Steve  
16 Rosenstock.

17 MR. ROSENSTOCK: Steve Rosenstock,  
18 EEI.

19 Again, in my mind, it is a  
20 clarification. Are we talking about high-rise  
21 buildings that have fire pumps that are  
22 specifically for the fire prevention systems?

1 Are we talking about the pumps that are on the  
2 back of a fire truck that are connected to a  
3 fire hydrant to fight a fire? Or both?

4 MR. BROOKMAN: Albert?

5 MR. HUBER: Albert Huber, Hydraulic  
6 Institute.

7 We are talking about pumps in  
8 buildings, not fire trucks.

9 MR. ROSENSTOCK: Okay. Steven  
10 Rosenstock, EEI.

11 Thank you, and I would just like to  
12 note for the record that, under Federal  
13 Regulation Notice that was put out, I think it  
14 was last year or the year before, that for the  
15 fire pump motors there are now minimum energy-  
16 efficiency requirements for fire pump motors  
17 that have been published and are now in the  
18 Code of Federal Regulations.

19 Thank you.

20 MR. BROOKMAN: Joanna Mauer?

21 MS. MAUER: Joanna Mauer.

22 We agreed that it makes sense to

1       exclude fire pumps. I think it is just a  
2       question of how do we define them, so that  
3       they are not used in other clean water  
4       applications. I think a similar issue has  
5       come up in the motors docket, and it is just a  
6       question of, you know, is there a  
7       certification or something that we can use  
8       just to make sure that they are used for that  
9       purpose only?

10               MR. BROOKMAN: Thank you.

11               Albert?

12               MR. HUBER: Albert Huber, Hydraulic  
13       Institute.

14               Fire pumps are specifically  
15       designed for fire protection. They do not  
16       operate at its best efficiency point. They  
17       are not designed to operate there. They are  
18       actually designed to operate to the left-hand  
19       side of the best efficiency point because they  
20       are required by Code to be able to pump at 150  
21       percent, and they are required to lift water  
22       at 15 feet at 150 percent. They also have

1 requirements that the shutoff head has to be  
2 maintained at a certain point.

3           Technically, it is used for -- it  
4 could be used for clean water, but it is not  
5 normally used because it is expensive. It  
6 can't have seals in it. It has to have  
7 packing. That is done because the fire  
8 protection people don't want to a failure  
9 during a fire. So, they let the water leak,  
10 which, if you let the water leak, you are  
11 losing water, and therefore, it is not  
12 efficient.

13           So, they are not designed for that,  
14 never were intended to be used for that. They  
15 are intended to be used for fire protection  
16 only. They are regulated by the National Fire  
17 Protection Association, and they are certified  
18 as meeting that NFPA 20 certification by the  
19 Underwriters Laboratory and Factory Mutual.

20           MR. BROOKMAN: Thank you.

21           MR. HUBER: And so, they carry a  
22 stamp to that effect.

1 MR. BROOKMAN: Steve Schmitz?

2 MR. SCHMITZ: Al actually just made  
3 my point.

4 MR. BROOKMAN: Okay.

5 MR. CYMBALSKY: Okay. So, just to  
6 be clear, there is a different certification  
7 process for these pumps.

8 Okay. Thank you.

9 MR. BROOKMAN: Okay. Neal?

10 MR. ELLIOTT: Just to go back to  
11 the motor rule, I would note that the  
12 inclusion of fire pump motors within the motor  
13 rule was a specific category that was set out,  
14 had a lower efficiency than other products,  
15 and it was explicitly included because of the  
16 unique nature of those motors and the  
17 requirement that those motors receive UL and  
18 Fire Certification.

19 So, again, it is a special product,  
20 and it should be treated specially. And just  
21 to reiterate what Joanna said, we do not think  
22 it should be covered in this rulemaking.

1                   MR. BROOKMAN: Okay. The question  
2 is whether we take a break now. I think  
3 probably we are about due. We have got a  
4 little bit more to cover here, right?

5                   MR. LLENZA: Yes.

6                   MR. BROOKMAN: Okay. Let's do take  
7 a break now. It is 10:45. We typically break  
8 for 15 minutes.

9                   For those of you who are new to the  
10 building, or those of you who are not new, you  
11 must wear your visitor's badge visible above  
12 your waist. They are very serious about  
13 security around here.

14                   There are restrooms at both ends of  
15 the hall. There is a coffee shop on the  
16 ground floor. If you take the elevators,  
17 there is a coffee shop on the ground floor  
18 just about directly beneath us; off the  
19 elevator and hang a left.

20                   Please go quickly. Sometimes they  
21 are not very efficient at Dunkin' Donuts.

22                   (Laughter.)

1                   And we will resume at 11:00.

2                   So, thanks. Hey, listen, we have  
3 got a really good start on the day. The  
4 quality of the comments has been excellent.  
5 Let's keep that going.

6                   Thank you.

7                   (Whereupon, the foregoing matter  
8 went off the record at 10:45 a.m. and went  
9 back on the record at 11:05 a.m.)

10                  MR. BROOKMAN: Okay. And once  
11 again, the quality of the comment has been  
12 excellent, and I am very eager for that  
13 continue. And so, we are going to proceed  
14 where we left off, and Alison is going to be  
15 at the podium.

16                  Alison?

17                  MS. WILLIAMS: Thank you.

18                  So, the last slide, we were just  
19 talking about possible exclusions for  
20 firefighting and self-priming pumps. Anyhow,  
21 there are coverage parameters that DOE is  
22 considering. DOE is interested in specific



1 reasons for why they should be in place.

2 And here, we are just acknowledging  
3 the parameters that the stakeholders have  
4 suggested in some of the meetings with DOE.  
5 So, those are listed here related to flow  
6 head, horsepower, and temperature. And the  
7 stakeholders say they have presented these to  
8 generally align with the EU scope, although I  
9 want to note that they are not exactly the  
10 same.

11 So, we did a little bit of estimate  
12 on how many pumps these would exclude. And  
13 so, those numbers are shown on the bottom  
14 here. We think it is about 48 percent of  
15 pumps by model availability and about two-  
16 thirds by shipment.

17 MR. BROOKMAN: Okay. Yes, Steve  
18 first.

19 MR. SCHMITZ: Steve Schmitz,  
20 Hydraulic Institute.

21 If we could go back one slide,  
22 please, Alison? Thank you.

1                   There is a typographical error on  
2 this slide. The second point of 295 feet  
3 should say 459 feet. The 295 feet represents  
4 the max head from the EU standard for four-  
5 pole operation, and at two-pole it is 459  
6 feet.

7                   MS. WILLIAMS: Okay.

8                   MS. MAUER: This is Joanna Mauer.

9                   I just want to clarify, that is a  
10 clarification from what was presented earlier.  
11 So, I think that is why there is some  
12 confusion. I think right now we are  
13 suggesting 459. There may have been something  
14 previously --

15                  MR. SCHMITZ: Right, which aligns  
16 with the EU standard, yes.

17                  MS. MAUER: And the EU standard has  
18 separate maximum head for two-pole and four-  
19 pole motors. I think what we are suggesting  
20 now is a single maximum head regardless of  
21 speed. Is that right, Steve?

22                  MR. SCHMITZ: That is what you are

1 suggesting or we --

2 MS. MAUER: That is what I thought  
3 we were --

4 MR. SCHMITZ: We are saying the  
5 hydraulic picket fence, if we call it that,  
6 the max head that would be involved, no matter  
7 what the speed, would be 459 feet.

8 MS. MAUER: Yes. And I am just  
9 clarifying that that is different than what we  
10 may have presented previously to DOE and a  
11 little bit different than the EU.

12 MR. SCHMITZ: It aligns with EU,  
13 yes.

14 MS. WILLIAMS: So, just to clarify,  
15 this is the only information I have seen  
16 before. And so, we certainly don't have any  
17 numbers involving the 495 that you -- 459,  
18 sorry.

19 MR. BROOKMAN: So, just to confirm,  
20 Steve, make the point again about 459.

21 MR. SCHMITZ: Four hundred fifty-  
22 nine is the max head, as defined by the EU

1 standard.

2 MR. BROOKMAN: Okay. Okay. Got  
3 it.

4 MS. WALTNER: Sorry. Just a  
5 clarification on --

6 MR. BROOKMAN: Yes, Meg, please.

7 MS. WALTNER: And so, in the EU  
8 standard is it max head regardless of speed as  
9 well? Or I think that is part of the  
10 confusion.

11 MR. SCHMITZ: It was max head at  
12 two-pole speed.

13 MR. BROOKMAN: Ken?

14 MR. NAPOLITANO: Maybe I could just  
15 get a little -- two-pole, four-pole, right?  
16 Two-pole run twice as fast as four-pole  
17 motors. So, it is kind of inconsequential  
18 once you say 495 feet because you are not  
19 going to get there with running at half-speed.  
20 You won't be able to generate that much.

21 So, I think the EU had some  
22 subcategories that said, if it was four-pole,

1 you could get up to here, and if it was two-  
2 pole, you could get up to here. But, once you  
3 define the max, it becomes inconsequential.

4 MR. BROOKMAN: Okay. Got it.  
5 Okay. Have we clarified that one? I think we  
6 did.

7 So, Steve Rosenstock, go ahead.

8 MR. ROSENSTOCK: Just quickly, when  
9 you say "stakeholders," are you saying both  
10 the Hydraulic Institute and the energy  
11 efficiency advocates? Is this a joint --

12 MS. WILLIAMS: Yes. So, this is  
13 made in one of the ex parte meetings with DOE  
14 and, also, in the technical meeting between  
15 HI, the stakeholders, and the technical  
16 consultant.

17 MR. ROSENSTOCK: Okay. And then,  
18 just a quick followup. With the parameter of  
19 greater -- so, it is greater than and equal to  
20 1 horsepower and, then, less than or equal to  
21 200 horsepower, correct?

22 MS. WILLIAMS: That is my

1 understanding.

2 MR. ROSENSTOCK: Okay. Because,  
3 just as a quick thought there, by having a 1-  
4 horsepower minimum, doesn't that exclude a lot  
5 of circulator pumps?

6 MR. BROOKMAN: That is an  
7 interesting question.

8 Okay. Gary Fernstrom?

9 MR. FERNSTROM: Seemingly, it  
10 would. So, as we consider wanting to include  
11 circulator pumps, we should make sure that the  
12 horsepower minimum coincides with however we  
13 come out on that.

14 MR. BROOKMAN: Okay. Thank you.  
15 I am eager for us to keep going.

16 MS. WILLIAMS: Sure.

17 MR. BROOKMAN: Oh, well, no, we are  
18 not done yet. Steve? And perhaps Albert.  
19 Steve Schmitz?

20 MR. SCHMITZ: Steve Schmitz,  
21 Hydraulic Institute.

22 Sorry. Thank you.

1 MR. BROOKMAN: No, no, we want  
2 this. This is good. Keep going.

3 MR. SCHMITZ: The Hydraulic  
4 Institute would appreciate better  
5 understanding how the numbers in the graph  
6 here, in the chart here, were reached, how  
7 they were calculated and how you got to that.

8 MS. WILLIAMS: Sure. So, quickly,  
9 as was demonstrated in the framework, we  
10 pulled about 115 manufacturer catalogs from  
11 the PUMP-FLO desktop software and pulled in  
12 pump models out of those. And then, we had to  
13 do some individual work with these. We  
14 excluded 50-hertz pumps, excluded wastewater  
15 pumps, went to the manufacturers' websites and  
16 tried to identify pump categories.

17 And so, we actually have head flow,  
18 horsepower, and temperature from the pump flow  
19 information that we used for the model  
20 availability estimates. And the shipment  
21 estimates were done by a market research  
22 consultant, based on 2010 Census data. So,

1 these are all strictly estimates, and, you  
2 know, they might change if we receive  
3 additional information on them.

4 MR. BROOKMAN: Albert first.

5 MR. HUBER: Albert Huber, Hydraulic  
6 Institute.

7 Alison, since this parameter has  
8 now changed to 459 feet of head, would it  
9 change this chart?

10 MS. WILLIAMS: Yes, it would change  
11 this chart probably significantly. As it  
12 states in the framework document, a lot of  
13 pump models were excluded here because of  
14 head, especially the multi-stage pumps, which  
15 naturally have higher head.

16 So, I would suspect, yes, these  
17 numbers would change. And we do have some  
18 discussion in the framework document about how  
19 that head effect would work. As will go  
20 farther with the EU, if you are only testing  
21 on certain stages, the head limit might have  
22 some different impacts than it would if you



1 are actually looking at all stage versions.

2 MR. BROOKMAN: Mark?

3 MR. HANDZEL: Mark Handzel for the  
4 Hydraulic Institute.

5 Alison, did you guys account for  
6 pump manufacturers that aren't in PUMP-FLO?

7 MS. WILLIAMS: No, we have not done  
8 that. So, this is just an estimate about 50  
9 percent of the market that we have. So, this,  
10 again, would change with any additional  
11 information we receive.

12 MR. BROOKMAN: Ken?

13 MR. NAPOLITANO: And ultimately, of  
14 course, we can hone these numbers. But, even  
15 at the 295 (sic) feet, if I looked at the  
16 first two categories, end suction close  
17 coupled and end suction frame mounted, which  
18 are the largest-volume pumps, I believe, or at  
19 least from an energy consumption standpoint,  
20 in the mix.

21 Just inside those parameters, the  
22 number of 43 and 41 percent just don't seem to

1 make sense. You know, it would seem like it  
2 would be more like 80 percent. So, you have  
3 got to refine those?

4 MS. WILLIAMS: Okay. Yes, I mean,  
5 we are certainly open to refining these  
6 estimates. They were basically done just to  
7 give a quick understanding of what these  
8 parameters might do in terms of the market.  
9 Yes, again, we only have part of the market.

10 It is also not necessarily all  
11 clean water pumps in here because we did have  
12 to do the filtering on that, you know, kind of  
13 manually looking at all catalogs. So, it is  
14 possible there are other pump types in here  
15 that are kind of skewing.

16 MR. BROOKMAN: So, individuals who  
17 attend these meetings on a consistent basis,  
18 it is a constant refrain that the Department  
19 of Energy is asking for data. And so, the  
20 question is, does the Hydraulic Institute, do  
21 you gather this kind of data right now? Ken?

22 MR. NAPOLITANO: Yes, we could

1 assist in this particular discussion around  
2 this model availability in terms of what  
3 percentage of the products fit in the  
4 parameters of the scope. We would be able to  
5 assist with hard data on that.

6 MR. BROOKMAN: That would be very  
7 helpful and the Department would really  
8 appreciate that, and the earlier, the better.

9 These two gentlemen, I didn't get  
10 your names earlier.

11 MR. CASE: Greg Case with Pump  
12 Design, Development & Diagnostics.

13 MR. BROOKMAN: Okay. And?

14 MR. MRKVICKA: Rodney Mrkvicka from  
15 Smith & Loveless.

16 MR. BROOKMAN: Thank you.

17 MR. MRKVICKA: And we are both  
18 members of the Hydraulic Institute.

19 MR. BROOKMAN: So, Greg, you are  
20 next in the queue.

21 MR. CASE: Alison, my question was,  
22 does this also include the ANSI pump models in

1 this?

2 MS. WILLIAMS: It does.

3 MR. CASE: Okay.

4 MS. WILLIAMS: So, the framework  
5 also states that the temperature exclusions  
6 would be lower if we took out the ANSI  
7 chemical process pump.

8 MR. BROOKMAN: Okay. Yes? Okay,  
9 Alison.

10 MS. WILLIAMS: Okay. So, this was  
11 basically just requesting comment on this.  
12 Again, DOE is not necessarily considering the  
13 parameters proposed. So, we would like more  
14 information on those parameters that were  
15 proposed, either that were up there or any  
16 others that people would like to suggest. And  
17 DOE especially seeks comment on -- sorry --  
18 the estimates of pumps. We would like more  
19 data on pumps that could be excluded from  
20 this.

21 MR. BROOKMAN: And the Hydraulic  
22 Institute will supply some of that, right?

1 MS. WILLIAMS: Likely.

2 MR. BROOKMAN: Other sources that  
3 come to mind before we move on?

4 (No response.)

5 MS. WILLIAMS: So, next we are  
6 going to talk about the definitions that DOE  
7 is considering for pumps. And so, currently,  
8 these definitions are based on the equipment  
9 categories that you saw earlier that DOE is  
10 considering for coverage.

11 Most of them have been developed  
12 after reviewing the definitions in the EU  
13 clean water pump regulation. And we have also  
14 developed some additional definitions based on  
15 other categories that the EU did not consider.

16 So, again, these may change. Right  
17 now, they don't have any parameters in them,  
18 as the EU does, because those are not being  
19 considered at the moment. So, eventually, the  
20 specific parameters, like head and flow, if  
21 there are any, could be added to these.

22 So, I am not going to read all of

1 these individually. We will just look at them  
2 and have some comments at the end.

3 So, again, we are starting with  
4 pump, rotodynamic water pump, and then, after  
5 that, it starts with the individual categories  
6 that we looked at earlier. So, these are just  
7 the categories that we saw.

8 So, DOE would like comment on any  
9 of the suggested definitions for pumps,  
10 whether they are sufficient to allow  
11 determination of what is covered and in what  
12 category your equipment might fit, and just a  
13 rather specific note on what could be used to  
14 define the axial/propeller mixed flow pumps in  
15 terms of specific speed or other parameters.

16 MR. BROOKMAN: Okay. Let's start  
17 with the definitions on slide 32. That is  
18 where we are right now. Mark?

19 MR. HANDZEL: Mark Handzel,  
20 speaking for the Hydraulic Institute.

21 The Hydraulic Institute has  
22 clearly-defined HI/ANSI definitions of pumps

1 that are considered standards in the industry  
2 by the pump manufacturers and their  
3 constituents. We do not feel that the DOE  
4 should initiate the use of another set of  
5 definitions for this rulemaking, primarily  
6 because we have these standards. They have  
7 been in the industry for a long time, and we  
8 feel that they are the way that products  
9 should be defined.

10 MR. BROOKMAN: Okay. Thank you.

11 Joanna?

12 MS. MAUER: Joanna Mauer.

13 So, we recognize the benefits of  
14 ANSI/HI definitions in the marketplace and for  
15 the industry, but we are concerned that in a  
16 regulatory environment that the ANSI/HI  
17 definitions could present some potential  
18 loopholes and, in particular, because the  
19 ANSI/HI definitions are very specific. You  
20 know, we see the possibility for making very  
21 minor alterations to a pump, such that it no  
22 longer meets that ANSI/HI definition.

1           And so, our current thinking is  
2           that it would be better to define pump  
3           categories more broadly and, then, to define  
4           any necessary exclusions to reach the scope of  
5           coverage that we would like. We may have some  
6           suggested tweaks to the DOE definitions, but  
7           we think they are a good starting point.

8           MR. BROOKMAN: Okay. Thank you.

9           Additional thoughts? We are going  
10          to keep -- so, the Hydraulic Institute does  
11          not wish to comment specifically on these  
12          definitions?

13          MR. HANDZEL: We didn't develop --  
14          Mark Handzel for the Hydraulic Institute -- we  
15          didn't develop specific responses, just  
16          because we feel that it is going the wrong  
17          direction.

18          MR. BROOKMAN: Okay. Okay. Then,  
19          let's look at, scan through 32, 33, and 34.  
20          And as would be reflected in the comment box  
21          on 35, let's see if anybody wishes to make  
22          specific            additions,            corrections,



1       amplifications to these definitions.

2                       (No response.)

3                       And, of course, definitions are a  
4       complicated bit of business.       So, written  
5       comments might be the best avenue here.

6                       Okay.   Then, I am seeing none as I  
7       scan the room.   So, we are going to move on.

8                       MS.       WILLIAMS:               So,       these  
9       definitions are related to the definition of  
10      clean water, which we touched on earlier, and  
11      the framework document we presented that used  
12      the EU definition for clean water.   And we are  
13      seeking comment on how best to translate the  
14      wording and units of that to the U.S.   The  
15      definition seems a little vague.   So, any  
16      comments to help improve that definition, as  
17      well as whether any other parameters, such as  
18      maximum solids diameter, could be added to  
19      that.

20                      And again, as we discussed before,  
21      we could alternatively do some different  
22      definitions,   such as defining physical

1 characteristics of the pumps themselves as  
2 opposed to the water. So, these are just  
3 things out for comment.

4 MR. BROOKMAN: Steve Rosenstock?

5 MR. ROSENSTOCK: Steve Rosenstock,  
6 EEI.

7 I didn't look in that section of  
8 the framework document, so please forgive me.  
9 But I am just kind of curious if you had a  
10 chance to look at the EU definition compared  
11 to any EPA definitions and if they are aligned  
12 at all.

13 MS. WILLIAMS: I have not looked at  
14 that. I am not sure if -- it is something we  
15 can certainly note down.

16 MR. BROOKMAN: Okay. Thank you.  
17 Steve Schmitz?

18 MR. SCHMITZ: Steve Schmitz,  
19 Hydraulic Institute.

20 We are just going to reiterate the  
21 prior comment about the use and definition of  
22 the ISO 9906 standard for definition of clean

1 water.

2 MR. BROOKMAN: Excellent. Okay.

3 Thank you.

4 Yes, Mark?

5 MR. HANDZEL: Mark Handzel for  
6 Hydraulic Institute.

7 Regarding 127, the question really  
8 has to do with whether the use of the words  
9 "solid diameter" should be used in a  
10 definition of clean water. So, the members of  
11 the Hydraulic Institute wish to clarify that  
12 consideration for solids diameter is not used  
13 in any definition of clean water pumping. No  
14 solids are allowed.

15 MR. BROOKMAN: Oh, okay. Thank  
16 you.

17 MS. WILLIAMS: Okay. So, we are  
18 going to switch to another section. Until  
19 now, we have been focusing basically on the  
20 pump itself, and DOE has also been considering  
21 a more expansive version of pump. So, the EU  
22 has started an exploration of the pump

1 inclusive of motor and controls, and  
2 stakeholders in this room have also suggested  
3 following such an approach. The primary  
4 reason for this approach is to capture the  
5 benefits of variable speed drives, primarily  
6 in variable-load applications with low static  
7 head.

8                   However, DOE realizes that  
9 manufacturers can't control how a pump or a  
10 VSD is used. In some cases, the same pump  
11 will be used in both constant and variable-  
12 load applications. So, any analysis that will  
13 be done will look at all the applications out  
14 there, including the baseline conditions,  
15 whether they are currently throttled, constant  
16 load, whatever, to determine whether or not  
17 the VSDs would save energy in the field.

18                   So, just kind of a background  
19 review, and we are looking at pumps a little  
20 more broadly. DOE believes that most pump  
21 types are generally sold without motors.  
22 However, some of the most common pump types,

1 including end suction close coupled, most of  
2 the time are shipped with a motor by the  
3 manufacturer.

4 DOE believes that a number of pumps  
5 sold with motors and VSDs by the pump  
6 manufacturer is much smaller, at approximately  
7 2 percent, although there may be some  
8 application categories, such as circulators or  
9 water pressure booster pumps, where there is  
10 more of those sold in a package.

11 So, DOE is interested in data on  
12 how pumps are sold, including whether they are  
13 sold alone, with a motor, with a motor and  
14 VSD, and whether they are actually integrated  
15 or they are just kind of priced together and  
16 shipped, you know, maybe separate boxes, the  
17 same box, whatever; basically, interested in  
18 data on this by equipment category, size,  
19 application, whatever is available.

20 MR. BROOKMAN: So, I am looking  
21 over there to Ken or someone first because  
22 this is back to that constant refrain: DOE

1 looking for data. And I was wondering if the  
2 Hydraulic Institute has that information, can  
3 supply that information. Or, Neal, do you  
4 wish to comment here?

5 MR. ELLIOTT: Neal Elliott, ACEEE.

6 I wanted to get on the record  
7 indicating that, as we have suggested to the  
8 Department several times, it is probably  
9 timely to do an update on motor and motor-  
10 driven equipment, energy use in the United  
11 States. The most recent comprehensive study  
12 was the 1999 study, the so-called "Xenergy  
13 Motor Market Study". We think it would be  
14 very useful -- and I am speaking on behalf, I  
15 think, of the motor industry and the motor-  
16 driven equipment industry as well as many in  
17 the energy-efficiency, that a comprehensive  
18 study would benefit substantially in moving  
19 forward with these issues.

20 MR. BROOKMAN: So, I lost track of  
21 that. Are you suggesting the Department of  
22 Energy does that or does that in cooperation

1 with the stakeholders?

2 MR. ELLIOTT: Yes, the Department  
3 did a study, EERE. There is actually pending  
4 legislation before the Congress which would  
5 actually direct the Department to undertake  
6 such a study.

7 MR. BROOKMAN: I see.

8 MR. ELLIOTT: Understand the cost  
9 is an issue here. We think this is a  
10 priority, though, in addressing many of these  
11 issues because we revisit them --

12 MR. BROOKMAN: Yes, yes.

13 MR. ELLIOTT: -- every time we do  
14 one of these rulemakings.

15 MR. BROOKMAN: Bruce, follow-on?

16 MR. LUNG: Bruce Lung, Alliance to  
17 Save Energy.

18 I would echo that request by Dr.  
19 Elliott.

20 I would also like to point out, and  
21 perhaps ask the technical advisors, there is  
22 actually a rich portfolio of information

1 related to energy efficiency in industrial-  
2 scale pumping systems that was produced by  
3 EERE's Advanced Manufacturing Office,  
4 including case studies, fact sheets, and  
5 source books. And if those resources have not  
6 been used, I would invite them to use them to  
7 inform particularly this discussion around  
8 variable-speed control of industrial pumping  
9 systems.

10 MR. BROOKMAN: Okay. Thank you.

11 Rodney, thank you for being  
12 patient.

13 MR. MRKVICKA: Rodney Mrkvicka of  
14 Smith & Loveless, and representing the  
15 Hydraulic Institute.

16 With respect to your Items 1-16 and  
17 1-17, the Hydraulic Institute does not have  
18 any of that data available to provide in those  
19 categories, and we believe acquiring that  
20 would be a pretty extensive market survey  
21 because of the wide range of categories you  
22 have.



1                   That being said, through our  
2 members that we have, we have an opinion on  
3 both those. And our opinion is that the pump  
4 with the motor combination would be the  
5 substantially largest market segment.

6                   Alison, on your slide 39, which was  
7 just above your first bullet point, it stated  
8 that most pump types are generally sold  
9 without motors. So, the Hydraulic Institute  
10 would like to request some additional  
11 information or background of that data, as it  
12 differs from our opinion, from that table.

13                   MS. WILLIAMS: Yes, I mean, just to  
14 clarify, these are estimates by a pumps market  
15 research consultant, and we are certainly  
16 welcome to any information that is different  
17 from this.

18                   MR. BROOKMAN: Rodney, from your  
19 comment, I couldn't understand. Do you have  
20 the capacity to gather this data?

21                   MR. MRKVICKA: Not at this moment,  
22 no.

1 MR. BROOKMAN: Okay. Okay. Alex  
2 Boesenberg?

3 MR. BOESENBERG: Since I won't be  
4 here after lunch, I beg the indulgence to  
5 comment on Item 12-2, in followup to Neal  
6 Elliott's statement.

7 When addressing cumulative  
8 regulatory burden, it is often what other  
9 things are going on that will affect the  
10 industry. I would submit that the issue of  
11 the motor study is one where the DOE is under  
12 a cumulative burden, where several rulemakings  
13 could be positively influenced by that study;  
14 ergo, better data. So, again, NEMA will echo  
15 Neal's statement to please find a way to fold  
16 that study in somehow.

17 MR. BROOKMAN: Okay. Thank you.  
18 Yes, Tom Eckman.

19 MR. ECKMAN: Tom Eckman, Northwest  
20 Power and Conservation Council.

21 This is mostly for the  
22 manufacturers in the room. It seems to me

1 that, given this standard isn't scheduled to  
2 take effect until 2019 or thereabouts, it  
3 would be interesting to know what you think  
4 the trendline looks like with respect to the  
5 sales of these units with the motor set  
6 connected to them compared to just the pump  
7 alone, and whether or not there is a trend  
8 that is moving that direction or away from it.

9           Since, if we are thinking about a  
10 regulatory regime that might include the whole  
11 drive and motor set, knowing that that is more  
12 likely to be the case in the future than less  
13 likely to be the case in the future would be  
14 of interest in setting up which policy option  
15 you want to pursue here.

16           MR. BROOKMAN: Ken?

17           MR. NAPOLITANO: Ken Napolitano,  
18 the Hydraulic Institute.

19           I think a couple of things. Just  
20 first to kind of expound on Rodney's point,  
21 while it is true that the Hydraulic Institute  
22 does not have this exact data definitively as

1 specifically how many pumps are sold with  
2 motors, first, I want to point out that we are  
3 generally eager to share as much data as  
4 possible with everyone, so that we can get to  
5 the right answer.

6 Secondly, we certainly can work  
7 towards, albeit maybe not precise, but working  
8 towards polling of the manufacturers to at  
9 least get some aggregated look of an estimate  
10 toward those data.

11 To answer your question, first of  
12 all, we believe just notionally that the  
13 number of pumps sold with motors is higher  
14 than what was displayed there.

15 Secondly, generally, the trend,  
16 although I wouldn't attempt to quantify the  
17 rate, is for that to increase and for the  
18 integration of speed control, whether it be a  
19 variable-speed drive or other type device, to  
20 increase as well. Certainly, it depends a lot  
21 on which pump type and category and size  
22 horsepower you are talking about. But I would

1 say that the general direction is for more  
2 integration rather than less.

3 MR. BROOKMAN: Thank you.

4 John Cymbalsky?

5 MR. CYMBALSKY: John Cymbalsky,  
6 DOE.

7 I just want to point out that, for  
8 the manufacturers, you can enter into some  
9 agreement with our consultants to sign a  
10 confidentiality agreement, where the  
11 information that you provide to them would not  
12 be divulged to the federal government --

13 MR. BROOKMAN: Or anyone.

14 MR. CYMBALSKY: -- if that makes  
15 you feel more comfortable moving this process  
16 along.

17 MR. BROOKMAN: Ken?

18 MR. NAPOLITANO: Yes, it is Ken  
19 Napolitano.

20 I think, for certain types of data,  
21 that would be something that would probably be  
22 required, and therefore, discussed. Other

1 types of data we are ready to put in the  
2 public record.

3 MR. BROOKMAN: There will be more  
4 said later in the day about how that gets  
5 done.

6 Okay. Keep going, Alison.

7 MS. WILLIAMS: So, just a few more  
8 questions on the system. DOE requests  
9 information on how often and what  
10 circumstances the intended application of the  
11 pump is known when it is sold, and is also  
12 interested in further comment on including  
13 feedback in any definition for pumps that  
14 includes motors and controls.

15 MR. BROOKMAN: Yes, Rodney?

16 MR. MRKVICKA: Rodney Mrkvicka,  
17 Smith & Loveless, representing the Hydraulic  
18 Institute.

19 To your Item 1-18, again, we don't  
20 have hard data to provide, but our opinion, a  
21 substantial majority of the time the  
22 manufacturer knows what the application of the

1 pump is for, not all the times, but a majority  
2 of the time. The end-user is the person who  
3 knows where it is all the time.

4 So, again, in feeding off of what  
5 Ken mentioned earlier, as we start to package  
6 these and the trend is going up, incorporating  
7 an extended product approach on this would  
8 help the end-user supply this pump in a better  
9 situation to be more energy efficient. And in  
10 doing this, you remove the fragmentation that  
11 you mentioned on the earlier slide about how  
12 pumps are supplied, where various people have  
13 the different points. Bringing this all  
14 together will help optimize the pump  
15 operation.

16 And if I may, on 1-19, it is very  
17 simple. The Hydraulic Institute agrees that  
18 feedback control is necessary to effectively  
19 operate these units.

20 MR. BROOKMAN: Thank you.

21 Steve Rosenstock?

22 MR. ROSENSTOCK: Steve Rosenstock,

1       EEI.

2                   Just, again, in terms of variable-  
3 speed drives, they are a great technology for  
4 saving energy, but I guess my thought is any  
5 sort of regulation -- the only similarity, in  
6 terms of other products, the only similar type  
7 of efficiency requirement, I will say, is with  
8 residential boilers have to have the automatic  
9 temperature resets. That is a requirement  
10 under federal law. Not only there is an AFUE  
11 for them, but there is also they have to have  
12 the temperature reset to modulate the usage to  
13 save more energy.

14                   I guess I am a little concerned  
15 that variable-speed drives are a control  
16 technology. They are using energy themselves,  
17 but, really, they are saving energy for the  
18 other product, the motor, which is a pump  
19 motor. That is what they are doing.

20                   I guess I am a little worried  
21 about, as we go down this road, are we going  
22 to try to also, are we also looking at certain



1 specifications for the variable-speed drive  
2 that might go on the motor that is attached to  
3 the pump? Again, it is a matter of where is  
4 this going in terms of, does the variable-  
5 speed drive have specific design requirements  
6 itself before it would be considered to comply  
7 with any sort of regulation?

8 MR. BROOKMAN: Charles? Betsy?  
9 Betsy?

10 MS. KOHL: Just real quick, so when  
11 we set efficiency standards, it is we don't  
12 set design requirements for specific pieces.  
13 We might look at more efficient VSDs in  
14 setting the standard, but how you get to the  
15 ultimate standard level is up to you. We  
16 don't set specific design requirements for a  
17 VSD.

18 MR. BROOKMAN: Don Brundage?

19 MR. BRUNDAGE: Don Brundage,  
20 Southern Company.

21 In the context of a manufacturer's  
22 standard, I am not necessarily opposed to

1 this. I am not sure how well it would work.  
2 I have some misgivings about trying to require  
3 variable-speed/drive speed package into pumps  
4 because, for one thing, if it is a pump that  
5 is designed by its operation to only operate  
6 at one speed when something else is operating,  
7 adding a variable-speed drive in that  
8 situation is going to increase energy use  
9 because of the energy use of the variable-  
10 speed drive itself.

11 So, I realize we are early in the  
12 process, but I am not sure how this could  
13 really be done in the context of --

14 MR. BROOKMAN: Right.

15 MR. BRUNDAGE: -- this rulemaking.

16 MR. BROOKMAN: We just want to  
17 gather any useful information at the stage we  
18 are in now.

19 Gary? And then, we are going to  
20 keep moving on.

21 MR. FERNSTROM: Okay. So, excuse  
22 me. Going to Don's point first, oftentimes,

1 engineers oversize this equipment. So,  
2 whether it is a fixed application or not, many  
3 times there are opportunities for a variable-  
4 speed drive to better match the pump to the  
5 desired operating condition. And you save  
6 energy that way, even though it is a fixed-  
7 speed application.

8 And going to Steve's point, I think  
9 whatever measurement and test algorithm we  
10 come up with, it needs to include the energy  
11 use of the variable-speed drive itself, which  
12 may include a standby energy use, in order to  
13 properly capture the energy use of the  
14 integrated piece of equipment that is being  
15 represented as an extended product,  
16 category/product.

17 MR. BROOKMAN: Okay. Ken?

18 MR. NAPOLITANO: Ken Napolitano of  
19 the Hydraulic Institute.

20 Of course, we proposed the use of  
21 what we refer to as extended product. And I  
22 would like to make just a couple of comments

1 about extended product because this is a very  
2 important part of the discussion when you  
3 consider the amount of energy savings  
4 potential from this approach as compared to  
5 looking at just the pump component efficiency.

6 The extended product approach is a  
7 methodology to calculate the Energy Efficiency  
8 Index of an extended product, incorporating  
9 load profiles. And it consists of a physical  
10 product. It doesn't just need to be a  
11 variable-speed drive, but it is a pump and a  
12 motor and some control feedback or a pump,  
13 motor, speed control, and a feedback loop.  
14 So, yes, you need a feedback mechanism to,  
15 then, adjust the pump to the demand.

16 And we have identified two  
17 categories. One is pump with a variable-speed  
18 drive for load profiles and applications that  
19 are conducive to that, but there is also  
20 constant-speed operation, where you don't have  
21 a highly-variable load profile, and it could  
22 be as simple as an on/off control. Because,

1 believe it or not, there are a lot of pumps  
2 that run out there and they just run and run  
3 and run, whether there is a demand or load or  
4 not. And simply by having a feedback loop  
5 that turns them off, it could have a  
6 substantial energy savings.

7 And so, by defining the extended  
8 product in those two potential categories,  
9 that approach can be used on virtually any  
10 application.

11 And then, lastly, we did an  
12 estimate, which we submitted a long time ago,  
13 that conservatively estimated the energy saved  
14 by incorporating the extended product approach  
15 in the scheme would represent 11.6-terawatt  
16 hours per year of energy savings potential.  
17 So, far and away, the largest piece.

18 So, it is more complex than just  
19 the pump efficiency. I think we are  
20 benefitting from the fact that we are behind  
21 the EU because the EU plowed a lot of ground,  
22 and they went first with Minimum Efficiency

1 Index on the pump itself because it is simpler  
2 to get at, but they are now writing  
3 regulations around the extended product  
4 approach. So, there is a methodology to get  
5 at that.

6 Thank you.

7 MR. BROOKMAN: Mike Rivest?

8 MR. RIVEST: Mike Rivest, Navigant  
9 Consulting.

10 Just sort of following up on  
11 Steve's comment about how one might  
12 incorporate standards that take into account  
13 variable-speed drives, and you mentioned the  
14 prescriptive standard for boilers, the idea  
15 here in this product would not be to have a  
16 prescriptive standard, but to develop a test  
17 method at different loading points which,  
18 then, combined with a load profile, would  
19 allow you to look at the consumption or the  
20 efficiency, sort of like an SEER value, if you  
21 will, for air conditioning, that would combine  
22 all the load profile, the test procedure at

1 different loading, and together you could  
2 develop the economic payback, if you will, of  
3 different load profiles, even for a customer  
4 that has a single speed. So, it is a little  
5 bit more complicated of an analysis, but there  
6 are certainly multiple rulemakings that have  
7 used this approach.

8 MR. BROOKMAN: Okay. Thanks, Mike.  
9 Yes, Albert?

10 MR. HUBER: This is Albert Huber  
11 with the Hydraulic Institute.

12 I just want to comment that the  
13 Hydraulic Institute is currently working on  
14 standards for tests to test this extended  
15 product and an EEI, which is the Energy  
16 Efficiency Index that you would judge the  
17 product by and label it by. So, we are  
18 already in the process of doing that.

19 MR. BROOKMAN: Do you have a  
20 timetable?

21 MR. HUBER: No, not at this time,  
22 but we are very close at this point.

1 MR. BROOKMAN: But you are close?

2 MR. HUBER: Yes.

3 MR. BROOKMAN: Okay.

4 MR. HUBER: Certainly within the  
5 timeframe -- (laughter) -- as close as any  
6 timetable that the DOE has in regulation, more  
7 like 2015.

8 MR. BROOKMAN: There is another  
9 constant refrain in these meetings, and that  
10 is, how soon can you get it to us, right?

11 (Laughter.)

12 To the Department. It is always  
13 beneficial.

14 Okay. Yes, please.

15 MR. HUBER: Excuse me.

16 MR. BROOKMAN: Yes.

17 MR. HUBER: We can get it, we  
18 believe we will have it to you this year.

19 MR. BROOKMAN: Great. Thank you,  
20 Albert. That is great.

21 Okay. Please say your name. Leave  
22 that thing on, okay (referring to microphone)?



1 MR. BUTLER: Kitt Butler with  
2 Advanced Energy.

3 I would just like to bring up that  
4 there is a test standard out there for VSD  
5 performance. It is AHRI 1210, and it does get  
6 at the points that were made earlier about  
7 different speeds and matrix between motor and  
8 drive.

9 MR. BROOKMAN: AHRI 1210? Okay.  
10 Thanks.

11 Alison, let's keep going.

12 MS. WILLIAMS: So, just to describe  
13 a little bit more about what we have been  
14 talking about --

15 MR. BROOKMAN: Well, wait.

16 Go ahead. Your name?

17 MR. LEMMOND: Jon Lemmond from  
18 AHRI.

19 I just want to add that that AHRI  
20 standard that was 1210 is an ANSI standard as  
21 well.

22 MR. BROOKMAN: Okay. Thank you.

1 Alison?

2 MS. WILLIAMS: So, in the first  
3 regulatory regime that DOE could follow, they  
4 would regulate just pumps alone, regardless of  
5 how they are sold, which is consistent with  
6 the current EU approach for clean water pumps,  
7 although, as noted, they have been exploring  
8 some additional options.

9 DOE could also consider looking at  
10 combined pump equipment. So, in Regulatory  
11 Regime 2, it would define pumps as inclusive  
12 of the motor and VSD if sold together.

13 So, we would end up with two  
14 equipment class sets, which we will talk about  
15 these a little bit later, one for pumps  
16 without VSDs and one for pumps with VSDs.

17 In the third option, we define  
18 pumps as inclusive of the motor if sold  
19 together. So, you are going to have two  
20 equipment class sets, one for pumps with  
21 motors and one for pumps without motors.

22 For the pumps with motors, VSDs

1 would be considered a design option to  
2 increase efficiency. So, it is kind of like  
3 what happened in the EU circulator regulation  
4 where some of the efficiency levels considered  
5 basically included a VSD. So, it would be  
6 something similar to that.

7 And just to note that in Regimes 2  
8 and 3, it is possible that the same pump could  
9 be placed into two equipment classes if it is  
10 sold both alone or with a motor or VSD.

11 This is just a visual description  
12 of what I just discussed. So, the first row  
13 is Regulatory Regime 1, where only the pump  
14 itself is regulated, regardless of how it is  
15 sold. In the second row, the pump itself is  
16 regulated unless it comes with both a motor  
17 and a VSD. And in the third row, it is  
18 regulated based on how it is sold. So, pump  
19 alone if sold alone; pump with a motor and  
20 consider a VSD as a design option for pump-  
21 sold motors, and then, again, the whole set  
22 for the third.

1                   MR.    BROOKMAN:        Yes,    Steve  
2    Rosenstock.

3                   MR.    ROSENSTOCK:    Steven Rosenstock,  
4    EEI.

5                   I    don't have problems with this  
6    conceptually, and I think it is a really,  
7    really good chart. My only concern is on the  
8    far right side it says, "Pumps sold with VSD".  
9    I would hate to limit any technology. What is  
10   there is some other technology that is -- I  
11   will just say maybe it is a step function  
12   rather than a continuous variable-speed drive.  
13   What if it is an on/off switch for certain  
14   motors? That saves the most energy.

15                  So,    in    terms    of    regulatory  
16    function, if you are going to add in the pump,  
17    the motor, and some sort of, I will say,  
18    energy control, it might be better to have a  
19    more inclusive type of language to say we are  
20    not just looking at variable-speed drives; we  
21    are looking at, if we can do it under certain  
22    test procedures, other technologies that might

1 control the energy usage of the motor that is  
2 a standalone product.

3 MR. BROOKMAN: Okay.

4 MR. ROSENSTOCK: Thank you.

5 MR. BROOKMAN: So, you now see the  
6 Request for Comment, Item 1-20 and -21. Do  
7 you want to just --

8 MS. WILLIAMS: Sure. The first is  
9 basically asking whether Regimes 2 or 3 could  
10 generate energy use by increasing the  
11 beneficial use of VSDs in the field or whether  
12 they might have any drawbacks. And we are  
13 also interested in the market share of pumps  
14 by category that would be used in an  
15 application that would benefit from a VSD.

16 MR. BROOKMAN: Rodney?

17 MR. MRKVICKA: Rodney Mrkvicka,  
18 Smith & Loveless and the Hydraulic Institute.

19 In response to your 1-20, the  
20 extended product proposal that HI has  
21 presented for a variable-load profile, VFDs or  
22 variable-speed drives in whatever category

1 they would vary the speed of the pump, yes,  
2 that would increase the beneficial use of  
3 them.

4 As Gary had mentioned earlier about  
5 pump applications, normal pump applications --  
6 or I shouldn't say "normal" -- many pump  
7 applications can be oversized, and you have to  
8 throttle back, so your motor is running full  
9 speed and you are throttling back. The use of  
10 VFDs can benefit by moving the pump more  
11 towards its Best Efficiency Point, or BEP, on  
12 its pump curve versus moving it away from it,  
13 if you are running at a constant speed.

14 So, in those variable-speed  
15 applications, yes, VFDs will be a beneficial  
16 use of them. In addition, using extended  
17 product in an EEI approach should move the  
18 market to a more optimum use of these  
19 products. Again, when you have a fragmented  
20 market and people put things together or are  
21 trying to design stuff, you may not get the  
22 most optimum energy-efficient unit at the end.

1                   Using the extended product, we  
2 believe that you are going to end up with more  
3 proper applications in the market than  
4 improper applications from that aspect. So,  
5 that is on 1-20.

6                   MR. BROOKMAN: Thank you.

7                   Other comments on 1-20? Joanna?

8                   MS. MAUER: Joanna Mauer.

9                   So, I guess, first, on Option 2, it  
10 seems like there may be an energy-savings  
11 opportunity with Option 2 if there is a  
12 significant variation in VFD efficiency, and I  
13 don't know what that variation is. But it  
14 doesn't seem to us that that would by itself  
15 increase the use of VFDs in the field. I  
16 think it would just have the effect of, if you  
17 are already going to buy a pump with a VFD,  
18 now you are going to get one that has a VFD  
19 with a high efficiency.

20                   I think to us the more interesting  
21 option is Option 3 because we see that the big  
22 opportunity here is increasing the market

1 penetration of pumps with VFDs, getting more  
2 VFDs out into the field in applications where  
3 they can save a significant amount of energy.

4 And so, I think with Option 3 it  
5 seems like in many cases a customer who  
6 otherwise would buy a pump with a motor  
7 without a VFD is now going to get a package  
8 that includes a VFD. So, it seems like it is  
9 an option to increase the use of VFDs in the  
10 field.

11 And I think the other point about  
12 Option 3 is that, as you mentioned, there  
13 would still be two categories of pumps. There  
14 would still be a separate category of pumps  
15 sold without a motor. And so, certain  
16 customers who have an application where they  
17 are really not going to see a benefit from a  
18 VFD, where using a VSD may not be a beneficial  
19 option for them, that customer still has the  
20 option of buying a pump and separately buying  
21 a motor, so that they still have that option.  
22 They are not required to buy this package that



1 includes the VSD.

2 MR. BROOKMAN: Albert? And then,  
3 to Gary.

4 MR. HUBER: Albert Huber, Hydraulic  
5 Institute.

6 Our proposal today is basically No.  
7 3 or Regime No. 3. And basically, the pump  
8 only would be regulated by an MEI, or a  
9 Minimum Efficiency Index, and our extended  
10 product would have two categories, one being  
11 pump and motor and the other one being pump,  
12 motor, VFD, and feedback. So, this is exactly  
13 what we are proposing.

14 MR. BROOKMAN: Thank you.

15 Joanna, follow on, yes.

16 MS. MAUER: Joanna Mauer.

17 Maybe we just need to have some  
18 further discussions, but I think the  
19 difference, the way I see it, between what DOE  
20 has laid out in terms of Option 3 and what you  
21 have just mentioned, Al, is that by having  
22 three categories, customers still have the

1 option of buying pump and motor without a VFD,  
2 where I think the real opportunity is getting  
3 more packages that include the VFD out into  
4 the field. And so, I don't have a good  
5 understanding of how having the three  
6 categories would actually increase the market  
7 penetration of products with VFDs.

8 MR. BROOKMAN: Ken, follow on.

9 MR. NAPOLITANO: No, I would just  
10 say that those are all good questions, and we  
11 are aligned with the notion of figuring out  
12 how to increase the adoption of VFDs.

13 MR. BROOKMAN: Okay. Gary?

14 MR. FERNSTROM: We strongly agree  
15 with Joanna.

16 MR. BROOKMAN: Okay. Steve  
17 Rosenstock?

18 MR. ROSENSTOCK: Steve Rosenstock,  
19 Edison Electric Institute.

20 I guess -- and it is good to hear  
21 -- but I guess in terms of DOE, under Option  
22 3, that would mean that there would be three

1 separate test procedures for this product.  
2 With other products there I am familiar with,  
3 I don't know if there are multiple efficiency  
4 test procedures. There is usually just one  
5 test procedure with, I will say, a static  
6 loading and static ambient conditions.

7           So, again, I don't mind. I would  
8 just say it would be kind of almost, it might  
9 be, again, unless there are other products  
10 that are doing it, it might be setting a  
11 precedent where, again, different  
12 manufacturers might have to do three different  
13 test procedures for all their products versus  
14 other manufacturers would only have to do one  
15 test procedure.

16           MR. BROOKMAN: Louis?

17           MR. STARR: In terms of Option 3,  
18 the only thing you might consider is perhaps  
19 putting some bookends in terms of the range of  
20 VFDs, where they are required. So, maybe 1 to  
21 25 horsepower.

22           The concern I might see is that a

1 distributor could go out and start buying a  
2 VFD and a bare motor separately and putting  
3 these things together. Or, in other words, if  
4 you had an application where you had a  
5 constant flow, but you had to buy a VFD, it  
6 is going to make the product more expensive.  
7 But if I can just buy the motor and sell it to  
8 you directly without having to put the VFD, my  
9 price is now lower than your price as a  
10 manufacturer. So, the prices of VFDs get to  
11 be pretty substantial when they get into  
12 certain ranges, and it can be as much as the  
13 product, the pump itself. So, you might think  
14 about some of the fallout of that.

15 MR. BROOKMAN: Okay.

16 I am eager for us to move on. So,  
17 Alison?

18 MS. WILLIAMS: Okay. So, until  
19 now, basically, we have been talking about  
20 pumps with electric motors. DOE acknowledges  
21 that about 10 percent of pumps are driven by  
22 something other than a motor, such as an

1 engine or a steam turbine. DOE is potentially  
2 considering regulating those as pumps sold  
3 alone, even if they are driven with an engine,  
4 mostly for simplicity. And we are interested  
5 in comment on the market-share in applications  
6 of the pumps driven by other than electric  
7 motors.

8 MR. BROOKMAN: Steven Rosenstock?

9 MR. ROSENSTOCK: Steven Rosenstock,  
10 Edison Electric Institute.

11 I want to thank you for this slide.  
12 EEI feels very strongly that DOE should take a  
13 fuel- and market-neutral approach to any new  
14 standard. So, I applaud that DOE is going to  
15 regulate these products because that is the  
16 best way to achieve maximum energy savings,  
17 regardless of the driver.

18 In terms of the efficiency  
19 regulation, all I would say is please try to  
20 be consistent as possible. If you are going  
21 to have three test procedures, like the  
22 previous slides, for products that are using

1 electric drivers or controls, then there  
2 should be a similar number of test procedures  
3 for the non-electric drivers, again, to  
4 maximize energy efficiency for these products.  
5 I think that is the best; it is the most  
6 market-neutral and fuel-neutral way to  
7 approach regulating these products.

8 Thank you.

9 MR. BROOKMAN: Rodney?

10 MR. MRKVICKA: Rodney Mrkvicka,  
11 Smith & Loveless, and the Hydraulic Institute.

12 On that comment on 1-22, the  
13 Hydraulic Institute does not have that data  
14 available, nor is it something that is in the  
15 near future that data available.

16 One comment on the first statement  
17 there. Approximately 10 percent of the pumps  
18 consider being driven by natural gas or diesel  
19 engines or steam turbines, it is our opinion  
20 that that figure is very high, comparatively  
21 speaking, to our membership and what we  
22 believe is non-electric motors. We think that

1 number is extremely high.

2 MR. BROOKMAN: Would you care to  
3 venture what you think it is?

4 MR. MRKVICKA: Estimate maybe 2 to  
5 3 percent.

6 MR. BROOKMAN: Thank you.  
7 Louis?

8 MR. STARR: I have a little bit of  
9 a question. I wonder if the individual pump  
10 manufacturers know individually what the  
11 numbers of pumps they sold and ones without  
12 motors, and all these variations and comments.  
13 I am wondering, as a collective, they don't  
14 know because that is proprietary information,  
15 and I am not sure -- individual pumps, maybe  
16 that would be a clarification. I am wondering  
17 if the pump manufacturers individually know  
18 how much pumps you sold with motors, how many  
19 you sell without VFDs, but as a group you  
20 don't know. But maybe revealing that  
21 information is problematic. And if that is  
22 the case, it seems like perhaps there could be

1 entering in with non-disclosure agreement  
2 would help that.

3 But am I wrong on that point or  
4 not?

5 MR. BROOKMAN: I saw both of you.  
6 Who of you would like to go first? Mark?

7 MR. HANDZEL: Mark Handzel on  
8 behalf of the Hydraulic Institute.

9 Your statement is correct. In  
10 general, as individual companies, we know that  
11 data. HI has never collected that data. So,  
12 that is why HI doesn't collectively have it.  
13 So, it does exist.

14 MR. BROOKMAN: Okay.

15 MR. NAPOLITANO: And I would just  
16 add to that. There probably are some  
17 proprietary confidential aspects of that  
18 within the membership of HI, which we could  
19 potentially get around. And there is also,  
20 you know, the way the channel works. So,  
21 although the manufacturer may sell a pump  
22 without a motor or without a motor and a VFD,



1       what we would consider, we would often refer  
2       to as a bare pump, that doesn't mean that one  
3       or more of those devices aren't put together  
4       along the supply chain, such that the customer  
5       gets it complete.

6                   And quite frankly, when the  
7       customer gets it from one of our authorized  
8       distributors, we give the distributor a pump.  
9       He puts a motor or something more on it and  
10      sells it to the customer. The customer pretty  
11      much views that as they got it from the  
12      manufacturer that way because the distributor  
13      is an extension of our supply chain. Where  
14      that value-added occurs in the supply chain,  
15      there is all kinds of market factors as to  
16      what drives that.

17                   MR. BROOKMAN: Louis?

18                   MR. STARR: Yes, I guess part of  
19      the reason I brought that up is I did design  
20      for seven years. I never bought a pump  
21      without a motor. I always thought they came  
22      together.

1 (Laughter.)

2 So, that is probably because I was  
3 buying it from the distributor.

4 MR. BROOKMAN: Okay. Alison?

5 MS. WILLIAMS: Okay. So,  
6 regardless of the Regulatory Regime chosen,  
7 DOE has reviewed some existing efficiency  
8 metrics for pumps.

9 The first one is pump efficiency,  
10 the ratio of hydraulic power to shaft input  
11 power. This is used in the EU clean water  
12 pump regulation and HI 20.3 and other country  
13 regulations, such as Mexico, South Korea, and  
14 China. The pump efficiency does not take into  
15 account the motor.

16 On the other hand, the overall  
17 wire-to-water efficiency takes into account  
18 electric input power at either a motor or  
19 control, depending on how it is defined. And  
20 this is used in Mexico for submersible pumps,  
21 where they basically have a minimum pump  
22 efficiency multiplied by a minimum motor

1 efficiency.

2           The EEI is the Energy Efficiency  
3 Index used for circulators in the EU, based on  
4 some reference power from the market when it  
5 was developed.

6           And bowl efficiency is similar to  
7 pump efficiency, but for a single bowl in  
8 vertically-suspended pumps, which is used in  
9 HI 14.6.

10           So, as the stakeholders have  
11 recommended the EU approach, DOE has reviewed  
12 it a little more. Again, pump efficiency is  
13 the metric, and they set minimum pump  
14 efficiency by taking into account flow,  
15 specific speed, pump type, and speed. And  
16 just to note, the specific speed also  
17 incorporates head.

18           And the result is this 3D surface  
19 that you can see here where efficiency is a  
20 function of flow and specific speed, and they  
21 raise the surface up and down, depending on  
22 equipment class and design speed, in order to

1 set the standard for a specific equipment  
2 class.

3 They also have a house-of-  
4 efficiency approach where they set pump  
5 efficiency at both the Best Efficiency Point,  
6 75 percent BEP flow and 110 BEP flow. And the  
7 requirement is that each of the part-load and  
8 overload points are based on the requirement  
9 BEP, and a pump has to pass all three points  
10 to meet the standard.

11 The standard is also based on full  
12 impeller only, and they test on a certain  
13 number of stages for their multi-stage pumps  
14 in the regulation.

15 MR. BROOKMAN: Let's pause there.

16 Steve Rosenstock?

17 MR. ROSENSTOCK: Thank you.

18 Steve Rosenstock, EEI.

19 At 110 percent, again, I am just  
20 going to use the 110 percent flow is an  
21 overload situation. I guess is that just for  
22 temporary like a startup condition or --

1 MR. BROOKMAN: Albert wishes to  
2 comment.

3 MR. HUBER: A hundred and ten  
4 percent is 110 percent of BEP, 10 percent more  
5 than the Best Efficiency Point. It is just  
6 running at the higher flow. You are not  
7 overloading the pump nor the motor nor  
8 anything else.

9 MR. ROSENSTOCK: Thank you for  
10 that. I appreciate that.

11 MR. HUBER: To further clarify  
12 that, 75 to 110 is pretty much our preferred  
13 operating range.

14 MR. BROOKMAN: Okay. Alison?

15 MS. WILLIAMS: Overload is just a  
16 nomenclature used by the EU, for example.

17 So, in considering these metrics,  
18 DOE is considering following the EU approach  
19 using pump efficiency at 3 points for all  
20 pumps sold alone or all pumps sold alone not  
21 considering motor and controls.

22 DOE may consider some other

1 metrics, such as overall efficiency for  
2 submersible pumps or bowl efficiency for  
3 vertically-suspended pumps.

4 In the other options where DOE  
5 defines pumps inclusive of motor and controls,  
6 pump efficiency is not a sufficient metric.  
7 So, in Regime 2 for pumps sold with both  
8 motors and VSDs, DOE is considering overall  
9 efficiency as the metric in order to account  
10 for the use of more efficient VSDs. So, this  
11 would be, again, possibly overall efficiency  
12 at 3 points.

13 And in Regime 3 for pumps sold with  
14 motors, DOE would need a different metric that  
15 would enable it to compare the energy  
16 efficiency of pumps with VSDs to those with  
17 motors but without VSDs. So, we believe it  
18 would be some sort of electric input power-  
19 based metric and have a few options laid out  
20 in the framework document, but it would need  
21 to be more extensive than the overall  
22 efficiency metric.

1                   Again, if DOE pursues Regime 2 or  
2                   3, there would be multiple equipment class  
3                   sets in these cases. So, DOE must consider  
4                   how to deal with the metrics.

5                   The first option is to just set the  
6                   most appropriate metric for each equipment  
7                   class set and not worry about them being  
8                   consistent.

9                   The second is where you have the  
10                  same metric for all equipment classes, and you  
11                  might include some standardized numbers for  
12                  motor or VSD efficiency for some of them.

13                  And the third one, you would have  
14                  the same metric, probably pump efficiency, for  
15                  all classes and potentially have another  
16                  metric for the pumps including the motor  
17                  and/or VSD.

18                  This table is basically summarizing  
19                  those options. In the first metric option of  
20                  separate, those are basically what DOE is  
21                  considering as most appropriate for each of  
22                  those, pump efficiency, overall efficiency,

1 and electric input power-based, and others  
2 show the different combinations of how the  
3 metrics could potentially work with the  
4 different regimes.

5 DOE notes that these options may  
6 impact manufacturer burden. As we mentioned,  
7 a pump both sold alone and with other  
8 equipment could be placed into two equipment  
9 classes, which may each have their own  
10 standard. DOE believes that potentially the  
11 same testing could be used, and you may just  
12 have to take additional measurements, such as  
13 both shaft input power and electric input  
14 power to the motor or VSD, or simply taking  
15 pump efficiency and multiplying it by other  
16 standardized numbers.

17 So, these are the comments. This  
18 first comment page is about pumps alone. So,  
19 following the EU approach, whether 75 and 110  
20 percent are the best points, and whether it  
21 should consider other metrics for submersible  
22 or vertically-suspended pumps.



1 MR. BROOKMAN: Let's just do that  
2 one first.

3 Ken?

4 MR. NAPOLITANO: Ken Napolitano,  
5 the Hydraulic Institute.

6 So, with respect to the operating  
7 range of 75 percent to 110 percent, we support  
8 that. That is our position, not only because  
9 it is harmonized with the EU, but because it  
10 is the appropriate range to optimize  
11 efficiency.

12 MR. BROOKMAN: Okay. Thank you.

13 Yes, Greg?

14 MR. CASE: To follow up on that, it  
15 also is in accordance with our HI preferred  
16 operating region, ANSI HI 9.6.3. So, there is  
17 a standard that backs up that flow range.

18 MR. BROOKMAN: Thank you.

19 Okay. Do you want to set up the  
20 next item?

21 Oh, Steve Rosenstock?

22 MR. ROSENSTOCK: Steve Rosenstock,

1       EEI.

2                   And again, I appreciate the tables  
3       that you put out. I guess, again, I kind of  
4       think of this from the end-user. If there are  
5       -- how do I say it? -- if there are different  
6       metrics, but they sound alike, if they are all  
7       saying they're pump efficiency, but they  
8       really tested differently, I am a little  
9       worried about possible customer confusion,  
10      just because if one thing is 81 percent and  
11      the other one is 83 percent and another one is  
12      85 percent, but if there are different tests,  
13      and they might need different things in terms  
14      of energy consumption, again, as we go down, I  
15      think there should try to be a way to make  
16      sure that there is minimum confusion for the  
17      end-user customer, that if one is 83 and  
18      another one is 81, the customer would say,  
19      okay, the 83 is going to be more efficient.  
20      And I just want to make sure it is going to be  
21      more efficient for the customer.

22                   MR. BROOKMAN: Alison?

1 MS. WILLIAMS: Sure. I mean, I  
2 have kind of reviewed all these. So, that is  
3 moving on kind of to the other regimes.

4 MR. BROOKMAN: Hang on a second.  
5 Let's make sure.

6 MS. WILLIAMS: Yes.

7 MR. BROOKMAN: Look at the page,  
8 please. Item 1-29, 1-30, and 1-31. Let's  
9 make certain we have gotten the comments that  
10 we wish to get here.

11 Greg?

12 MR. CASE: On 1-29, again, echoing  
13 the comments from 1-28, we would like to  
14 remain harmonized as much as possible with EU.  
15 So, if we can stay in that range, we would  
16 like to stay there.

17 And it is, again, supported by the  
18 ANSI/HI allowable operating region document.  
19 So, instead of expanding that to a larger  
20 range, we would like to stay within that  
21 range. That is the preferred operating  
22 region. That is where pumps operate, where we

1 tell our customers that is where they should  
2 operate their pumps.

3 MR. BROOKMAN: Okay. Thank you.  
4 Albert?

5 MR. HUBER: Albert Huber, Hydraulic  
6 Institute.

7 I would like to point out that, if  
8 you are asking here if you can broaden the  
9 efficiency curves, if you broaden the curve,  
10 then your peak efficiency or the BEP will drop  
11 by design. So, you will be defeating the  
12 purpose. The whole purpose of energy  
13 efficiency in pumps is to operate the pump at  
14 its BEP. And to broaden it out, so you lower  
15 it, you are defeating the purpose.

16 MS. WILLIAMS: Just to clarify, we  
17 are not necessarily suggesting broadening the  
18 curves. You could suggest other points  
19 between 75 and 110.

20 MR. BROOKMAN: Go ahead, Greg.  
21 Do you wish to follow on, Albert?  
22 No?

1 Greg?

2 MR. CASE: Also, the possibility of  
3 using a weighted average, we could create a  
4 pump curve that had a weighted average that  
5 had a higher peak value, but was not as broad.  
6 So, it wouldn't be as applicable over a larger  
7 flow range.

8 So, the reason the house of  
9 efficiency was created was to create wider  
10 high-efficiency zones on pumps, so they could  
11 be applied over a wider range of flows and  
12 still maintain a high efficiency.

13 We can design pumps that have a  
14 very high peak efficiency and a very narrow  
15 band of efficiency. And I don't think that is  
16 where you want us to go.

17 MR. BROOKMAN: Okay. Got it.

18 MS. WILLIAMS: Okay. So, the next  
19 comment, 1-32 is about Regime 2, whether  
20 overall efficiency at 3 points would be an  
21 appropriate metric for that regime.

22 MR. BROOKMAN: Greg?

1 MR. CASE: Greg Case with Hydraulic  
2 Institute.

3 The Hydraulic Institute believes  
4 that this would increase the testing burden on  
5 manufacturers. These costs would also be  
6 passed on in the market. So, these costs  
7 would go up to the consumer, as we had to do  
8 all these different tests, possibly different  
9 vendors for multiple motor manufacturers, et  
10 cetera.

11 MR. BROOKMAN: Okay. Joanna?

12 MS. MAUER: Joanna Mauer.

13 I guess I am a little confused  
14 about Item 1-32. For pumps sold with a motor  
15 and VSD, I would imagine that you would want  
16 to have test points where the pump is  
17 operating at a lower speed.

18 MS. WILLIAMS: Right. So, we are  
19 requesting comment on whether we should add  
20 additional test points below 75 percent for  
21 that reason, to capture lower speeds that the  
22 pump or the VSD might be running at.

1                   So, to clarify, the EU approach is  
2 testing at the same speed for all three  
3 points, but DOES could consider testing at  
4 different speeds to meet either of those same  
5 points or different points.

6                   MR. BROOKMAN: Neal?

7                   MR. ELLIOTT: This is Neal Elliott,  
8 ACEEE.

9                   Clarification here: once you  
10 change the speed at which the pump is  
11 operating, you change the BEP, correct? You  
12 are going to move it down? So, we need to be  
13 careful here in our terminology. When we are  
14 saying this, you know, when you change the  
15 speed of the pump, you change the pump curve.  
16 It is not the same flow or pressure or these  
17 factors. So, it is a little more complex. I  
18 think we need to be clear about that in how we  
19 communicate it.

20                   MS. WILLIAMS: So, to be precise,  
21 it should be intended to be 75 percent of the  
22 BEP flow at full speed. So, you would, then,

1 potentially -- again, these are just  
2 considerations -- you would reduce speed to  
3 the equivalent.

4 MR. BROOKMAN: Did that make it  
5 more clear? Go ahead.

6 MR. ELLIOTT: I guess the point we  
7 need to be cognizant of is, when we are  
8 talking about the multiple testing points,  
9 that may be multiple testing points at  
10 multiple speeds, if we are talking about a VFD  
11 because we will have multiple BEPs at  
12 different speeds. And I don't know that that  
13 matters hydraulically.

14 MS. WILLIAMS: Right. So, I mean,  
15 that can be worked out, right? I mean, I  
16 think what was considered in the framework  
17 document -- and again, we are open to other  
18 suggestions -- is you might test the 100  
19 percent point at full speed, 75 percent at 75  
20 percent, or, you know, at a reduced speed  
21 equivalent to 75 percent flow at full speed.  
22 Sorry. It is a little confusing. But you



1 wouldn't necessarily have to have multiple  
2 points on the same reduced-speed curve.

3 MR. BROOKMAN: I want to make sure  
4 we drag this to the ground before we are  
5 finished.

6 (Laughter.)

7 Go ahead.

8 MR. FERMAN: Yes, Randal Ferman,  
9 Ekwestrel Corp Consulting.

10 MR. BROOKMAN: Go ahead. Get to  
11 the microphone. We need this on the record.

12 And then, I am going to Rodney.

13 MR. FERMAN: Okay. I just wanted  
14 to, hopefully, clarify this point about  
15 operating at multiple speeds.

16 MR. BROOKMAN: Yes.

17 MR. FERMAN: In a pure friction  
18 system curve, which is fairly common in the  
19 smaller pumping systems, you drop it to a  
20 lower speed and the pump is still at its best  
21 efficiency point, if it was sized at its best  
22 efficiency point at full speed. So, there may

1 be no issue as far as dropping speed relative  
2 to the pump performance curve itself.

3 MR. BROOKMAN: Mike, there is a  
4 microphone right there. The Mike Rivest  
5 follow-on.

6 I haven't forgotten you, Rodney.

7 MR. RIVEST: Yes, Mike Rivest,  
8 Navigant Consulting.

9 So, this boils down to how we  
10 define efficiency. What we are trying to  
11 achieve is energy savings. So, if we operate  
12 the pump at a lower speed and lower efficiency  
13 but we consume less energy, then that is our  
14 goal. So, I don't think -- I am seeing heads  
15 saying yes.

16 So, the question we are trying to  
17 answer is, what are the points, the test  
18 points, we should be looking at that would  
19 best reflect how systems operate, so that we  
20 capture the energy use?

21 MR. BROOKMAN: I am going to go to  
22 Rodney, unless you want to let him follow on.

1 Gary? Go ahead.

2 MR. FERNSTROM: This is Gary.

3 I am definitely with Mike on this.  
4 This is complicated, and we are talking about  
5 two different things.

6 So, with the pump running at a  
7 fixed speed, perhaps its maximum speed, to get  
8 this house of efficiency, we would like to see  
9 how it performs when it is a little bit  
10 underloaded and a little bit overloaded, the  
11 presumption being that in a lot of cases in  
12 real application it is going to be a little  
13 bit underloaded.

14 MR. BROOKMAN: Uh-hum.

15 MR. FERNSTROM: However, when you  
16 connect the VFD, the overall efficiency is how  
17 much clean water you move per unit of energy  
18 that is consumed. And pumps that operate at a  
19 lower flow and a lower total dynamic head are  
20 fundamentally presenting a greater system  
21 efficiency than ones that are operating at  
22 high flow and high head. So, somehow in our

1 metric we would like to capture this.

2 So, it is complicated. I think it  
3 merits a lot more discussion and thought. But  
4 we want to make sure we get the right metric.  
5 In my mind, it aligns with what Mike is  
6 thinking.

7 MR. BROOKMAN: Rodney?

8 MR. MRKVICKA: Rodney Mrkvicka,  
9 Smith & Loveless and the Hydraulic Institute.

10 With respect to the points that you  
11 have there, BEP 75 percent and 110 percent,  
12 that associates to the pump or the bare pump  
13 efficiency as itself. So, the bare pump will  
14 be evaluated against those points through what  
15 was mentioned earlier, the MEI, or Minimum  
16 Efficiency Index. So, that is the bare pump.

17 When you put it into an extended  
18 product, you now have taken that extended  
19 product and you are evaluating against its  
20 system or load curve. From that standpoint,  
21 that unit has to operate to a system or load  
22 curve for whatever use it has been put into.

1                   The points, then, that the EEI  
2                   evaluated, is evaluated against, is a load  
3                   curve set of points, not these BEP points.  
4                   So, what is up there as 75 percent and 110  
5                   percent are just on the pump head or the MEI  
6                   side. EEI will be evaluated versus a load  
7                   curve, and that will be different points over  
8                   the load, whether that is flow or pump head.  
9                   That varies through for whatever system you  
10                  are going to apply this into.

11                  When you do that, and to mention  
12                  the same comments that were mentioned earlier,  
13                  the extended product is to save energy. And  
14                  the amount of energy saved of a controlled  
15                  product system versus an uncontrolled product  
16                  system is what we are trying to achieve with  
17                  the extended product. And that is where we  
18                  get that 10-to-1 ratio of greater energy  
19                  savings going ahead.

20                  So, the points that here relate  
21                  just to the bare pump evaluation or the MEI  
22                  index. Our intention is to have various load

1 profiles that the extended product will be  
2 evaluated against to tell you what the energy  
3 usage is, and the EEI will end up being a  
4 ratio between controlled and uncontrolled  
5 energy usage on that system.

6 MR. BROOKMAN: Okay.

7 MS. WILLIAMS: So, just to clarify,  
8 in the framework document we are discussing  
9 some options. You know, we are starting with  
10 the 75 and 110, and there is a table and a  
11 figure about how the different metrics for  
12 Regime 2, or particularly Regime 3, could  
13 create a metric based on different load  
14 points. So, DOE is certainly interested in  
15 any feedback on what those load points would  
16 be.

17 MR. BROOKMAN: Are you on this  
18 point? Okay, Steve Rosenstock.

19 MR. ROSENSTOCK: Steve Rosenstock,  
20 EEI.

21 I think at some point -- you know,  
22 this is obviously a very big test procedure

1 question. I think you have the wonderful  
2 charts. If you show a table or chart that  
3 shows the test procedure and how it might  
4 operate for each of the different types of  
5 systems, pump alone, pump with motors, pump  
6 with VSD, and just show, I will say, the test  
7 conditions, I think that will help everybody  
8 in terms of, you know, will you be able to  
9 show the savings with the VFD, yes or no; will  
10 you be able to show the savings with a more  
11 efficient motor, yes or no? Once that is out,  
12 I think that will help answer a lot of  
13 questions.

14 MR. LLENZA: This is Charles Llenza  
15 from the Department of Energy.

16 The test procedure process is  
17 parallel, but it will have its own formats for  
18 meetings, for comments, et cetera. We welcome  
19 as much advance comments as to the nature of  
20 what we should be including, how complicated  
21 it should be or not be, and, also,  
22 streamlining any tests that are out there,

1 integrating them into the DOE test procedure  
2 in such a way that we don't create any  
3 additional burdens, where possible.

4 MR. BROOKMAN: Well, I think we  
5 have kind of clarified the intent of these  
6 questions here. Do we have any other specific  
7 comment before we move on?

8 (No response.)

9 We are moving on.

10 MS. WILLIAMS: Okay. So, just the  
11 final comment request on this item is any  
12 issues that result from having different  
13 metrics for pumps sold alone and pumps sold  
14 with motors and VSDs. I think that was  
15 discussed a little bit already.

16 MR. BROOKMAN: Yes. Any  
17 amplification? Go ahead, Rodney.

18 MR. MRKVICKA: Just a statement.  
19 Oh, I'm sorry. Rod Mrkvicka from Smith &  
20 Loveless and the Hydraulic Institute.

21 The Institute doesn't anticipate  
22 any issues between pumps sold alone and pumps



1 sold with motors and VFDs or the extended  
2 product, as we defined it, because we are  
3 stating that the pump, it has to meet an MEI,  
4 Minimum Efficiency Index, either way, whether  
5 it is sold alone or in an extended product.

6 MR. BROOKMAN: Aha. Okay. Okay.

7 MS. WILLIAMS: Okay. So, just to  
8 move forward with the potential implementation  
9 methods, DOE is considering whether to follow  
10 the EU approach where any standard would be a  
11 function of flow and specific speed. DOE could  
12 also explore other parameters, such as head.

13 DOE has done some initial analysis  
14 in comparing the U.S. market to the EU market  
15 to look at the EU surfaces. As I mentioned  
16 before, this is based on data that we pulled  
17 from the PUMP-FLO software to find all these  
18 different pump models we could look at.

19 So, our first comparison is if we  
20 create our own surface using the same form as  
21 the EU and compare it to the EU. So, we have  
22 both the 3D version on the left, which may or

1 may not rotate. Okay, never mind.

2 (Laughter.)

3 And on the right, it is a 2D  
4 version of that where we are looking at a few  
5 different specific speeds. So, the left is  
6 specific speed versus flow. And just because  
7 that is a little bit hard to see, the right is  
8 a comparison at a few different specific  
9 speeds between surfaces that we developed with  
10 U.S. data and the EU surface.

11 And again, these surfaces are just  
12 kind of show a methodology. Any information  
13 we got about pump models would change these  
14 surfaces.

15 (Computer problem.)

16 We may need a break.

17 (Laughter.)

18 MR. BROOKMAN: Do you think it is  
19 stalled at this point?

20 MS. WILLIAMS: I am going to close  
21 it out and reopen it.

22 MR. BROOKMAN: Just if you are

1       curious, shortly we are going to be pausing  
2       for lunch because we are due for lunch.

3                       (Laughter.)

4                       MS. WILLIAMS:   Okay.   So, because  
5       the U.S. market and the EU market do not  
6       appear to be completely identical, we have  
7       been exploring other methods.   So, we could  
8       either use the same surfaces as EU and just  
9       change the C-values to move the surface up and  
10      down or we can actually create our own  
11      surfaces for the U.S. market that are specific  
12      to individual product classes and actually  
13      specific to the efficiency level.

14                      So, again, you can see the 3D  
15      surface.   I am not going to try to play this  
16      movie, I guess.   They are really cool, though.

17                      (Laughter.)

18                      Basically, the 2D slice is showing  
19      you that the surface can flatten from bottom  
20      to top of market because high flow pumps  
21      generally max out their efficiency sooner  
22      because they can reach higher efficiencies.

1 So, DOE has the ability to kind of follow the  
2 EU approach, but make it a little more  
3 specific to both the U.S. market and more  
4 accurate, specific efficiency levels.

5 MR. BROOKMAN: Steve, please.

6 MR. ROSENSTOCK: Steve Rosenstock,  
7 EEI.

8 So, at some point, there would be,  
9 I will say, three graphs, one at BEP, one at  
10 75 BEP, and then, one at 110 BEP possibly?

11 MS. WILLIAMS: Well, so the EU  
12 didn't actually do that. They only have the  
13 graph at BEP. Someone can correct me if I am  
14 wrong. And then, they just have a multiplying  
15 factor. So, .947 and .985.

16 MR. BROOKMAN: Okay.

17 MS. WILLIAMS: So, DOE requests  
18 comment on this implementation methodology,  
19 including whether flow and specific speed are  
20 the appropriate parameters, whether they  
21 should maintain the same surfaces, or adjust  
22 them, or make them most appropriate to the

1 different efficiency levels.

2 MR. BROOKMAN: Mark, is this you?

3 No?

4 Greg? Thank you.

5 MR. CASE: Greg Case, Hydraulic

6 Institute.

7 We would support staying with the  
8 EU equation except for that C-factor at the  
9 end. Again, from the result of harmonization,  
10 we would like to do that.

11 We also have done our own survey of  
12 our members, and we have 2,000 data points  
13 over all classes of pumps. With that, we  
14 found that we got a reasonably-good dropout  
15 rate.

16 Now one of the things that is much  
17 different from what you did than what the EU  
18 did was you don't have any dropout rates here.  
19 You have got a centerline that kind of goes  
20 through the middle of the data. You have got  
21 a top of market, and you have got a bottom of  
22 market. There are no MEI values in here.

1                   So, I found it very difficult to  
2                   try to equate what you got with what the EU  
3                   has proposed. And so, that makes it kind of  
4                   hard to know if your surfaces are better or  
5                   worse than their surfaces.

6                   I would have to agree that we could  
7                   get equations that fit this data better, but  
8                   in an attempt to harmonize with Europe and  
9                   also reduce the burden to manufacturers of  
10                  having to meet multiple different equations  
11                  that they are going to have for each equipment  
12                  class, the Hydraulic Institute would prefer  
13                  that we just use that C-value to change  
14                  things.

15                  And we also found that our C-value  
16                  was different than the European C-value, but  
17                  it is still a very simple change to move that  
18                  vertically on those C-values. I don't know if  
19                  you have data on how far off theirs was. I  
20                  mean, you have to assume in your analysis that  
21                  your median and your mean were equal for your  
22                  analysis to work, and I don't know that we can

1       assume that.

2                   MS. WILLIAMS:     I mean, so just  
3       conceptually our average surface I showed  
4       would be equivalent to the EU MEI 50.

5                   MR. CASE:    But, again, you have to  
6       assume that your median and your mean are the  
7       equal, and I can't take that leap of faith.

8                   MS. WILLIAMS:   Also, just a point  
9       of clarification, I mean, if you are changing  
10      the C-values, you are still not exactly  
11      harmonized with the EU, right?

12                  MR. CASE:    That is correct.  There  
13      would have to be two --

14                  MS. WILLIAMS:   So, regardless of  
15      how you change it, you are not harmonized.

16                  MR. CASE:    Yes, but you don't have  
17      to change the seven variables instead of just  
18      the one.  They have different C-values for  
19      different motor --

20                  MS. WILLIAMS:   Right.

21                  MR.    CASE:       --    or    different  
22      equipment class and different speeds.  And we

1 would just propose that, for our speeds and  
2 our equipment classes, we would have a  
3 C-adjusted value. The C-factor would be  
4 adjusted. That would be our preference as  
5 manufacturers.

6 MR. BROOKMAN: Greg, did I hear you  
7 correctly? Did you say your survey has 2,000  
8 data points?

9 MR. CASE: We have 2,024 data  
10 points.

11 MR. BROOKMAN: Can you provide  
12 those to the Department of Energy?

13 MR. CASE: We will provide those to  
14 the Department of Energy and, also, those are  
15 within the scope that we proposed. That  
16 doesn't go beyond that scope.

17 MR. BROOKMAN: I got you. Well,  
18 that is still a hell of a start.

19 (Laughter.)

20 Ken, go ahead.

21 MR. NAPOLITANO: Yes, I would like  
22 to just follow up on that. And we took this



1 up at the recent Hydraulic Institute Board  
2 meeting.

3 So, as Greg said, on the scope that  
4 we had originally proposed -- so, it didn't  
5 include ANSI pumps, et cetera -- we went out  
6 and got a large group of the HI membership who  
7 participate in that class and confidentially  
8 gathered all that technical data. It was a  
9 huge effort. And we had an independent third  
10 party aggregate the data.

11 We believe it is, for that scope,  
12 very statistically-significant, an accurate  
13 representation of the baseline, the current  
14 state.

15 And we recently, through vote of  
16 the Board, have agreed to provide the DOE with  
17 that data, and at least for that scope of  
18 pumps, wherever the scope shakes out, we would  
19 recommend using that as the baseline because  
20 we have all validated that data.

21 MR. BROOKMAN: Okay. Thank you.

22 Do you have any questions before I

1 move on, Alison?

2 MS. WILLIAMS: No, and the  
3 subsequent questions are basically asking for  
4 what we are talking about, additional pump  
5 data that would help improve our database at  
6 full speed BEP flow, 75, and 110.

7 MR. BROOKMAN: I thought that was  
8 pretty clear. You don't have any  
9 clarifications on what they said, no?

10 MS. WILLIAMS: No. Just move on.  
11 Sorry.

12 MR. BROOKMAN: Okay. Yes, Greg?

13 MR. CASE: Greg Case, Hydraulic  
14 Institute.

15 One more comment. We noticed in  
16 your data that you have 27,000 pumps listed.  
17 When Europe did their survey, they had 2,300-  
18 plus.

19 MS. WILLIAMS: Yes.

20 MR. CASE: We have 2,024 in ours.  
21 So, we believe that your dataset may be a lot  
22 larger than what the dataset actually is out

1 in the universe.

2 MS. WILLIAMS: Yes. So, just to  
3 clarify, it does include multiple-speed and  
4 multiple-stage versions of basic pump models.  
5 So, it is something we will work to refine in  
6 the future.

7 MR. CASE: But you have over 2,000  
8 pumps in one style of pump.

9 MS. WILLIAMS: Uh-hum.

10 MR. CASE: And we didn't come  
11 anywhere near that. Again, you had a larger  
12 scope than we did, but I just want to make --

13 MS. WILLIAMS: Yes. I don't think  
14 the scope is all that much larger, but, yes,  
15 it is coming from 115 manufacturer catalogs  
16 and all their 60-hertz models at full  
17 impeller. So, I can't answer to discrepancy.

18 Okay. So --

19 MR. BROOKMAN: Wait. Are we there?  
20 Have you got one more? Yes, one more.

21 MS. WILLIAMS: Sure. Okay. So,  
22 just to follow up, DOE is considering

1 following the EU, also, on the other things of  
2 basing the standard on full impeller and  
3 testing based on certain number of stages for  
4 radial split and submersible pumps.

5 And just to mention that we don't  
6 think the axial split multi-stage could be  
7 tested in one stage version because they are  
8 not cellular in nature.

9 So, we are basically requesting  
10 comments on these suggestions.

11 MR. BROOKMAN: Greg?

12 MR. CASE: We would concur that it  
13 should be tested at full diameter. That is,  
14 again, harmonized with the EU standard. We  
15 all do testing at that diameter. The pump is  
16 most efficient at that diameter. So, we  
17 believe that we should stay with that full  
18 diameter. So, that was 1-40.

19 MR. BROOKMAN: Okay.

20 MR. CASE: In 1-41, again, we would  
21 like to stay harmonized with the EU standard.  
22 We think the number of single-stage pumps that

1 are actually sold is very limited. In the EU  
2 standard, they use three stages for the radial  
3 multi-stage and nine stages for the  
4 submersibles. And we found that that is where  
5 we took our data points from when we did our  
6 survey. We find those values to be reasonable  
7 or those stages to be reasonable.

8 If you test these as a one-stage  
9 pump, you are introducing all the efficiency  
10 losses for your intake and your discharge into  
11 that one stage; that will bring those  
12 efficiencies down.

13 MS. WILLIAMS: Yes. Just to  
14 clarify, the suggestion was, the alternative  
15 would not necessarily be to test a single  
16 stage, but to test in whatever configuration  
17 you are selling your pump.

18 MR. BROOKMAN: No? Okay.

19 And then, finally, 1-42. Comments  
20 on that? Steve?

21 MR. SCHMITZ: Thank you.

22 Steve Schmitz, Hydraulic Institute.

1                   The Hydraulic Institute does not  
2                   have information regarding the percent of  
3                   pumps sold at full impeller diameters, for a  
4                   number of the reasons that have already been  
5                   stated. But we would be happy to cooperate  
6                   with DOE in a joint analysis of obtaining this  
7                   data.

8                   MR. BROOKMAN: Additional comments  
9                   here? Anything?

10                   (No response.)

11                   So, we have reached a point where  
12                   we can pause for lunch.

13                   And let me say that this has been  
14                   an unusually effective comment at the  
15                   framework stage. I think it is a very, very  
16                   useful gleaning of information. And so, I  
17                   thank all of you.

18                   Don't go anywhere after lunch.

19                   (Laughter.)

20                   It is now 12:30. It takes just  
21                   about an hour to eat if you stay in the  
22                   building. If you leave the building, you need

1 to clear back through security and all that.  
2 Don't do that. We can all go en masse down  
3 the elevator and across about 100 yards that  
4 away to the big cafeteria. There is also a  
5 Subway shop directly below us on the ground  
6 floor. You need to go to the ground floor in  
7 any case to get to eat.

8 We are going to resume at 1:30.  
9 Once again, let me remind you, you must wear  
10 this badge. This room will be locked. So,  
11 you can leave your stuff. Someone will be  
12 here. It will be locked. You might need an  
13 ID to get back in. In the cafeteria, you will  
14 have to clear back through a secure portal.  
15 So, you might need an ID to get back in.

16 So, anyway, a very good, very  
17 constructive morning. Thank you for that.

18 We will resume at 1:30 right here.

19 (Whereupon, the foregoing matter  
20 went off the record for lunch at 12:29 p.m.  
21 and went back on the record at 1:33 p.m.)  
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A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

1:33 p.m.

MR. BROOKMAN: As a tool, and to provide information, the Department typically makes a Xerox copy of the business cards of all the individuals who are present. And so, Brenda Edwards just distributed that. And if you didn't get one, I am sure you can get your hands on a copy. So, that should be there for you as a reference document.

So, we are going to proceed, and we are going to pick up where we left off and hear about test procedures. We are going to hear from Sarah Widder.

MS. WIDDER: Good afternoon.

As Doug said, I am Sarah Widder from Pacific Northwest National Lab.

It looks like we haven't quite gotten everybody back. So, we will try to breeze through this before we get everybody.

(Laughter.)

No, I am just kidding. I hope we



1 don't have any comments.

2 (Laughter.)

3 But, hopefully, we have been  
4 through a lot of the main scope-related issues  
5 in this morning's discussion that are going to  
6 be pertinent to the test procedure. So, I  
7 would like you to keep those in mind.

8 And the first point of the test  
9 procedure is that, as Charlie mentioned, this  
10 is going to be a separate, but concurrent  
11 rulemaking process. The test procedure  
12 rulemaking and the standards rulemaking really  
13 work together. We need those well-described  
14 test procedures to understand the basis for  
15 how we build up that metric for pumps and how  
16 we understand, then, the ability to save  
17 energy based on those metrics.

18 So, the test procedure is very  
19 important for the standard, but it is going to  
20 occur as a separate process. That will start  
21 with a NOPR document that will be published,  
22 probably the next document you will see out of

1       this effort.

2                   And then, we will have a NOPR  
3 public meeting just like this. And that will  
4 be the opportunity to really get into the  
5 weeds on some of the technical details.

6                   Right now, we are just going to  
7 stay a little bit higher, talking about scope  
8 and what we want to start to think about for  
9 the test procedure.

10                   I sort of described the  
11 relationship between the standards and the  
12 test procedure, but once the pumps test  
13 procedure is established, every manufacturer  
14 must use that test procedure to establish the  
15 efficiency metrics and to show compliance with  
16 DOE standards, once those are set. And so, it  
17 is really important that we think about both  
18 the scope and the burden associated with these  
19 test procedures.

20                   And as a basis, DOE really looks  
21 out to the industry, what is available in the  
22 industry. We want to minimize burden with the

1 test procedures and have them have the  
2 flexibility to establish perhaps efficiency at  
3 multiple speeds or multiple rating points, if  
4 that is what we need to sufficiently describe  
5 the energy use or energy efficiency of a pump,  
6 but do that with the least amount of  
7 additional burden.

8           So, the first standard, industry  
9 standard test procedure, and probably the most  
10 prominent one that DOE reviewed, was HI 14.6,  
11 and you have heard that brought up. That is  
12 the test for rotodynamic pumps, and it is an  
13 acceptance test, that is really the framework  
14 it is written from currently. It applies to  
15 any size centrifugal, mixed-flow, or axial-  
16 flow rotodynamic pump without fittings and is  
17 particular to pumps that use clear water.

18           It does have provisions for using  
19 alternative homogenous liquids, but since we  
20 are preliminarily considering pumps just for  
21 clear water applications, we will just be  
22 using -- the standard would be sufficient to

1 test those pumps. It is based on measuring  
2 the flow of the pump's liquid and, then, the  
3 power input to the pump to measure efficiency.

4 That is harmonized with an ISO  
5 Standard 9906 that was recently updated and  
6 has several grades of precision. Those two  
7 standards, as you have heard, are harmonized  
8 and have very similar test requirements and  
9 test metrics, as well as definitions.

10 The one thing that 14.6 doesn't  
11 address very well is submersible pumps. HI  
12 has a separate standard for that, 11.6. It  
13 has similar metrics and test conditions. It  
14 is also harmonized with the 14.6 test for  
15 rotodynamic pumps, but it is particular to  
16 submersible pumps where it is very difficult  
17 to measure the power input to the shaft  
18 because that is all one package. And also, it  
19 is particular only to clean water.

20 DOE also reviewed the ISO Standard  
21 for precision class testing, using a  
22 thermodynamic method. There could be reasons

1 to consider a method like that if it is a  
2 very, very large pump where it is difficult to  
3 measure flow precisely. So, instead of  
4 measuring flow based on a flow measurement  
5 device, it is measured based on thermodynamic  
6 principles of temperature and pressure of the  
7 water.

8 So, in reviewing those standards,  
9 DOE is considering using HI 14.6 as the basis  
10 for the test procedure rulemaking since it  
11 seems to be a widely-accepted test standard  
12 for pumps and covers most of the scope of  
13 pumps we have been discussing here today.

14 DOE requests comment on using HI  
15 14.6 2011 and HI 11.6 for submersible pumps.  
16 We also request comment on the other standards  
17 that we reviewed or any other standards that  
18 we may not have listed here that would be  
19 important for DOE to be aware of as we move  
20 forward with the test procedure rulemaking, to  
21 make sure that we are considering all the  
22 available procedures.

1           We also request comment on the  
2           scope of these test procedures, if there are  
3           any particular elements that they are not  
4           appropriate, or the comment earlier about  
5           making sure we are able to quantify the  
6           performance of pumps that are driven by gas or  
7           engines as opposed to electric motors might be  
8           something that we will have to consider as we  
9           move forward.

10                   And then, DOE is also interested in  
11           the pros and cons of the thermodynamic  
12           approach and when that might be more  
13           appropriate than explicitly measuring flow.

14                   MR. BROOKMAN: Let's start with  
15           1-43.

16                   Arnold Sdano?

17                   MR. SDANO: Arnold Sdano, Pentair,  
18           representing HI.

19                   MR. BROOKMAN: Is that turned on  
20           (referring to the microphone)?

21                   MR. SDANO: Thank you.

22                   MR. BROOKMAN: Thank you.

1 MR. SDANO: Arnold Sdano, Pentair,  
2 representing HI.

3 At HI, we have developed a formal,  
4 written response to this that is a little  
5 wordy. So, just to summarize, as mentioned  
6 previously, we have started the efforts or  
7 drafting a 14.6 DOE because we think that that  
8 is appropriate. And what it is is a condensed  
9 version of the 14.6 standard, focusing on what  
10 is required for this Committee's work, where  
11 we eliminate things like the mechanical tests  
12 and NPSH and the effect of reducing impeller  
13 diameter.

14 And towards that end, on the  
15 extended product approach, we are expanding  
16 the Appendix G, which is for string testing,  
17 where we would include the scope of  
18 submersible pumps or testing with motors and  
19 VFDs in that appendix as well.

20 So, all the appendices that were  
21 not normative in the existing standard are  
22 going to be made normative in this standard.

1 That draft has been presented to the  
2 Subcommittee at HI that had prepared it. I am  
3 starting to get comments back to that, and we  
4 expect to have that ready to present to the  
5 Department along with the deadline for these  
6 comments by, I think it was, May 2nd.

7 MS. WIDDER: That is very helpful.  
8 Thank you.

9 MR. BROOKMAN: So, you have adapted  
10 and, as you said, condensed. Is it much  
11 different than the existing HI 14.6?

12 MR. SDANO: What it has done is it  
13 has focused-in on what we believe are the  
14 pertinent criteria, Grade 2 testing, Grade  
15 2(b) acceptance criteria. It doesn't  
16 reference anything of MEI because we  
17 understand that that has to be sorted out  
18 later, you know MEI 10, or whatever the level  
19 is going to be, nor does it get into what the  
20 EEI might be as acceptance levels. But it  
21 sets the protocol, the calibration periods,  
22 the instrumentation and accuracy, the



1 instrumentation fluctuations that are  
2 required.

3 MR. BROOKMAN: Excellent. And you  
4 did not comment on 11.6 and the two ISOs that  
5 are listed in Comment 1-43.

6 MR. SDANO: The elements required  
7 out of 11.6 are going to be included into the  
8 Appendix G, which is for string testing.  
9 Considering that the pump and the motor are a  
10 combined-unit in submersibles, we think that  
11 is an appropriate area to include that.  
12 Ninety percent of those two documents are the  
13 same already. So, it is the perfect place to  
14 include that.

15 But the thermal method is something  
16 that we disagree with wholeheartedly; that is  
17 not, in our experience, used in the United  
18 States. And the fact that it has a  
19 publication date of 1999, and since ANSI  
20 standards come under a five-year review, a  
21 ten-year cycle, I would suspect it is probably  
22 in withdrawn status.

1 MR. BROOKMAN: I see. Okay.

2 John Cymbalsky?

3 MR. CYMBALSKY: Thanks. John  
4 Cymbalsky, DOE.

5 I just wanted to reiterate a little  
6 bit what Sarah said about representations of  
7 your products with respect to efficiency.  
8 When you are developing this test method, and  
9 as we develop ours, I just want to make it  
10 clear that any representation that you want to  
11 make with respect to the efficiency metrics in  
12 the DOE standard must use the DOE test  
13 procedure. So, keep this in mind as you are  
14 developing your test methods.

15 MR. BROOKMAN: Okay. Yes, okay.

16 So, other comments related to 1-43?  
17 And then, we will proceed on down this comment  
18 box.

19 (No response.)

20 Okay. We are moving on, -44 and  
21 -45.

22 (No response.)

1                   Nothing additional?

2                   Did you want any additional  
3 queries?

4                   MS. WIDDER: I am looking forward  
5 to the HI submission of their revised test  
6 procedure. I don't think I have any  
7 additional specific comments at this point.

8                   MR. BROOKMAN: Okay. Then, we are  
9 moving on.

10                  MS. WIDDER: Okay. And this is  
11 consistent with what you heard this morning.  
12 DOE is considering an extended product  
13 approach that might consider the pump  
14 inclusive of the motor and VSD, a pumping  
15 system, in addition to or instead of the pump  
16 all by itself, if the pump is sold that way  
17 from the manufacturer.

18                  If that is the case, then I  
19 understand that HI is expanding Appendix G,  
20 which is the string test, to be more specific  
21 about how to determine the overall wire-to-  
22 water efficiency metric that would be applied

1 to those pumps. That would account for the  
2 pump efficiency as well as the motor  
3 efficiency and the VSD efficiency.

4 Some things to think about for that  
5 particular metric, and if we include VSDs,  
6 are, as we discussed this morning, the  
7 particular test points that would effectively  
8 and sufficiently capture the energy use of a  
9 pumping system with a VSD, such that it wasn't  
10 overly burdensome for the manufacturer  
11 producing that pump.

12 That is really all I have to say  
13 about that. I think we have talked a lot  
14 about some of the issues associated with  
15 testing pumping systems, as well as pumps by  
16 themselves, and that it could be very  
17 burdensome for manufacturers if multiple tests  
18 are required. And so, making sure that those  
19 tests are streamlined and, as Alison mentioned  
20 earlier, perhaps developing a test that we  
21 could test a pumping system and capture the  
22 pump efficiency as well as the wire-to-water

1 efficiency on one stand in one test, and  
2 having those requirements all in the same test  
3 procedure, would be something that DOE is very  
4 interested in, if this extended product  
5 approach is considered.

6 So, really, specific comments about  
7 that and particularly the burden associated  
8 with multiple test points and how much it  
9 costs to produce a test. The DOE, as you will  
10 hear about later on, really considers  
11 manufacturer burden in the test procedure as  
12 well as standards rulemaking. And so, data  
13 related to that will help us craft the  
14 proposal that will form the NOPR test  
15 procedure. So, I would put a request for that  
16 as well.

17 MR. BROOKMAN: Gary Fernstrom?

18 MR. FERNSTROM: So, Gary Fernstrom,  
19 the California Investor Owned Utilities.

20 I would encourage DOE to consider  
21 for this particular category, pump plus motor  
22 plus VSD, an energy-efficiency approach

1 similar to what Mike was talking about earlier  
2 which would compare the amount of water  
3 pumped, the volume of water, to the electric  
4 energy required to pump that.

5 And in order to do that, you have  
6 to take some system curve into consideration,  
7 and I would encourage DOE to investigate what  
8 might be typical system curves for some common  
9 pump applications. That approach is used in  
10 swimming pool pumps by the California Energy  
11 Commission and Energy Star.

12 MR. BROOKMAN: Good. Thank you.

13 MS. WIDDER: Okay?

14 MR. BROOKMAN: Yes.

15 MS. WIDDER: The next slide is just  
16 related to test procedure accuracy. This is  
17 also a very important aspect of the test  
18 procedure. One of the most important parts of  
19 the test procedure, actually, is that the  
20 manufacturers, as well as DOE, can have  
21 confidence that this is an accurate and  
22 repeatable representation of the energy

1 efficiency of a particular product. And  
2 so, if DOE were to test that particular pump  
3 and a third-party lab were to test that  
4 particular pump and the manufacturer were to  
5 test that particular pump, everyone would get  
6 the same result. And so, that is something  
7 that we will definitely need to consider as we  
8 move forward with the test procedure  
9 rulemaking.

10 I forgot the gentleman's name, but  
11 from HI who mentioned considering Grade 2 in  
12 the HI 14.6 DOE draft. That tolerance and  
13 uncertainty criteria, if that is something the  
14 industry is comfortable with, we can  
15 definitely base the uncertainty measurement  
16 and the tolerances that DOE adopts on  
17 something that already exists in the industry.  
18 And that would work well for everyone. But we  
19 need to make sure that gives DOE as well as  
20 the manufacturers the right level of certainty  
21 that we have a repeatable test.

22 The Department, in their

1 investigation, understands that some smaller  
2 pumps, less than 10-kilowatt hours, can have  
3 higher uncertainty or higher variability in  
4 their measurement of efficiency. And that is  
5 something the DOE will have to consider when  
6 forming this test procedure. We could  
7 consider wider tolerances, which is currently  
8 what is in 14.6, on the particular rating or  
9 on some of the measurement criteria, or - DOE  
10 requires a certain number of products to be  
11 tested to form a certification for each  
12 product - And so, you could increase the  
13 number of products or pieces of equipment that  
14 were tested for a particular rating.

15 And so, those are some of the  
16 things that we will be thinking about as we  
17 move forward in the test procedure rulemaking,  
18 and DOE encourages comments on those as well.

19 MR. BROOKMAN: Neal?

20 MR. ELLIOTT: Neal Elliott, ACEEE.

21 Just looking back and remembering  
22 some of the challenges that we encountered



1 with the motor rules a decade-and-a-half ago  
2 in terms of reproducibility, I think it is  
3 going to be important for the testing  
4 community, the industry, and DOE to work  
5 together to do the reasonable round-robin  
6 testing, so that we actually have a sense of  
7 what is normal product variation, what is  
8 normal test variation facility-to-facility.

9           Unfortunately, as you start  
10 combining pump testing with the motor and  
11 other associated components, as my colleague,  
12 Kitt Butler from Advanced Energy, can speak  
13 to, we have got a lot of variables, both from  
14 the test as well as in the product itself.  
15 So, I think to the extent the industry, DOE,  
16 and the testing community can come together to  
17 produce some kind of an understanding of what  
18 is natural variation, I think that would  
19 contribute substantially to making this work.

20           I think for the Department to  
21 create unrealistic tolerances on the testing  
22 could potentially be a major problem.

1 MR. BROOKMAN: Okay. Thank you.

2 Okay. And perhaps 1-47 has been  
3 addressed already.

4 Do you want to set up 1-48?

5 MS. WIDDER: Sure. So, we did talk  
6 about DOE's Request for Comment on applicable  
7 test procedures for the complete motor  
8 package. DOE also requests comment on the  
9 accuracy of different measurement equipment.  
10 And I think the comment we just heard was  
11 answering that to some extent, about the  
12 different contributors to uncertainty in the  
13 test, both product variability as well as test  
14 variability. And we will certainly want to  
15 consider those and would love to work with  
16 industry to develop appropriate tolerances and  
17 uncertainty for pumps.

18 MR. BROOKMAN: Additional questions  
19 or comments before we move on?

20 Yes, Arnold?

21 MR. SDANO: Arnold Sdano, Pentair,  
22 representing HI.

1                   Most pump manufacturers that are  
2 members of HI are already performing the  
3 extended product tests for customers.  
4 Typically, it would be a wire-to-water, and it  
5 would include losses of the variable-speed  
6 drive and the motor and the pump itself.

7                   What we have learned is that we do  
8 have to upgrade some of our instrumentation,  
9 so that, particularly on power analyzers, the  
10 newer generation of power analyzers in front  
11 of the VFD are what is required in order to  
12 accurately measure that and to avoid the  
13 destruction that the VFD can cause to the  
14 power readings, if you attempt to measure them  
15 some other place.

16                   But it is really something  
17 manageable and within the scope of what most  
18 of the HI members are doing today.

19                   MR. BROOKMAN: Thank you.

20                   Yes, other thoughts on 1-48, the  
21 equipment needed, changes that might be made,  
22 et cetera?

1 Gary Fernstrom?

2 MR. FERNSTROM: Following up on  
3 Pentair's comments, many of these VFDs are  
4 introduced on linear wave forms into the  
5 utility system. So, it would be important to  
6 measure their power and energy use with true  
7 RMS power-measuring equipment.

8 MR. BROOKMAN: Okay. Thank you.

9 MS. WIDDER: Thank you.

10 MR. BROOKMAN: Additional thoughts?

11 (No response.)

12 We are a little bit behind. So,  
13 let me keep pressing us forward here.

14 MS. WIDDER: All right. The next  
15 Request for Comment relates to the  
16 applicability of calculation methods. For  
17 some types of equipment, DOE has considered  
18 alternative methods of rating equipment or  
19 coming up with a certification for DOE that  
20 has to do with rating one representative piece  
21 of equipment, and then using that rating, that  
22 tested piece of equipment, to extrapolate

1 ratings for other similar types of equipment  
2 if there is appropriate calculation methods  
3 that can be applied. There is an appendix in  
4 14.6 that does address this somewhat for pumps  
5 that have similar geometric and kinematic  
6 characteristics.

7 And so, DOE is requesting on  
8 comment on the applicability of that appendix  
9 or any other calculation methods to  
10 establishing reliable ratings for pumps or if  
11 testing every piece of equipment, every basic  
12 model is the right approach.

13 MR. BROOKMAN: Arnold?

14 MR. SDANO: One of the things we  
15 have done in this draft of 14.6 DOE is we have  
16 extracted the model test section that I  
17 believe you might have been referring to.  
18 However, we do believe that the calculation  
19 methods are mostly appropriate. Generally,  
20 what we do as pump manufacturers, and we have  
21 somewhat of a luxury over perhaps the motor  
22 manufacturers, of what they have experienced,

1 in that we are producing product basically off  
2 of patterns that pretty much define the  
3 geometry of a particular pump. And so, we  
4 will test a particular pump in the development  
5 stage, go back and modify the patterns, if  
6 required, and retest it until we get  
7 through -- and my company refers to it as a  
8 PPAP process or the first article inspection.

9           Once we get it passed, that is kind  
10 of locked down, and we really only need that  
11 one sample pump to base our curves on that we  
12 go to the market with. And that is typical  
13 throughout the pump industry. But I might  
14 only test a three-stage turbine, knowing how I  
15 would extrapolate it for a one-stage up  
16 through a nine-stage. And so, you know, I am  
17 using that basis of that test and  
18 extrapolating it using our calculation method.

19           MR. BROOKMAN: Okay.

20           MS. WIDDER: Thank you.

21           If any other pump manufacturers -  
22 maybe not now, but in their written comments -

1 have similar experiences, and DOE would also  
2 be interested in any sacrifices of accuracy  
3 that a calculation method would be incurring.

4 MR. BROOKMAN: From Arnold's  
5 comment, I wasn't sure -- your company does it  
6 one way, or is it fairly uniform?

7 MR. SDANO: I don't know of any  
8 variations from company-to-company. I believe  
9 we use very similar processes.

10 MR. BROOKMAN: I just thought I  
11 would inquire. Okay.

12 MS. WIDDER: Okay.

13 MR. BROOKMAN: Yes. Good.

14 MS. WIDDER: The last Request for  
15 Comment is on the number of unique pump models  
16 manufacturers would have to test. And this  
17 could be with or without the calculation  
18 method that we have just described, since we  
19 are interested in the ability of that  
20 calculation method to reduce test burden, and  
21 what the burden would be without that  
22 calculation method.

1                   We are also interested in, when we  
2 talk about overall wire-to-water tests, the  
3 additional burden that might be required at  
4 additional test points, and any comment  
5 related to that burden is welcome.

6                   MR. BROOKMAN: Arnold?

7                   MR. SDANO: So, just to repeat,  
8 some of the pump manufacturers are going to  
9 upgrade their instrumentation to do the  
10 extended product approach, and that you need a  
11 higher-quality power analyzer upfront.

12                   Yes, there probably are additional  
13 points. We find that frequently on extended  
14 product approach right now, where customers  
15 insist on multiple points at different speeds,  
16 but it is not an undue burden. It is  
17 something that we face every day. It is an  
18 everyday occurrence already for us.

19                   MS. WIDDER: So, just to clarify,  
20 that is not really an incremental burden? It  
21 is something that is common in the industry,  
22 although it is I don't believe normative in



1 the standard right now?

2 MR. SDANO: That is correct.

3 MS. WIDDER: Okay. Thank you.

4 One other quick question, add-on on  
5 the burden question. We talked previously  
6 about tolerances, and the DOE understands that  
7 additional, tighter tolerances would increase  
8 burden. You would need more precise  
9 measurement equipment and could require more  
10 tests. And so, how different levels of  
11 certainty or uncertainty in the test relate to  
12 burden is also very helpful.

13 So, for example, in HI 14.6, if we  
14 were to move to, say, a Grade 1 tolerance  
15 versus a Grade 2 tolerance, or down to a Grade  
16 3 tolerance, what does that do for the cost of  
17 testing, the burden of testing, from a  
18 manufacturer's perspective, so we can make an  
19 informed decision about what the right  
20 tolerance level is?

21 MR. BROOKMAN: Arnold?

22 MR. SDANO: Right now, since HI, as

1 members, we test to 14.6, our customers come  
2 in and audit us against 14.6, and 14.6 defines  
3 the requirements. When you get in excess of  
4 200 horsepower, you are going to be to a Grade  
5 1 already. Those pump manufacturers that make  
6 that equipment of the higher energy levels, we  
7 already have the instrumentation that complies  
8 with that.

9 And on the other hand, if it is an  
10 ANSI-pump manufacturer and generally lower  
11 horsepowers, you know, they might have much of  
12 their product shipping as a Grade 3. And so,  
13 it would have to be an upgrade to meet what we  
14 are proposing for the 14.6 DOE.

15 But the bulk of the manufacturers  
16 fitting within the scope as suggested, that  
17 the Grade 2 and 2(b) acceptance levels would  
18 fit right in with what we do daily.

19 MR. BROOKMAN: Okay. Thank you.

20 MS. WIDDER: Thank you.

21 MR. BROOKMAN: Additional comments  
22 on this stream of content?

1 (No response.)

2 Okay.

3 MS. WIDDER: Yes, I am done. So,  
4 now I think I am inviting Alison back to the  
5 podium to talk about, to introduce the  
6 subsequent rulemaking analyses that DOE will  
7 perform to set standard levels.

8 MS. WILLIAMS: Okay. Thanks,  
9 Sarah.

10 So, whenever DOE does this  
11 rulemaking procedure, we go through several  
12 analyses that Charlie introduced briefly  
13 earlier.

14 The first one, we undertake, as  
15 part of the preliminary analysis, is the  
16 market and technology assessment. The purpose  
17 of this is basically to characterize the pumps  
18 market and the measures to improve  
19 efficiencies. So, we look at manufacturers,  
20 shipments and trends, technologies that  
21 improve efficiency, and different regulatory  
22 and non-regulatory initiatives related to pump

1 efficiency.

2           So, as just an overview of the  
3 manufacturers as far as what DOE understands  
4 right now, we believe there are 10 companies  
5 representing 60 to 70 percent of the total  
6 U.S. pump market, and that these companies  
7 represent approximately 70 brands or  
8 divisions. And we do have in the framework  
9 document a list of those major suppliers and  
10 their parent companies.

11           We have also looked at the Census  
12 data for pumps that is available through 2010.  
13 We don't expect any further data to be  
14 available from the Census because they have  
15 discontinued that report.

16           Pages 46 to 51 of the framework  
17 document, go through our attempted mapping of  
18 Census codes to product categories that we are  
19 looking at, allocations of exports and imports  
20 to the different product codes because the  
21 Census presents only very aggregated import  
22 and export data, and estimated percentage of

1 pumps in the Census shipments that are serving  
2 clean water. So, we will welcome comment on  
3 any of those estimates that we have in the  
4 framework document.

5 And just as a bit of a market  
6 overview, the estimate is that 89 percent of  
7 shipments of the covered pumps that DOE is  
8 considering covering are end suction close  
9 coupled, but that is only 35 percent by value,  
10 which as a proxy for energy use might be  
11 significantly lower.

12 And so, again, we are just  
13 requesting comments on the market assessment.  
14 We would like any information on pump  
15 features, efficiencies, trends in efficiency,  
16 historical shipments, and prices. Bookings  
17 data would also be important if shipments are  
18 not available.

19 MR. BROOKMAN: Steve Rosenstock.

20 MR. ROSENSTOCK: Steve Rosenstock,  
21 Edison Electric Institute.

22 For pumps that are driven by

1 electric motors that are covered under DOE  
2 regulations already specifically talking about  
3 especially ones from 1 to 200 horsepower that  
4 already have had energy-efficient standards  
5 into EPACK '92, DOE is doing another  
6 rulemaking for those motors. I believe there  
7 was a joint recommendation from -- well, NEMA  
8 is not here and the advocates -- in terms of  
9 new standards that would go into effect in  
10 2015.

11 Are you going to use that  
12 information to help with your assessment? Or  
13 have you included that in a preliminary  
14 assessment?

15 MS. WILLIAMS: We can certainly  
16 look at that data that is available.

17 MR. ROSENSTOCK: Okay. Thank you.

18 MR. BROOKMAN: Yes, Mark?

19 MR. HANDZEL: Mark Handzel for the  
20 Hydraulic Institute.

21 Regarding 3.1, the specific  
22 information that you are asking for here,

1 Alison, you know, the Hydraulic Institute does  
2 not have that data. It really resides with  
3 each of our individual members.

4 It would be a considerable  
5 undertaking to try to gather it. I think that  
6 is why you are asking for it, is because you  
7 have figured that out.

8 MS. WILLIAMS: My understanding is  
9 that HI does have M10 booking data, though.

10 MR. HANDZEL: So, understand that  
11 M10 bookings data is collected in sales  
12 dollars.

13 MS. WILLIAMS: Uh-hum.

14 MR. HANDZEL: So there is no unit  
15 volume information. So, it is not going to  
16 give you complete information for what you  
17 want.

18 MS. WILLIAMS: We accept proxy  
19 information also.

20 (Laughter.)

21 MR. HANDZEL: Okay. So, I think we  
22 will take that under advisement. In our

1 written response, we will evaluate including  
2 that information. Okay? So, that is 3.1.

3 I have a response for 3.2. Are we  
4 ready to move on to that?

5 MR. BROOKMAN: Yes.

6 MR. HANDZEL: And, Alison, you have  
7 kind of already hit on some of this, but I  
8 will just say -- I have a written thing -- the  
9 Hydraulic Institute wishes to clarify that,  
10 historically, the U.S. Census data has not  
11 aligned with the ANSI/HI nomenclature  
12 descriptions. So, we cannot provide accurate  
13 input on this question.

14 Furthermore, we want to point out  
15 that the U.S. Census data MA333 report was an  
16 estimate in the sense that they collected some  
17 data and, then, used load factors to increase  
18 the data to give an overall number. So, we  
19 have concerns about its accuracy.

20 And then, lastly, you have already  
21 said the data hasn't been collected since  
22 2010, and it doesn't sound like it is going to



1 be collected again. So, we just really  
2 struggle with the data that is there.

3 MR. BROOKMAN: But would you be  
4 willing to characterize the accuracy of the  
5 Census data?

6 MR. HANDZEL: I am not comfortable  
7 doing that.

8 (Laughter.)

9 We haven't talked about that as a  
10 group. So, I can't really give you an answer  
11 on that, though.

12 MR. BROOKMAN: Okay. Yes, Neal?

13 MR. ELLIOTT: Neal Elliott, ACEEE.

14 I would also note that 2010  
15 shipments data was still with the depths of  
16 the Great Recession. And so, that data may  
17 not be reflective of overall market  
18 characteristics. So, it should be dealt with  
19 with a great deal of caution.

20 MR. BROOKMAN: Okay. Thank you.

21 MS. WILLIAMS: I just also wanted  
22 to comment on that. Some of the things we did

1 in the framework with the 2010 data in terms  
2 of disaggregation or allocation, if we get  
3 input on whether or not those were good, we  
4 can apply them to historical Census data as  
5 well. So, we don't plan to use only 2010.

6 MR. BROOKMAN: Did they address 3.3  
7 fully, Alison?

8 MS. WILLIAMS: It sounds like there  
9 is not really any information on it.

10 MR. BROOKMAN: Nothing additional  
11 on that? Okay. Let's go.

12 MS. WILLIAMS: Okay. So, in terms  
13 of the market assessment, one of the things  
14 that DOE does is develop equipment classes.  
15 Each equipment class is subject to its own  
16 standard.

17 So, here, what we are looking at is  
18 equipment classes that DOE is considering.  
19 Right now, they are basically aligning  
20 directly with the equipment categories that  
21 you have seen before, although we do have a  
22 design speed addition on the right side. I am

1 going to get into design speed in a couple of  
2 more slides.

3 So, just in terms of the equipment  
4 classes, the things that DOE can base them on  
5 is type of energy, capacity, and performance.  
6 We are not proposing to do type of energy at  
7 this point because pumps driven by engines are  
8 currently considered just to regulate the  
9 pumps themselves regardless of the fuel.  
10 Capacity we are not considering because we are  
11 considering the standard as a function of flow  
12 and specific speed, which would address that.  
13 So, we are only looking at performance-related  
14 features right now.

15 In addition, there are comments  
16 about this. DOE understands that some of  
17 these equipment classes maybe could be  
18 aggregated together and some may need further  
19 disaggregation. So, we are interested in  
20 whether, for example, end suction close  
21 coupled and frame-mounted can be a single  
22 equipment class because the wet ends are often

1 identical.

2           So, I will just move to the comment  
3 slide. We are interested in 3-4 about other  
4 performance-related features that maybe we  
5 haven't considered for equipment classes that  
6 should be in. And then, as well, in 3-5 or  
7 3-6, different disaggregations or aggregations  
8 that should potentially be made to these  
9 equipment classes.

10           MR. BROOKMAN:     Maybe you could  
11 return to the preceding slide.

12           MS. WILLIAMS:    Yes.

13           MR. BROOKMAN:    Steve?

14           MR. SCHMITZ:     Thank you.

15                            Along the lines of what you have  
16 heard previously, HI does not believe that DOE  
17 should pursue evaluating different equipment  
18 classes, and that we would support maintaining  
19 the originally-mentioned descriptions for pump  
20 types as it applies to the EU Directive.

21           MS. WILLIAMS:    So, just to clarify,  
22 you just mean that you only want those pump

1 types to be considered as equipment classes?

2 MR. SCHMITZ: Correct.

3 MR. BROOKMAN: Any other thoughts  
4 on aggregations, disaggregations, variations  
5 from what is presented in slide 78?

6 John Cymbalsky?

7 MR. CYMBALSKY: Maybe I am jumping  
8 ahead a little bit. But if DOE today were to  
9 just take the EU standard and the EU product  
10 classes and apply them as the standard, what  
11 percent do you think of the pumps out there  
12 now would fall off the market? Do we know  
13 that number? I may have asked this at one of  
14 our ex parte meetings.

15 MR. NAPOLITANO: Let me take a  
16 shot.

17 MR. BROOKMAN: Ken?

18 MR. NAPOLITANO: So, there are two  
19 separate questions there. One is, what scope  
20 of product by market volume -- I mean, it gets  
21 back to the market -- does the EU scope? The  
22 question of how many fall out is where you set

1 the MEI index.

2 MR. CYMBALSKY: Right.

3 MR. NAPOLITANO: So, the EU  
4 standard set initially of .1, which translates  
5 to the worst 10 percent of the current state  
6 snapshot dropout, and then, eventually,  
7 escalates over time to a .4, which means you  
8 are taking out the worst 40 percent  
9 performers.

10 So, there are two things. One,  
11 scope, how many pumps are you capturing? And  
12 then, two, where do you set that MEI index?

13 MR. CYMBALSKY: Okay. And do you  
14 think that the U.S. market is similar in  
15 stature to the EU market?

16 MR. NAPOLITANO: Yes. The  
17 discussion that we had earlier -- and Greg  
18 will jump in -- around the MEI and the  
19 C-factor and the difference between the  
20 dataset that they used when they captured the  
21 current state of the market of products versus  
22 what we captured versus the 27,000 points

1 basically says you can get very close  
2 ultimately to that same current set of data,  
3 tweak the C-factor a little bit, and then,  
4 choose to set your MEI index, which, then, by  
5 definition, says whatever that dataset is, I  
6 am taking the worst 10 percent out, the next  
7 level, however you want to set that. And  
8 then, you could ultimately figured out tied to  
9 an energy saving.

10 MR. BROOKMAN: Please, Greg.

11 MR. CASE: Greg Case, PD-cubed, on  
12 behalf of HI.

13 One of the things that we found  
14 when we first analyzed the EU methodology, and  
15 we took a small sample, kind of a straw poll  
16 of HI manufacturers, we found that we did get  
17 the 10 percent and the 40 percent dropout rate  
18 when we applied their C-factors to our data,  
19 that limited, very limited set of data.

20 And the reason that that happened  
21 was we did it as an aggregate. We looked at  
22 all the different pump types. And when we

1 bring them together, yes, we got a 10 percent  
2 and a 40 percent dropout rate, just like they  
3 did.

4 When we went and got the larger set  
5 of data that we are going to supply to the  
6 DOE, and we looked at by equipment class, we  
7 got much different fallout rates than they  
8 did. And so, adjusting, as Ken was saying,  
9 adjusting that C-factor allowed us to get the  
10 40 percent and the 10 percent dropout rates,  
11 just like they did, with the adjusted  
12 C-factor.

13 MR. BROOKMAN: Got it.

14 MR. CASE: Now, as an aggregate,  
15 you would probably get close to the 10 and the  
16 40 percent.

17 MR. BROOKMAN: Okay. Did we get  
18 3-7?

19 MS. WILLIAMS: No. So, 3-7, we are  
20 interested in specific equipment classes that  
21 would always be used in variable load  
22 applications.



1 MR. BROOKMAN: Mark, please?

2 MR. HANDZEL: Mark Handzel, on  
3 behalf of the Hydraulic Institute.

4 Again, we just wanted to clarify  
5 that the equipment class does not determine  
6 whether or not a pump can be used in variable  
7 load applications. Really, the application is  
8 what defines this, and there is no other way  
9 to explain it. That is just the way it is.

10 MR. BROOKMAN: The industry  
11 representatives seem aligned on this point.  
12 It is okay to have a counterpoint here in this  
13 room, if anybody has one.

14 (Laughter.)

15 (No response.)

16 Okay. We are moving on.

17 MS. WILLIAMS: Okay. So, to move  
18 on to whether or not design speed should be  
19 included as a differentiator of equipment  
20 classes, just to note that the EU regulation  
21 does contain separate efficiency standards for  
22 pumps operating with two-pole and four-pole

1 motors.

2 Our understanding is that this  
3 captures a size effect in which a larger pump  
4 running at lower speeds is more efficient than  
5 a smaller pump at higher speeds. However, the  
6 implication of setting these two different  
7 standards results in different predicted  
8 efficiency for the same pump running at  
9 multiple speeds.

10 So, DOE is interested in a possible  
11 result of this on market shift or other issues  
12 and wants to make sure that the way the  
13 efficiency equations and standards are set is  
14 appropriate for pumps running at different  
15 speeds.

16 And regardless of whether DOE sets  
17 equipment classes based on a design speed,  
18 there has to be some determination of what  
19 speed is used for testing and compliance. It  
20 might be difficult to select a single speed  
21 for testing because of variation in each  
22 equipment class. Another possibility would be

1 to require calculating minimum efficiency at  
2 multiple speeds and, then, requiring  
3 compliance at one of those speeds, such as the  
4 one with the greatest efficiency requirement  
5 or the lowest efficiency requirement or the  
6 most stringent one.

7 So, again, we just want to request  
8 comment on various issues related to this  
9 design speed problem. There's a whole bunch  
10 of pages in the framework document that gets  
11 into a lot more detail about this that we  
12 don't have time to get into right now.

13 But one of them relates to whether  
14 or not it is better to use Reynolds number  
15 instead of flow for setting these standards.  
16 And again, in 3-9, I already mentioned we are  
17 interested in what method of surface-fitting  
18 provides the most appropriate predicted or the  
19 minimum efficiency for different pumps.

20 MR. BROOKMAN: Arnold?

21 MR. SDANO: ANSI/HI 20.3 2009,  
22 efficiency prediction method, that is a

1 standard we have. I have chaired that  
2 Committee. What we did is we brought all the  
3 information we could find in the industry  
4 together of how do you predict pump efficiency  
5 when we drafted that standard. We went out  
6 and polled our members and came up with their  
7 efficiency based on equipment class and  
8 divided it up that way.

9 And one of the problems that we saw  
10 with using the Reynolds number, or  
11 particularly that was extracted from HH  
12 Anderson, was that it doesn't reflect the  
13 significant change in design when you go from  
14 a pure radial volute-type pump to a vertical  
15 turbine-type pump, where it becomes a mixed  
16 flow. And so, instead of a single hump on  
17 efficiency at about 2500 U.S. Units specific  
18 speed, in fact, our data showed that we had a  
19 two-humped camel, and it was based on a change  
20 in design when you got into mixed flow and  
21 reflected the difference between volute and a  
22 diffuser-type pump.

1           And so, we recommend going out, and  
2           that is what we are collecting data, and based  
3           on different pump types, is it a more  
4           appropriate method if we would look towards  
5           the 20.3? You can see the way we ended up  
6           there, and we think that is much more  
7           appropriate.

8           MS. WILLIAMS:     So, in terms of  
9           20.3, as I recall, that is just flow and  
10          specific speed correction, and doesn't correct  
11          separately for design speed, as the EU does?

12          MR. SDANO:     No, in 14.6, in the  
13          model section we have already talked about,  
14          though, there is a Reynolds number scale-up,  
15          but that variation is just minute in  
16          comparison to the change in the pump type.

17          MS. WILLIAMS:   Okay. So, is HI  
18          proposing to use those design speed equipment  
19          classes the way that EU did or no?

20          MR. SDANO:     Yes.

21          MS. WILLIAMS:   Yes? Okay. So, you  
22          are proposing -- I mean, I know you don't like

1 to use equipment categories.

2 MR. SDANO: With different  
3 C-factors for different types of pumps.

4 MS. WILLIAMS: But you --

5 MR. SDANO: Yes.

6 MS. WILLIAMS: -- agree with having  
7 the different --

8 MR. SDANO: That is correct.

9 MS. WILLIAMS: Okay. And so, in  
10 the next comment related to that, we are  
11 interested in how testing occurs in the EU.  
12 You know, if you have a single-pump model that  
13 is offered at multiple speeds, what speed do  
14 the manufacturers determine to test it at, and  
15 any other of these comments related to the  
16 speed issue?

17 MR. BROOKMAN: Greg?

18 MR. CASE: To go back to 3-9,  
19 because we do advocate at HI -- Greg Case,  
20 Hydraulic Institute -- we do advocate that we  
21 would support the different speeds in the  
22 testing. Okay? Because we have found that

1 there are significant data differences between  
2 the two, just as you did in your comments.

3 There are also things that we do  
4 design-wise to the impeller to be able to --  
5 or to the pump itself, things like that, with  
6 the larger or higher-speed equipment. So, on  
7 the efficiency, balance holes, things like  
8 that that we might do.

9 Moving on to the 3-10, we do  
10 believe that you should be using separate  
11 equations for the multiple speed.

12 MS. WILLIAMS: And so, then, if you  
13 have a pump model offered at multiple speeds,  
14 in the EU are people testing at both speeds?

15 MR. CASE: Yes. And it would have  
16 different C-factors based on those two tests.  
17 Again, you may sell a pump at four-pole speed  
18 and, actually, modify that pump slightly to  
19 run at two-pole speed, based on thrust  
20 balancing and things like that.

21 MR. BROOKMAN: Steve Rosenstock?

22 MR. ROSENSTOCK: Steve Rosenstock,

1       EEI.

2                   Just again, this is a quick follow-  
3 up. Then, would that mean that you would have  
4 to test the same pump at multiple speeds and,  
5 then, at three BEP conditions? Or are there  
6 some calculations in there?

7                   MR. BROOKMAN: Greg?

8                   MR. CASE: You would have two BEPs  
9 that you test at but three points on the  
10 curve. Most of our testing actually happens  
11 on multiple points on the curve, possibly  
12 seven or more, when we are running these  
13 tests. But we would test at the 75, 110, and  
14 the BEP for both speeds, correct.

15                   MR. BROOKMAN: Do you want to set  
16 up -- do you have follow-on? I like your  
17 questioning. It is good.

18                   MS. WILLIAMS: No, I think that --

19                   MR. BROOKMAN: Did we get 3-11,  
20 -12, and -13 yet?

21                   MS. WILLIAMS: They are kind of all  
22 related. So, it sounds like the answer to -12



1 and -13 --

2 MR. BROOKMAN: And I think they  
3 talked about testing and compliance burden, at  
4 least globally.

5 MS. WILLIAMS: Yes.

6 MR. BROOKMAN: And then, is there  
7 any other specific query you want to put out  
8 there, based on this comment box?

9 MS. WILLIAMS: I don't have any.

10 MR. BROOKMAN: Okay. No additional  
11 comments? We are moving on.

12 Greg?

13 MR. CASE: We would, again, the  
14 testing would be done at nominal speeds, not  
15 some intermediate speed. So, we would say  
16 two-pole and four-pole nominal speeds at 60  
17 hertz.

18 MR. BROOKMAN: Sixty? Okay.

19 MS. WILLIAMS: All right. And just  
20 to clarify something I didn't say earlier, the  
21 DOE has not yet determined how many speeds or  
22 poles it is covering. So, if it decides to

1 cover more speeds, then this would actually  
2 break down into additional speeds for six-pole  
3 and eight-pole motors, for example.

4 MR. BROOKMAN: Joanna?

5 MS. MAUER: Joanna Mauer.

6 I just want to make sure I  
7 understand kind of the questions. Is this  
8 about that in some cases the same physical  
9 pump can be operated at different speeds? And  
10 so, that pump could fall into different, the  
11 same pump could fall into more than one  
12 equipment class?

13 MR. LLENZA: The usage of the pump  
14 could be more than just one application. That  
15 is what I think.

16 MR. BROOKMAN: That was Charles.

17 Albert, do you want to take that  
18 one?

19 MR. HUBER: Yes. I mean, you can,  
20 but the efficiency is going to be different.  
21 And therefore, we would test at all speeds  
22 that we were going to be held to. That is

1 what we do today.

2 MS. MAUER: So, the same pump might  
3 be tested at different speeds and certified at  
4 different speeds as meeting standards that  
5 apply to --

6 MR. HUBER: Yes, for that speed,  
7 yes.

8 MS. MAUER: -- different product  
9 classes?

10 MR. HUBER: Yes. For that speed,  
11 yes.

12 I don't really know how you would  
13 have your product classes, whether you would  
14 break it down by speed or you would just have  
15 the class and, then, show the different  
16 speeds. I really don't know.

17 MR. LLENZA: This is Charles  
18 Llenza, Department of Energy.

19 So, for a pump that is tested at  
20 different speeds, would you give it a nominal  
21 rating or an average rating for efficiency  
22 or --

1 MR. NAPOLITANO: Well, you would  
2 just have a rating specific to each of the  
3 primary speeds that that pump would typically  
4 run. So, if you looked in any manufacturer's  
5 performance data, catalog of pump curves, you  
6 would see a given size pump and you would see  
7 a performance curve at two-pole speed and at  
8 four-pole speed and maybe at six-pole speed,  
9 because not only is the head and flow  
10 different, but the efficiency characteristics  
11 are slightly different at those different  
12 speeds, enough to warrant taking the data and  
13 publishing it at its different speeds.

14 So, whether that means that it is a  
15 different equipment class I guess ultimately  
16 depends on how the equipment classes are  
17 defined and whether the exact same pump runs  
18 at two different speeds. It is two classes.  
19 If it is, then the answer is yes, and if it  
20 isn't, the answer is no.

21 MR. BROOKMAN: Okay. Good. Yes.

22 Gary Fernstrom?

1 MR. FERNSTROM: Well, where this  
2 plays out is with the variable-speed pump  
3 motor and controller. So, you know, you would  
4 want to have information reported at different  
5 speeds that this equipment would likely be run  
6 at. And again, my frame of reference goes  
7 back to the swimming pool pumps where we  
8 specify different speeds -- high speed, half  
9 speed, low speed, and best efficiency speed --  
10 that we would like to see the efficiency rated  
11 at. But it may be different for this  
12 application.

13 MR. BROOKMAN: Ken, please, yes.

14 MR. NAPOLITANO: Okay. Gary, so in  
15 the case of a variable-speed drive, and what  
16 we have talked about is an extended product,  
17 the approach that we are proposing,  
18 essentially, goes after wire-to-water, right?  
19 It says I am going to apply a load profile to  
20 this integrated pump motor drive, and I am  
21 going to measure for how much output I get,  
22 how much energy input am I consuming. And

1 that takes all of the variables into account.

2 So, if, for example, the pump  
3 hydraulic efficiency at a lower speeds is  
4 slightly different than it is at the same  
5 point at a higher speed, that all comes out in  
6 the wash with the wire-to-water, because you  
7 are, then, basically, what are you putting in  
8 and what are you getting out, and everything  
9 in between is the aggregated efficiency.

10 MR. BROOKMAN: Mike Rivest?

11 MR. RIVEST: Mike Rivest, Navigant.

12 I understand what you are saying.  
13 But the benefit of having different  
14 efficiencies published at different ratings,  
15 you know, different loads, is that we can,  
16 then, use that to evaluate the economics on a  
17 client that may have a different load profile  
18 than the test load profile.

19 So, integrating everything into a  
20 single metric and reporting just that metric  
21 wouldn't give us the information we need to  
22 see if it is cost-effective on a single-speed

1 customer or, you know, someone very different  
2 low profile. I don't know if that is what you  
3 are going at, Gary.

4 MR. BROOKMAN: Ken?

5 MR. NAPOLITANO: Well, first of  
6 all, we would agree with that. We are already  
7 saying that we do today publish the efficiency  
8 at multiple speeds --

9 MR. RIVEST: Okay.

10 MR. NAPOLITANO: -- and in some  
11 cases, even a variable-speed version of that  
12 curve that gives gradations in between the  
13 nominal motor speeds.

14 MR. RIVEST: Okay.

15 MR. NAPOLITANO: So, I think we  
16 have --

17 MR. RIVEST: Okay. I was just  
18 concerned that you were collapsing everything  
19 and reporting just that one --

20 MR. NAPOLITANO: No, just the point  
21 that, when you ultimately did the wire-and-  
22 water test --

1 MR. RIVEST: Yes.

2 MR. NAPOLITANO: -- it was taking  
3 all of those components into account.

4 MR. BROOKMAN: Gary?

5 MR. FERNSTROM: I will pass.

6 MR. BROOKMAN: Okay. Have we  
7 covered this?

8 MS. WILLIAMS: I think we have.

9 MR. BROOKMAN: Okay. Let's go on.

10 MS. WILLIAMS: Okay. So, when DOE  
11 performs its engineering analysis that we will  
12 talk about next, sometimes DOE does not  
13 analyze all of the equipment classes  
14 separately. So, one thing that DOE can do is  
15 select some representative classes that  
16 results can be used to extrapolate to the  
17 other classes.

18 So, just in terms of analysis, the  
19 things that DOE has identified that could  
20 possibly be combined are end suction close  
21 coupled and frame-mounted pumps and possibly  
22 vertical turbine and submersible pumps,



1 depending on the metric chosen for those.

2           Within the representative classes,  
3 DOE traditionally selects representative units  
4 to analyze as a basis to determine the  
5 incremental costs associated with increases in  
6 efficiency. So, in general, these are units  
7 that are functionally equivalent in all  
8 aspects except efficiency. So, a lot of  
9 times, for example, for motors, you will look  
10 at the same motor at standard and premium  
11 efficiency.

12           For pumps, what we think would  
13 happen is we would have to find pumps with  
14 approximately the same BEP flow and specific  
15 speed, but with different efficiency levels.  
16 And we understand that these may be a little  
17 more difficult to find than traditional  
18 products because the same manufacturer will  
19 not necessarily offer multiple pumps at the  
20 same BEP because they are covering a wide area  
21 of duty points.

22           So, then, once DOE selects these

1 representative units, and again, scale the  
2 results from the analysis to the full range of  
3 flow and specific speeds within the equipment  
4 class, efficiency results could possibly be  
5 scaled with some of the 3D figures that we  
6 have looked at now, but DOE also has to  
7 determine ways to scale the cost.

8           So, I have some Requests for  
9 Comments here. And actually, thinking about  
10 it, some of these might be best answered after  
11 we have gone a little farther. But, in case  
12 someone has a comment right now, we are  
13 basically seeking information on whether there  
14 is any representative classes that could be  
15 grouped together and what representative units  
16 would be most appropriate.

17           MR. BROOKMAN: Steve?

18           MR. ROSENSTOCK: Steve Rosenstock,  
19 EEI.

20           And I will use my experience with  
21 the transformers. You know, I don't mind the  
22 concept of this. I just know that sometimes

1 when you have too wide of a swathe, you get  
2 some very interesting results because of the  
3 representative class is too large. And I will  
4 just say for like the transformers, for  
5 certain types of transformers, you were going  
6 anywhere from 10 KVA to 333 KVA in terms of  
7 capacity. And, yes, they were the same design  
8 line, but they are different products when you  
9 get right down to it. They are doing the same  
10 function, but because of their size and  
11 because of some of their application, they  
12 could be significantly different products.

13 And the fact that, again, the  
14 current scope is anywhere from 1 to 200  
15 horsepower, again, you are talking about, I  
16 will say, physically small to very large. And  
17 then, when you put in the variable-speed  
18 drives on top of that, again, I am just  
19 thinking that, then, there is probably, from 1  
20 to 200 horsepower, that is at least 20  
21 different motor sizes at least right there  
22 within each class of product here.

1                   So, I like the idea, but I think  
2                   there has to be real care, especially in terms  
3                   of either motor horsepower that is serving or  
4                   engine -- excuse me -- steam or diesel engine  
5                   or electric motor, the size of the motor or  
6                   engine that is serving the product as well as  
7                   just physical size and possibly the  
8                   application, just because of the fact, you  
9                   know, just in terms of cost and, then,  
10                  actually, in terms of some of the loading,  
11                  there is going to be such a variation. You  
12                  might be making, when you get right down to  
13                  it, there could be, you know, 50 products  
14                  being analyzed here. And that is before you  
15                  get to the motor horsepower from the 1 to 200  
16                  horsepower.

17                   So, I like the idea, but I think  
18                   there is going to be some pretty small ranges  
19                   of representative classes to get better  
20                   accuracy in terms of results.

21                   MS. WILLIAMS: Okay.

22                   MR. BROOKMAN: Arnold?

1 MR. SDANO: Frankly, I am kind of  
2 at a loss to understand why you would select  
3 one specific speed and one flow for that  
4 analysis. A pump type is going to have a  
5 significant impact on what efficiency you get.

6 Basically, you are only confirming  
7 one point on that entire 3D curve that  
8 Europump came up with for their MEI. And I  
9 don't know how you would extrapolate that from  
10 that point.

11 MR. RIVEST: Mike Rivest, Navigant  
12 Consulting.

13 Can you put up the figure with the  
14 dots and the lines?

15 MR. BROOKMAN: Which one?

16 MR. RIVEST: I think I saw one.

17 MS. WILLIAMS: There?

18 MR. RIVEST: Right.

19 So, this would represent all the  
20 pumps in a particular product class. And what  
21 makes a product class is that every pump  
22 within that class would have to meet the same

1 efficiency equation.

2 And earlier, there was a  
3 description of how the EU set the standard, so  
4 that that first standard line would eliminate  
5 from the market 10 percent of the pumps, so 10  
6 percent of the dots, and then, with an intent  
7 of eliminating 40 percent of the dots  
8 eventually.

9 If you were aggregating too many  
10 product classes, too many types of pumps that  
11 really should not be in the same product  
12 class, as you lift that standard from 10 to  
13 40, you would notice that certain types of  
14 pumps are disappearing completely. What that  
15 would mean is that you really haven't  
16 established the product classes correctly. If  
17 they were established correctly, all of the  
18 pump types, part of that class would be  
19 eliminated at the same rate. So, that is one  
20 way of thinking of what we are trying to do  
21 with the class, just not separate things up  
22 too much, but, then, not aggregate them so

1 much that, by raising the bar, we are  
2 eliminating certain types of pumps.

3           Then, the idea of a representative  
4 unit is, what we are trying to do is determine  
5 the cost-effectiveness to the consumer of  
6 raising that curve from baseline, say zero, to  
7 10 or to 40. And what we do is we try to  
8 purchase a pump at 40 that is on that line of  
9 40 percent and one that is at the bottom at  
10 zero and say, okay, what design features are  
11 incorporated in the better pump, and how much  
12 does it cost to get there?

13           And to do that tradeoff analysis  
14 between the incremental cost of that pump and  
15 the economics, and the payback to the  
16 consumer. Of course, we can't do that for  
17 every pump here. So, we try to pick on that  
18 locus of points -- can you put that back  
19 there? -- where is the highest density of  
20 bumps, if you will, and the flow there  
21 being -- say you were to take your  
22 representative units at 600 gallons per minute

1 and base your analysis on the economics of  
2 that type of pump. So, we would look at the  
3 cost of zero, the red line, the cost of the  
4 blue line, do the economics on that, and then,  
5 from that representative unit, make a  
6 conclusion about the cost-effectiveness of  
7 going to 40 percent.

8 If we are using a representative  
9 unit, the representative pump as being that  
10 one, we would, then, extend our conclusion to  
11 all the pumps on this graph and say, well, if  
12 it is cost-effective for the 600 to go to 40  
13 percent, we are going to go to 40 percent on  
14 everything else.

15 If you know something about how  
16 these costs scale, you may say, "That's just  
17 not right because it is cost-effective to go  
18 to 40 percent at one size, but not at  
19 another." We may decide to break that down  
20 into three segments, look at a 200, a 600, and  
21 a 1200, and then, set the cost-effective level  
22 using the economics of each of those



1       separately. So, that is what a representative  
2       unit would be. That is how we would use it.

3               MR. BROOKMAN: Yes, Albert?

4               MR. HUBER: Albert Huber from HI.

5               Just so there is no  
6       misunderstanding about the MEI that Europe is  
7       using, what they are endeavoring to do is they  
8       look at the market as a whole. And because  
9       none of our BEPs are always the same flow for  
10      any product class, that is another difficulty  
11      you have with pumps. Not everybody's BEP for  
12      a certain size pump is at 500 gallons, for  
13      instance. It could be 450; it could be 550.

14              MR. BROOKMAN: I'm sorry, the BEP  
15      was what again?

16              MR. HUBER: The Best Efficiency  
17      Point.

18              MR. BROOKMAN: Okay.

19              MR. HUBER: So, what it does is you  
20      take a full diameter impeller for a particular  
21      class of pump -- and Greg can correct me if I  
22      am wrong -- but you take it, and you take the

1 BEP, you take 75 percent, and you take the 110  
2 percent. And then, you measure the total  
3 population. Everybody in the marketplace  
4 submits; in this case, the HI did and we are  
5 going to turn this data over to you. We all  
6 did that. We turned in our best efficiency at  
7 full diameter for each class, for the classes  
8 and scope that we have provided. That is  
9 already done.

10 MR. RIVEST: So, you know how the  
11 word "class" keeps coming back.

12 MR. HUBER: Okay.

13 MR. RIVEST: And I just don't know  
14 whether we are all using "class" the same way.

15 When you all submitted your data,  
16 this was cost and efficiency data or --

17 MR. HUBER: No, no, no. We do have  
18 cost data.

19 MR. RIVEST: Okay. So, you sort of  
20 wrote down the spec of the pump you were all  
21 costing?

22 MR. HUBER: Right. We took it

1 all --

2 MR. RIVEST: That is a  
3 representative unit?

4 MR. HUBER: Yes. We took it off  
5 the HI nomenclature. We said you submit this  
6 pump.

7 MR. RIVEST: Right.

8 MR. HUBER: You submit it at full  
9 diameter. You submit it --

10 MR. RIVEST: By flow rate?

11 MR. HUBER: No.

12 MR. RIVEST: No?

13 MR. HUBER: No. It is not a flow  
14 rate, is it? There is a flow rate in there,  
15 but your BEP may not be at the same point.

16 MR. RIVEST: Right.

17 MR. BROOKMAN: Alison, come on.

18 MS. WILLIAMS: Can I jump in here?

19 MR. BROOKMAN: Yes.

20 MS. WILLIAMS: So, I think we are  
21 talking about a couple of different things.

22 So, when we are looking -- I am actually going

1 to go a couple more slides, I think.

2 What Mike was saying was that we  
3 are looking to determine the cost differential  
4 of increasing efficiency for pumps that are  
5 very similar. And for that, that is what we  
6 traditionally do; we use those rep units for.

7 It would not take away from I think  
8 what you are talking about, where you are  
9 collecting pumps of the same type, whatever  
10 size they are, and comparing them to the  
11 minimum efficiency equation to get the MEI.  
12 That would still happen. We are just looking  
13 for ways to isolate determining the cost of  
14 that increased efficiency. Traditionally, DOE  
15 does this by choosing representative units  
16 that can, then, scale those costs to a  
17 different unit.

18 MR. RIVEST: So, we can scale the  
19 cost, but we don't have to scale the cost. We  
20 can just agree that the standard level -- so,  
21 once you have represented the population with  
22 the dots and, then, you have run your lines

1 and your equations that fit those dots, we  
2 need to determine which line we are going to  
3 take as a standard.

4 So, we just have to agree what  
5 pump, you know, what segments, what cross-  
6 section of those lines of the analysis for the  
7 cost-effectiveness is going to be based. Once  
8 it is determined it is 40 percent, the 40  
9 percent line is what sets the standard to  
10 everything. So, we don't have to scale. You  
11 know, we don't have to look at any other  
12 pumps.

13 MR. BROOKMAN: Thanks, Mike.

14 Now to Ken.

15 MR. NAPOLITANO: Ken Napolitano.

16 So, going back to your original  
17 point in this string, which was that we have  
18 to get the breakdown of classifications  
19 balanced correctly, so that you don't penalize  
20 one style of pump versus -- we completely  
21 agree with that. That is absolutely dead-on  
22 right.

1                   What that actually shakes out as,  
2                   you know, and there is an equation for  
3                   different styles of pumps and how fine do you  
4                   break it down or not and the tradeoffs with  
5                   that, you are absolutely right.

6                   I don't know if we know, sitting  
7                   here today, for the purposes of this other  
8                   discussion, which is understanding the  
9                   incremental cost to go from 10 to 20 or 20 to  
10                  40, or whatever, whether or not inside of a  
11                  particular class, however you end up defining  
12                  that, picking one representative point and  
13                  comparing the 10 to the 40 of that same  
14                  representative unit can be extrapolated to all  
15                  extremes and be accurate. I don't think we  
16                  know that.

17                  That is something we would probably  
18                  have to go back and take a look at and, to  
19                  your point say, is one close enough or do you  
20                  want to do one at the low end, one at the high  
21                  end, because of how costs change with size, or  
22                  do you need to look at a couple? I don't

1 think we know the answer to that that I am  
2 aware of.

3 Greg, do you have --

4 MR. BROOKMAN: Greg, use the  
5 microphone, if you are going to respond.

6 MR. CASE: I am just wondering if I  
7 should respond.

8 (Laughter.)

9 MR. BROOKMAN: Albert? And then,  
10 to Greg, and back to Mike.

11 MR. HUBER: What we did to try to  
12 come up with some idea of what it would cost  
13 to redesign, we did a study and it was  
14 independently surveyed, which we intend to  
15 turn over to the DOE. We said this is the  
16 cost of taking a pump -- I think we said, we  
17 told our people we wanted to go to 40. So,  
18 this is what it is going to take. The MEI, we  
19 all knew what we were talking about for each  
20 class.

21 MR. NAPOLITANO: Just remember  
22 there are two costs, the cost of redesign and

1 the cost to the consumer.

2 MR. HUBER: That is true.

3 MR. NAPOLITANO: And I believe you  
4 were programming --

5 MR. BROOKMAN: Repeat that into the  
6 record, Albert. Or, Ken, go ahead, Ken.

7 MR. NAPOLITANO: I just want to  
8 make sure we are clarifying, and both are  
9 probably relevant, but they are different.  
10 All right. There are two costs to consider in  
11 how much does it cost to go from 10 to 40.  
12 One is the cost to the industry, and the other  
13 is the cost to the consumer. We have captured  
14 one, and not necessarily the other.

15 MR. HUBER: That is correct.

16 MR. RIVEST: They are both separate  
17 considerations.

18 MR. HUBER: Right. And we did it  
19 by horsepower. So, that gave us size.

20 MR. RIVEST: You did it by  
21 horsepower. So, we will see how that maps to  
22 -- they are probably pretty close, right?



1 MR. HUBER: It is probably pretty  
2 close.

3 MR. RIVEST: Okay.

4 MR. HUBER: And, you know, we  
5 intend to turn that over. The larger you got  
6 in the pump, the more it costs.

7 MR. RIVEST: And Steve started this  
8 conversation by saying, "Well, be careful you  
9 don't aggregate too much," because transformer  
10 standards were set in a very similar fashion.  
11 So, our scale there goes from like 25 to 1500,  
12 and we split it into three segments. There  
13 were some thought that maybe we should have  
14 split into more segments. Because as you do  
15 the economics on the 25, the 500, and the  
16 1500, to determine if the whole equation is  
17 cost-justified, we weigh the results of the  
18 economic analysis.

19 MR. BROOKMAN: Greg, do you want to  
20 add on?

21 MR. CASE: No.

22 MR. BROOKMAN: No, not at this

1 point?

2 Did we cover it?

3 MS. WILLIAMS: Yes. I just want to  
4 say, yes, in the interest of moving on, as I  
5 said, what I have been talking about is DOE's  
6 traditional approach, and we are certainly  
7 open to methods of getting cost increase data  
8 from the industry. And I think we will work  
9 with you moving forward on that.

10 So, to move on, baseline models, I  
11 really want to talk about efficiency levels,  
12 as Mike started. So, what we want to start  
13 with is the baseline level, what is basically  
14 the lowest efficiency, the most typical pump  
15 on the market right now?

16 In other rulemakings, it is often  
17 the current federal standard, but there isn't  
18 one for pumps. So, DOE is considering the  
19 appropriate method to develop those levels.

20 This is a 2D slice that you have  
21 seen before. The red line on the bottom is  
22 the bottom of market. So, if you take the

1 whole 3D space and put a surface to the very  
2 lowest pumps across the 3D space, you get that  
3 line. What you see happens is that in certain  
4 areas there are no pumps that are actually at  
5 that baseline level.

6           So, to solve that problem, there  
7 are a couple of things we have thought of that  
8 we can do, one of which is to make a  
9 discontinuous surface, if that works. But the  
10 other one is to raise the level of the bottom  
11 of the market to create a baseline that  
12 represents least-efficient, most-typical pumps  
13 across the flow and specific speed. So, you  
14 can see the example in this slice where that  
15 line goes through many more pumps.

16           So, DOE is still exploring options  
17 for how it would set baseline levels in this  
18 case. And again, it is designed to represent  
19 the same level across all the flows and  
20 specific speeds.

21           So, similarly, DOE looks at  
22 efficiency levels from the baseline through

1 the max-tech level. Max-tech does not  
2 necessarily have to be available on the market  
3 right now. It could be involved in a working  
4 prototype. Sometimes it is the market  
5 maximum. So, you may have pumps on the market  
6 right now that are basically the highest it  
7 can go.

8 And then, DOE looks at the design  
9 options and costs associated with getting to  
10 each of the levels it selects from baseline to  
11 max-tech, which is similar to the EU's  
12 different MEI levels.

13 So, DOE is also looking at how to  
14 define max-tech, in this case, based on market  
15 maximums. And the same problem with the  
16 baseline level; if you set it based on the  
17 whole 3D space, you end up with a lot of  
18 spaces that don't have pumps there. And this  
19 could be problematic. If you choose where  
20 there is a pump, it may not represent the same  
21 level of cost across these spaces where there  
22 aren't any pumps.

1                   So, again, the options are  
2 discontinuous functions or lowering the market  
3 max level to something that crosses a lot more  
4 pumps across the space, which is essentially  
5 treating some of these other ones as outliers.

6                   The DOE seeks comment on how the  
7 baseline level and the efficiency level,  
8 including the max-tech level, are set. That  
9 is all three of these issues right here.

10                  MR. BROOKMAN: Steve Rosenstock?

11                  MR. ROSENSTOCK: Would you go back  
12 to the previous slide I think you showed? I  
13 guess I am misreading this. It is looking  
14 like the max-tech is lower than the top of the  
15 market?

16                  MS. WILLIAMS: Sorry. That is  
17 mislabeled.

18                  MR. ROSENSTOCK: Okay. I just  
19 wanted to double --

20                  MS. WILLIAMS: So, the blue line is  
21 top of market. Oh, the red line should be a  
22 revised market maximum level, basically.

1 There is not really a good name for it, right?  
2 So, the blue is if you set top of market based  
3 on all the pumps in the 3D surface and you end  
4 up with these holes, and the red line is  
5 basically just one example of an attempt to  
6 get a market maximum that represents all the  
7 flow and specific speed spaces. So, the  
8 terminology is not really correct and is  
9 confusing.

10 MR. ROSENSTOCK: And again, Steve  
11 Rosenstock.

12 Yes, again, it is a matter of  
13 earlier on there was like four different  
14 versions of efficiency that were shown, you  
15 know, that was being used throughout the  
16 world.

17 MS. WILLIAMS: Yes. So, these  
18 particular figures are based on pump  
19 efficiency.

20 MR. ROSENSTOCK: Right.

21 MS. WILLIAMS: Yes. Sorry. So, we  
22 could do something similar with overall

1 efficiency or other metrics. We just  
2 basically have these as examples for a  
3 methodology that could be followed.

4 MR. ROSENSTOCK: Steve Rosenstock.

5 Yes, so this is just one example of  
6 one possible approach --

7 MS. WILLIAMS: That's right.

8 MR. ROSENSTOCK: -- at this  
9 specific test condition at Best Efficient  
10 point?

11 MS. WILLIAMS: Correct.

12 MR. ROSENSTOCK: Thank you.

13 MR. BROOKMAN: Greg?

14 MR. CASE: Greg Case, HI.

15 One difference I want to try to  
16 make clear here is the MEI looks to drop the  
17 bottom 10 percent. It is not shooting for a  
18 certain efficiency level, which we seem to be  
19 going for here. It is I want to eliminate a  
20 certain portion of the market that is the  
21 lowest-performing part of that market.

22 And so, you would be able to always

1 find a spot with that 10 percent. You  
2 wouldn't have to worry about discontinuities  
3 or any of that.

4 MS. WILLIAMS: Yes.

5 MR. CASE: So, it differs from your  
6 process, I understand, but it does simplify  
7 trying to find 10 percent, 15 percent, 20  
8 percent, whatever we set that level at.

9 MS. WILLIAMS: Right. So, DOE's  
10 process, basically, deals with efficiency  
11 levels. So, you could create an efficiency  
12 level that was the equivalent of cutting off a  
13 certain percentage of market, and that is  
14 something that could be done. But, yes, the  
15 terminology and the process here is different  
16 in that respect.

17 MS. WILLIAMS: So, moving on, the  
18 next part of the market assessment is the  
19 technology assessment in which DOE identifies  
20 technology options that can be used to improve  
21 efficiency. And this list is a preliminary  
22 list of things that could happen. We



1 understand that the primary thing that happens  
2 is just hydraulic redesign of the pumps to  
3 meet the new standard. And we have identified  
4 a few other things that have more detail in  
5 the framework, including smoothing surface  
6 finish, reducing clearances, reducing  
7 friction.

8 And then, if we do go to the  
9 expanded approach of pumps inclusive of motor  
10 and VSD, we will also potentially look at  
11 technology options, which are adding a VSD,  
12 improving the VSD efficiency, and, also,  
13 reducing standby power for those VSDs. And we  
14 are also interested in other suggestions that  
15 manufacturers are using to improve the  
16 efficiency of their pumps.

17 MR. BROOKMAN: Yes, Greg?

18 MR. CASE: Greg Case, HI.

19 In 3-14, we agree with the factors  
20 for the pump that you have come up with as  
21 ways to improve the pump. In the framework  
22 document, we believe some of the percentages

1 of increase would be going from the lowest  
2 pump on the market to max-tech level, to be  
3 able to hit those types of increases. A  
4 surface finish of 18 percent increase in  
5 efficiency, only a very, very small segment  
6 market could possibly benefit like that.

7 MS. WILLIAMS: To be fair, the  
8 framework document does state that it is  
9 typically 1 to 3 percent.

10 MR. CASE: Yes, yes. So, we just  
11 wanted to go on record as HI saying some of  
12 the efficiencies that we saw, the 10 to 12  
13 percent increase in efficiency, that would be  
14 taking us from the bottom of the market to the  
15 top of the market in most cases.

16 MS. WILLIAMS: So, we would be  
17 interested in specific information related to  
18 that and the efficiency increases that the  
19 manufacturers believe actually result from  
20 these technology options.

21 MR. BROOKMAN: Neal?

22 MR. ELLIOTT: Neal Elliott, ACEEE.

1           The other concern, just in terms of  
2           some of these technologies -- and I am going  
3           to mention, in particular, the surface finish  
4           and running clearances -- those are designed  
5           as new. And one of the concerns I have is  
6           actually persistence in the marketplace for  
7           those.

8           You know, having an ultra-smooth  
9           finish is something that may be great for  
10          performance right out of the box. It is  
11          unlikely that performance would persist in the  
12          marketplace.

13          So, I just think we need to be  
14          careful in terms of looking at, if you will,  
15          from my racing days when I raced cars,  
16          blueprinting an engine and taking an engine  
17          that we are actually going to try to run for  
18          100,000. So, let's not push the envelope on  
19          stuff that is not going to have long-term  
20          market persistence.

21          The other thing -- and this came up  
22          at lunch, and I just wanted to reiterate this

1 -- when we use the term "VFD" here or "VSD," I  
2 think we want to be clear that, when we are  
3 talking about it from the advocates'  
4 perspective and from HI's perspective, we are  
5 not talking about just putting an adjustable-  
6 speed motor device there. We are talking  
7 about putting an adjustable-speed motor device  
8 control and feedback circuitry together. It  
9 is not just the VSD; there is more to that.

10 And I think I am concerned that we  
11 kind of go into the shorthand, but I think we  
12 need to be cognizant that the adjustable-speed  
13 drive or variable-speed drive without controls  
14 doesn't really produce the results we are  
15 looking for.

16 MR. BROOKMAN: Charles Llenza?

17 MR. LLENZA: Yes, that has to do  
18 with the definition of what we decide that VSD  
19 is for these applications. So, you could sort  
20 of define it.

21 MR. BROOKMAN: And I think that is  
22 useful because I think that is the first time

1 we have all been really clear. We have kind  
2 of danced around the edges about those  
3 elements being one thing. So, thank you for  
4 that.

5 MR. ELLIOTT: Yes, and I think it  
6 is an issue, you know, as long as we define  
7 this clearly -- that was not clearly-defined  
8 in the framework document. I think in the HI  
9 it was clear. When we clearly defined it, we  
10 defined it as the four components, which was  
11 the pump, the drive, the motor, and the  
12 feedback control system. So, I think in our  
13 sense there are the four elements.

14 MR. BROOKMAN: Mike, follow on. Go  
15 ahead.

16 MR. RIVEST: Mike Rivest.

17 You know, in any case, when we look  
18 at the consumer end-costs, we are looking at  
19 installed cost. So, we would have those  
20 components plus their installation. So, it  
21 would be a total. You know, we would capture  
22 all the costs.

1 MR. ELLIOTT: I understand. This  
2 is a question for transparency and clarity in  
3 terminology because I don't want this to come  
4 and be misconstrued in the market by others  
5 who we are dealing with or, basically, have it  
6 come around and bite us in the back side.

7 MR. BROOKMAN: Right.

8 MR. ELLIOTT: So, I am just looking  
9 for transparency.

10 MR. BROOKMAN: Gary first. And  
11 then, back to Steve.

12 MR. FERNSTROM: Gary Fernstrom,  
13 California IOUs.

14 This isn't just an issue with  
15 respect to capturing the cost. It is an issue  
16 with respect to fully understanding the  
17 savings. So, we are going to regulate an  
18 appliance, we will better understand the  
19 savings if we are looking at an appliance, a  
20 pump, that is sold in a fully-integrated  
21 package, which would include the pump, motor,  
22 control, and control algorithm.

1                   And I would like to make one quick  
2                   comments on 3-14, the opportunities for  
3                   improvement. Neal mentioned persistence in  
4                   the market of these opportunities. I think  
5                   there may be an opportunity associated with  
6                   improving maintainability or persistence of  
7                   savings in the market itself.

8                   For example, that might be easily-  
9                   accessible taps for measuring suction and  
10                  discharge pressure. It might be perhaps  
11                  selling some pumps with gauges, so operators  
12                  could determine whether or not they are  
13                  operating at their Best Efficiency Point or  
14                  even within their operating range.

15                  So, as you look at options, I think  
16                  you should look at a group of options that may  
17                  improve maintenance and persistence of savings  
18                  over the lifetime rather than just as the pump  
19                  package is sold.

20                  MR. BROOKMAN: Okay. Thank you.

21                  MS. WILLIAMS: I just want to  
22                  follow up on that. Any technology options

1 that you want to propose to be considered,  
2 just keep in mind that they do have to be  
3 captured in a metric. And as was mentioned  
4 before, if it is strictly a design requirement  
5 -- it is just something to keep in mind where  
6 you are thinking of the options; we do have to  
7 be able to capture them in a metric.

8 MR. FERNSTROM: Okay. So, that is  
9 an excellent point. Looking to the lighting  
10 industry, it utilizes mean lamp lumens, which  
11 is metric of performance over life. I don't  
12 know what may or may not be appropriate for  
13 pumps, but, surely, there are some savings  
14 associated with measures that would improve  
15 performance over life that could and should be  
16 looked at.

17 MR. BROOKMAN: Okay. Steve, thanks  
18 for being patient.

19 MR. ROSENSTOCK: Well, sure.  
20 Again, Steve Rosenstock, EEI.

21 And again, please forgive me I  
22 didn't read that section of the framework



1 document. But, again, I just have to come  
2 back to the fact I know variable-speed drives  
3 are very common and they have come down in  
4 price quite significantly. But I would hope  
5 that, if there are other technologies that go  
6 in that parentheses that says "pumps plus  
7 motors plus," if there is a stage control that  
8 would work better or two-stage or three-stage  
9 control, that may or may not be in the  
10 classical definition a variable-speed drive or  
11 some other technology out there that could  
12 also provide savings for these products, I  
13 would not want them to be excluded from the  
14 technology options or the analysis.

15 Because manufacturers and other  
16 companies are innovating all the time, and I  
17 just kind of get a sense that it is like, "Oh,  
18 well, it is a variable-speed drive and the  
19 feedback control are the option with this  
20 equipment, period," and I don't feel that that  
21 is the case. There might be others out there.

22 Thank you.

1 MR. BROOKMAN: Yes.

2 Louis?

3 MR. STARR: I think maybe some of  
4 the points that Steve is bringing up, some  
5 examples of that would be like an Aquastat,  
6 which measures return water temperature. So,  
7 it turns the pump on full speed whenever you  
8 need hot water. And then, another example  
9 would be like a submersible pump. Like you  
10 have an air conditioner system and you have  
11 water that comes off the coil and you pump it  
12 up and dump it into the thing. Neither of  
13 those applications would have VFD used in, but  
14 an Aquastat, which is very cheap, or  
15 relatively cheap, and a float switch, which is  
16 also relatively cheap, would be some things  
17 that would be kind of technologies that would  
18 kind of meet what he is talking about.

19 MR. BROOKMAN: Okay. Thank you.

20 Ken?

21 MR. NAPOLITANO: Ken Napolitano  
22 with HI.

1           I just wanted to reiterate that  
2           what the HI is proposing in the extended  
3           product approach is two categories. One is a  
4           pump motor variable-speed device, variable-  
5           speed drive, with feedback, which isn't  
6           necessarily a VFD, variable-frequency drive,  
7           which is a very specific electronic device to  
8           vary the speed of a motor, but not the only  
9           way to vary speed. So, we are not limiting it  
10          to that.

11                   And then, the second category of  
12           extended product which is a pump and a motor  
13           with some control mechanism that doesn't  
14           include variable speed, which does exactly  
15           what was just mentioned, like turning a pump  
16           on and off based on load demand. So, that is  
17           how we have proposed to address that.

18                   MR. BROOKMAN: Thank you.

19                   Joanna?

20                   MS. MAUER: Joanna Mauer.

21                   Ken, is HI considering a test  
22           procedure for extended products that would

1 capture the effectiveness of the feedback  
2 control?

3 MR. NAPOLITANO: Yes, the simple  
4 answer is yes. The effectiveness of the  
5 feedback control itself or of the extended  
6 product including the feedback control?

7 MS. MAUER: The extended product  
8 including the feedback control.

9 MR. NAPOLITANO: Yes. So, in  
10 simple terms, it is here is a load profile of  
11 a variable load which you define, and then,  
12 you test products against that. It is  
13 essentially that wire-to-water that says how  
14 much energy do I have to put in to get out  
15 what amount of output.

16 MS. MAUER: So, it could capture,  
17 if you an identical, two identical pumps,  
18 motors, VFDs, say, but with different control  
19 systems, that one might be better than the  
20 other, would the test procedure capture that  
21 difference?

22 MR. BROOKMAN: Greg?

1                   MR. CASE:       The semi-analytical  
2 model might be better than test procedure  
3 there.     We would develop a set of load  
4 profiles, kind of like miles per gallon for a  
5 car.     You know you are not really going to get  
6 the miles per gallon that the sticker says,  
7 but we would test against a certain criteria,  
8 load profile, maybe for possibly more than  
9 those.     Those pumps could be rated, those  
10 pumps, motors, possibly drives, possibly  
11 on/off controls could be rated against those,  
12 and we would get an output number.     It would  
13 allow you to compare one unit to the other.

14                   So, not a test, but more of a semi-  
15 analytical model that we could provide the  
16 data into that would give you that output and  
17 help you with that decision matrix.

18                   MR. BROOKMAN:   Okay.   Louis?

19                   MR. STARR:    I think, essentially,  
20 what he is saying is just a load profile.  
21 Even for those two examples I provided, you  
22 could create a load profile for that.     Then,

1 with that load profile, you could capture the  
2 savings based on it. So, basically, it's just  
3 identifying the load profiles for certain  
4 conditions.

5 MR. BROOKMAN: Okay.

6 MR. HANDZEL: But you have to have  
7 the load data for the motor, the drive, and  
8 the pump.

9 MR. BROOKMAN: And that was Mark  
10 last.

11 MR. HANDZEL: Sorry.

12 MR. BROOKMAN: So, Tom Eckman?

13 That's okay.

14 MR. ECKMAN: Tom Eckman.

15 I am really glad DOE has a top-  
16 notch analytical team to deal with this  
17 problem. I will just state that for the  
18 record.

19 (Laughter.)

20 Because, in addition to the load  
21 profile, to do the economics right, we need to  
22 know the share or the fraction of the units

1 out there today that already have this system  
2 engaged. So, how many variable-speed drives  
3 are in place on pumps today for various  
4 horsepower, flow rates, and what have you?

5 Because the base-case condition  
6 would be in some cases a variable-speed drive  
7 and in some cases no variable-speed drive.  
8 So, good luck with that.

9 MR. BROOKMAN: Yes.

10 Sarah, do you want in here?

11 MS. WIDDER: Sure. Just really  
12 quick, I think Tom is exactly right. We are  
13 going to get into that and try to talk about  
14 our analysis approach in the next few slides.  
15 So, that is a good prelude to it.

16 And it will be a difficult problem.  
17 So, hopefully, everyone can help us with that.

18 The one thing I had to follow up on  
19 the semi-analytical model you were describing,  
20 which seems to be this 14.6 DOE test  
21 procedure, or is that separate? The semi-  
22 analytical model is different than the 14.6

1       DOE?   Okay.   Excellent.   That is very helpful.  
2  
3       I was concerned that we were talking about  
4       load profiles for different applications in  
5       the test procedure, which would be very  
6       difficult to achieve.

6                       Okay.   Thanks.

7                       MR. BROOKMAN:   Okay.   We are moving  
8       on.

9                       And shortly, for those of you who  
10       are interested, we are going to be taking a  
11       break.

12                      Go ahead.

13                      MS. WILLIAMS:   So, just skipping to  
14       the next analysis, which is directly, it is  
15       the screening analysis in which DOE basically  
16       looks at all the technology options that have  
17       been identified and evaluates them against the  
18       following four criteria, which have to do with  
19       technological feasibility; practicability to  
20       manufacture, sell, and service; impacts on  
21       utility or availability to customers; and  
22       impacts on health and safety.



1                   So, DOE seeks any comment in the  
2                   framework document related to the technologies  
3                   listed or unlisted and which screening  
4                   criteria might apply to them.

5                   MR. BROOKMAN: Neal

6                   MR. ELLIOTT: Just in response to  
7                   4-1, I wanted to reiterate the concern about  
8                   the persistence issue and the feasibility of  
9                   these in actual performance in the marketplace  
10                  over an extended period.

11                  MR. BROOKMAN: And let's take a  
12                  break, and we are not going to go far. Let's  
13                  see if we can do this in 10 minutes. We are  
14                  behind schedule, and we will continue doing  
15                  this until we are finished. Okay?

16                  (Laughter.)

17                  So, let's run to the restroom and  
18                  get back here in 10 minutes, which by the wall  
19                  clock there means 3:15. So, we will see back  
20                  here shortly.

21                  (Whereupon, the foregoing matter  
22                  went off the record at 3:04 p.m. and went back

1 on the record at 3:14 p.m.)

2 MR. BROOKMAN: So, we are handing  
3 out a document. Many of you in the back don't  
4 have this yet.

5 This is a document concerning  
6 commercial and industrial pumps, a rulemaking  
7 action issued by the Department of Energy.  
8 Although it is not intended or expected,  
9 should any discrepancy occur between the  
10 document posted here and the document posted  
11 in The Federal Register, The Federal Register  
12 publication controls. This document is being  
13 made available through the internet solely as  
14 a means to facilitate public access to this  
15 document.

16 So, you want to hand it out back  
17 there.

18 And now, we are going to resume and  
19 we are going to hear from Dan Weintraub,  
20 engineering analysis and manufacturing impact  
21 analysis.

22 MR. WEINTRAUB: Hello, everyone.

1           As he said, my name is Dan  
2 Weintraub. I am with Navigant Consulting, and  
3 I will be taking us through an overview of our  
4 engineering analysis and then a quick overview  
5 of the preliminary manufacturer impact  
6 analysis also.

7           So, what we are going to go through  
8 here, Mike Rivest actually hit on a little bit  
9 as we were discussing the relationships  
10 between cost and efficiency.

11           So, the purpose here of the  
12 analysis overall is to develop a cost-  
13 efficiency curve. That represents the  
14 relationship between manufacturer price and  
15 efficiency. This would be for each product  
16 class or equipment class. We would like to  
17 develop as many curves as we can. Of course,  
18 we have the limitations that we were  
19 discussing earlier.

20           Now the reasons we develop these  
21 curves, these are inputs into the downstream  
22 analyses, which ultimately help us with our

1 decision-making. So, some of these rulemaking  
2 analyses that these feed into would be the  
3 life-cycle cost and payback period analysis,  
4 manufacturer impact analysis, and the  
5 employment impact analysis. Again, these are  
6 all downstream.

7           So, next we will look at the  
8 approaches we take to get us to this cost-  
9 efficiency relationship. We have multiple  
10 options that we generally go through. We are  
11 looking at this generically right now, and we  
12 will drill down as we get into these analyses,  
13 as the process goes on.

14           But, in general, we can use a  
15 combination of three approaches. Those would  
16 be the design option approach, the efficiency-  
17 level approach, and the reverse-engineering  
18 approach.

19           Looking at them specifically, the  
20 design option approach is more of a bottoms-up  
21 approach. In this case, we look at energy-  
22 efficient design options that are currently on

1 the market or potentially on the market, maybe  
2 in prototype phases, and we look at the cost  
3 to adopt these individual options or  
4 combinations of these options, and look at the  
5 resulting efficiency to build incremental cost  
6 curves.

7 On the other hand, if we look at  
8 the efficiency-level approach, that is a more  
9 of a top-down approach. So, this would be  
10 looking at setting a target efficiency level  
11 that we would like to hit and then looks at  
12 the technologies and costs that are needed to  
13 reach those target levels.

14 So, if, for example, we were  
15 looking to cut out the bottom 10 percent of  
16 the market, we would look at the efficiency  
17 level needed to do that and the cost  
18 associated with doing so. And that can be  
19 done for any level.

20 Finally, the last option that we  
21 generally use is the reverse-engineering  
22 approach. This is more of an empirical

1 approach. Here we evaluate the cost of  
2 efficiency in products that are already out on  
3 the market, out there already, and to do so,  
4 we purchase these products. These would be  
5 part of the representative units that we were  
6 discussing earlier. We tear them down. We  
7 run them through a cost model of our own,  
8 which we will discuss a little bit more later,  
9 and understand the cost-efficiency curve for  
10 what is out there right now.

11 MR. BROOKMAN: As the comment box  
12 on this page reflects, the Department might  
13 consider using any one or a combination of  
14 these approaches. We have had some comment on  
15 this already. Additional comments before we  
16 move on?

17 Yes? Your name, please?

18 MR. MCKINSTRY: Dave McKinstry,  
19 Colfax Fluid Handling.

20 MR. BROOKMAN: Is that on  
21 (referring to the microphone)? You are not  
22 on, Dave.

1 MR. MCKINSTRY: I am on now.

2 MR. BROOKMAN: Okay. Good.

3 MR. MCKINSTRY: Okay. I guess my  
4 question is probably a little heresy in this  
5 group. But I don't see this fitting very well  
6 into the MEI process, if the MEI process is  
7 adopted.

8 The MEI process really  
9 fundamentally says we have a tool to eliminate  
10 a percentage of the lowest efficiency pumps in  
11 the marketplace. And as long as you keep  
12 doing that in some form, .1, .2, .3, the  
13 marketplace takes care of all of this work in  
14 order to bring more efficient products to the  
15 marketplace, so that the market adjusts for  
16 the MEI.

17 MR. BROOKMAN: Mike Rivest?

18 MR. RIVEST: Heresy, you say, huh?

19 (Laughter.)

20 There are so many jokes we could  
21 make here.

22 So, the Department's job, the

1 analysts on this project are looking for the  
2 level that is cost-justified. And so, the  
3 process of going from 10 to 30 to 40 to 50,  
4 you know, intuitively, you guys probably know  
5 what the right number is because you have the  
6 experience. You know how much it is to make  
7 these products. You know what you are capable  
8 of achieving at a reasonable cost.

9 But there comes a moment where the  
10 costs are no longer reasonable. And so, what  
11 we are trying to do is find out how much it  
12 costs to eliminate 10 percent or 20 or 30 and  
13 stop where the benefit to the consumer is  
14 weighed, is less than the incremental cost to  
15 the consumer of that pump.

16 So, we need to understand your  
17 costs of manufacturing these pumps. What is  
18 it you have to do to replace this 10 percent  
19 of the market with more efficient products?  
20 Is it redesign costs? Are you having to go to  
21 different materials? New tooling? Different  
22 tolerances? We need to understand that and



1 monetize it.

2 MR. BROOKMAN: Dave?

3 MR. McKINSTRY: Dave McKinstry,  
4 Colfax Fluid Handling.

5 Well, you know, we do that every  
6 day. That is what we do to stay in business.  
7 But the beauty of the proposition that we have  
8 made is that we have one process to bring up  
9 the efficiency overall of the marketplace by  
10 using the MEI method, and we have a second  
11 process that saves some real energy, which is  
12 the extended product. So, the combination of  
13 those two will bring massive improvements to  
14 reduction of energy consumption without any of  
15 this work in the technical analysis of costs  
16 of a manufacturer.

17 MR. RIVEST: The method that the  
18 Department uses is similar to what you are  
19 describing, which would be to set a level that  
20 eliminates the least-efficient product from  
21 the market and creates a product class that is  
22 more efficient and label it, and have people

1 adopt it.

2 But we still need a way of knowing  
3 that the correct number is 10 percent, not 20  
4 percent. So, we need to document it.

5 MR. MCKINSTRY: Then, here is my  
6 challenge to you: find that way and make the  
7 MEI work rather than go through your historic  
8 process, which we think is wasteful -- I  
9 shouldn't speak "we" because that is not an  
10 institute position -- which I think is  
11 wasteful.

12 MR. BROOKMAN: Okay. Thank you.

13 Ken?

14 MR. NAPOLITANO: So, maybe I could  
15 add a little clarity here because I think we  
16 are conflating several things here. So, first  
17 of all, HI wants to reiterate the fact that we  
18 strongly recommend that we harmonize as much  
19 as possible with the EU. And the EU used an  
20 MEI approach, and they did so after studying  
21 for many, many years. There are a lot of  
22 technical reasons why that approach is better

1 than trying to set an efficiency number for a  
2 particular size pump and a particular class,  
3 because it adjusts for a lot of variables.

4 And so, I think one of the things  
5 that is coming out here is that, when Alison  
6 was last up, we were looking at the maps, and  
7 it maybe kind of missed us at the time that  
8 that was talking about an efficiency number as  
9 opposed to this concept of the MEI index.

10 We just want to reiterate that we  
11 believe that the MEI index is the proper  
12 methodology, the most effective methodology  
13 for calculating how you are going to exclude  
14 the low-performing, separate from what level  
15 you end up choosing. So, that is one point,  
16 is using the MEI index.

17 And then, there is this separate  
18 point about the cost/benefit relationship  
19 between the various levels. Although I don't  
20 know that we know the answer on how to  
21 calculate that, although we are going to be  
22 providing data, from the standpoint of what

1 the redesign costs are to hit different  
2 levels, we have that. So, that is one  
3 component of it. It may not be all the  
4 components of it because it is just the  
5 redesign aspect.

6 But, clearly, we understand the  
7 need to try to figure out what is the logical  
8 place to draw that line.

9 MR. BROOKMAN: Gary?

10 MR. FERNSTROM: I don't think these  
11 two things are mutually-exclusive. I think  
12 MEI is a good way to look at efficiency. What  
13 efficiency improvement we hope to get relative  
14 to the standards that are set is an economic  
15 question. You know, obviously, the higher and  
16 higher we want to go, at some point there is  
17 going to be some cost.

18 So, the advocates are going to be  
19 asking for the very best efficiency we can get  
20 that is cost-effective for consumers, and that  
21 is an economic question that needs to be  
22 answered. I would highly recommend that DOE

1 use mature market cost for these improvements  
2 rather than the cost that one might find  
3 through analyzing a design approach, for  
4 example, using today's costs, because we have  
5 consistently found that the mature market cost  
6 of improving efficiency is less than it may  
7 have been estimated during proceedings like  
8 this that preceded those rules going into  
9 effect.

10 MR. BROOKMAN: Mike, do you have a  
11 final comment?

12 MR. RIVEST: No final comment,  
13 except to say that, you know, we look forward  
14 to working with HI to capture what those costs  
15 are, to understand that if you are going to  
16 submit the data, that would be fantastic. It  
17 is better, though, if we understand how they  
18 were constructed, so that we can document and  
19 -- I don't like to use the word -- but  
20 validate, if you will, that we agree with  
21 those incremental costs.

22 MR. BROOKMAN: So, back to Dan for

1 a brief description of these methodologies.

2 MR. WEINTRAUB: Sure. So, moving  
3 forward, yes, if we continue to look at our  
4 historical methodologies that we would use to  
5 develop these cost-efficiency curves,  
6 basically, at a high level we define our  
7 baseline models, which we have discussed in-  
8 depth earlier what these baseline models are.

9 We go through tear-down and  
10 testing, data collection and interviews, and  
11 that takes us to developing our cost-  
12 efficiency relationship.

13 Now, looking at the steps in  
14 detail, we have gone through baseline. Alison  
15 spoke to that earlier. The next two  
16 steps, tear-down and testing, and data  
17 collection and interviews, are generally steps  
18 that can be done in parallel, depending on the  
19 situation. And then, tear-down and testing,  
20 here is where we would conduct tests to verify  
21 performance and efficiency ratings. This has  
22 been touched on earlier also. And again, this

1 is important since the test procedure is not  
2 yet in place. You are currently using HI  
3 standards, and hopefully, we can see how those  
4 line up with whatever we arrive at.

5 And then, following that, we  
6 perform reverse-engineering on these products  
7 that we have tested. And we mentioned on the  
8 previous slide -- and we will mention it again  
9 in more detail -- what we mean by reverse-  
10 engineering to help us understand the costs a  
11 little bit better.

12 Now, when it comes to data  
13 collection and interviews, here we look to  
14 collect all available public and private data  
15 on efficient pump designs. And that means  
16 looking at publicly-available data, but also  
17 having conversations with you, manufacturers,  
18 usually under NDA, to try to understand as  
19 best we can, so everything you know we can  
20 know at the same time. We are looking to gain  
21 as much information as possible.

22 Along those lines, once we have

1 gathered as much information as we can, that  
2 allows us to, then, go forward and develop  
3 these cost-efficiency relationships. So, we  
4 have our inputs, and that brings us down to  
5 our cost-efficiency relationships.

6 So, at this time, we will have some  
7 comments we are looking for. So, the DOE  
8 seeks input on the methods and approaches used  
9 by manufacturers to improve the efficiency of  
10 pumps and, in particular, how frequently  
11 hydraulic redesign would be the only method  
12 employed. I know there was a little  
13 discussion of that earlier.

14 MR. BROOKMAN: Comment on that?  
15 Ken?

16 MR. NAPOLITANO: Yes. So, this is  
17 an important point. I think our position is  
18 that hydraulic redesign is going to be the  
19 predominant method because things like surface  
20 finish, tightening clearances, you know,  
21 tightening clearances, in particular, those  
22 are easy to do. And if we could get a little



1 more efficiency out of a pump by tightening  
2 the clearances, we have already done it.

3           Forget about Neal's point, which is  
4 also valid, that if you tighten them, they are  
5 going to open. The more you tighten them, the  
6 faster they are going to open and you will  
7 lose that efficiency anyway. Because there is  
8 a process of natural selection in the  
9 marketplace which says, especially in today's  
10 marketplace, if you have an inefficient pump,  
11 you are going to have a hard time selling it.

12           So, if you can tweak the clearances  
13 or do any of those types of things to eke it  
14 up, you have already gone down that route.  
15 Surface finish, material changes in most cases  
16 are so costly for the benefit you get from  
17 them that the economically-viable variance of  
18 that has also already been exercised. So, you  
19 are back to hydraulic redesign.

20           And hydraulic redesign involves a  
21 lot of upfront cost: engineering time,  
22 tooling, new patterns, testing, qualification

1 process, and so forth. And so, it is going to  
2 be difficult for a third party, for example,  
3 to do a reverse-engineering to determine the  
4 cost of inefficient-versus-efficient because  
5 the number of pieces, the pounds per piece,  
6 the number of machining, it is going to be  
7 exactly the same.

8 The difference is that you have  
9 spent millions of dollars to redesign, and a  
10 manufacturer is going to need to amortize  
11 those costs over some reasonable life, which  
12 is what gets passed on to the consumer. But  
13 the physical product won't necessarily  
14 evaluate, from a pure cost to manufacture  
15 standpoint, all that -- now there are some  
16 exceptions, but, overwhelmingly, it is the  
17 massive cost of the redesign amortized over  
18 some period of time to recoup that.

19 MR. BROOKMAN: Okay. Thank you.

20 Steve Rosenstock? No? Okay.

21 Do you want to hit 5-8?

22 MR. WEINTRAUB: Yes. So, the other item we

1 are looking for comment on here, Item 5-8, for  
2 each equipment class, DOE welcomes comments on  
3 methods and approaches that DOE intends to  
4 employ to determine potential efficiency  
5 improvements for pumps, detailed information  
6 on the pump's performance and the incremental  
7 manufacturing costs, e.g., material cost,  
8 labor, overhead, building conversion, capital  
9 expenditures for tooling or equipment,  
10 conversion costs associated with efficient  
11 design, R&D expenses, marketing expenses.  
12 That would all be useful. So, again, just  
13 talk about this in general. I mean, we are  
14 aware there is a lot on the front-end.

15 MR. BROOKMAN: Gary Fernstrom?

16 MR. FERNSTROM: I would like to go  
17 back to the point that we are already making  
18 the most efficient pumps that can be made.

19 (Laughter.)

20 I think what the industry means by  
21 that is we are already making the most  
22 efficient pumps that competitive pressures

1 bring upon us by virtue of what consumers are  
2 willing to buy. And there are probably,  
3 certainly, some segments of the market where,  
4 rather than good performance, least-cost is  
5 the buying priority of consumers.

6 And I submit that in that case,  
7 competitive pressure probably does not bring  
8 us to the most-efficient pumps that can be  
9 made. They bring us to the best pumps that  
10 can be made while meeting the price  
11 expectations of customers.

12 MR. BROOKMAN: Ken wishes to  
13 respond.

14 MR. NAPOLITANO: Ken Napolitano,  
15 HI.

16 No, I didn't mean to suggest in any  
17 case that we are making the most-efficient  
18 pumps that can be made. I would say, though,  
19 that over the years, especially in the recent  
20 couple of decades, manufacturers have invested  
21 substantially in improving their efficiencies.  
22 If you were to take the baseline 20 or 30

1 years ago and compare it to today, we have  
2 already dropped out -- who knows? -- the  
3 bottom 25, for lots of reasons, whether it is  
4 ASHRAE or AHRI, you know, building codes, but  
5 just the general LEED green building  
6 certifications, the general efficiency  
7 awareness of consumers in the marketplace,  
8 right?

9           How many of us bought fluorescent  
10 lightbulbs 20 years ago, and they were 10  
11 times the cost of a regular lightbulb, even  
12 though you could do the math in your head?  
13 So, the marketplace has changed, and so the  
14 line has moved.

15           But we wouldn't be here at the  
16 table in a cooperation fashion to say, yes, we  
17 can raise the efficiencies more and here is  
18 the methodology to do that, and start to take  
19 out whatever today's baseline is against the  
20 bottom 10, the bottom 20, and, by the way,  
21 couple it with an extended-product approach,  
22 which really gets at a big chunk of energy.

1 So, we agree.

2 MR. BROOKMAN: Go ahead, Gary.

3 MR. FERNSTROM: So, I don't think  
4 regulations are really directed at  
5 manufacturers. I mean, obviously,  
6 manufacturers are the ones that are required  
7 to comply. But I think the regulations are to  
8 assist those customers that maybe don't want  
9 to buy what is best.

10 MR. BROOKMAN: Louis?

11 MR. STARR: I have a general  
12 question in terms of, it seems like the way  
13 the European market, they adopted the MEI of  
14 10 and 40 percent. What it sounds like they  
15 didn't do is really -- I mean, because it  
16 seems like the natural thing is to split it  
17 out per class and decide an MEI based upon  
18 that class.

19 I am kind of wondering, in the  
20 European market, if they didn't do that kind  
21 of cost analysis, it seems like it would have  
22 some pretty bad impacts on some of your

1 pumplines. I mean, they may have been trying  
2 to achieve it across the market, but it seems  
3 like it could have some negatives, just as a  
4 pump manufacturer. You might have to improve,  
5 spend a lot of money improving certain  
6 pumplines; other ones, it was 10 percent was  
7 no problem.

8 MR. BROOKMAN: Ken?

9 MR. NAPOLITANO: Yes. So, back to  
10 the point about breaking it down into its  
11 categories, the EU did do that. So, the  
12 equation for a particular class of pump is not  
13 the same for another, for that reason.

14 So, they segregated it that way.  
15 It gets to the C-factor and the equation that  
16 is used. And then, inside of that class, they  
17 said 10 or 20, but against a different  
18 equation. So, one was not disproportionately  
19 disadvantaged to another.

20 MR. BROOKMAN: Okay. We are going  
21 to press on with the content on slide 102.

22 MR. WEINTRAUB: All right.

1 MR. BROOKMAN: Oh, Mike Rivest  
2 wishes to wedge-in here.

3 MR. RIVEST: Just out of curiosity,  
4 did that analysis take into account costs?  
5 How was that performed?

6 MR. BROOKMAN: Dave?

7 MR. MCKINSTRY: Well, EU did this.  
8 EU did this over a 10-year period, and there  
9 are some really substantial studies that have  
10 been made, published, and I think Alison may  
11 have them and have looked at them; I am not  
12 sure.

13 MR. BROOKMAN: Did you hear him?  
14 Do you have the studies that the EU produced  
15 over a 10-year period?

16 MS. WILLIAMS: So, we have looked  
17 at the studies, and they are fairly extensive  
18 in terms of the efficiency analysis, but there  
19 is not really cost analysis in there. As far  
20 as I understand, the only cost analysis was  
21 that brief calculation of the manufacturer  
22 cost at each level that was highly top-down.



1 It wasn't like built up and looked at every  
2 level separately and comprehensively. So, I  
3 think we are talking about a different level  
4 of cost-effectiveness analysis in this  
5 rulemaking.

6 MR. BROOKMAN: Charles Llenza?

7 MR. LLENZA: I just wanted to ask,  
8 also, what about impacts to the consumer?  
9 There wasn't anything on that particular  
10 level, either?

11 MS. WILLIAMS: They do do some  
12 analyses, but, in general, the EU analyses are  
13 much more simple than what DOE is required to  
14 do by EPCA.

15 MR. BROOKMAN: Back to Dave.

16 MR. MCKINSTRY: No, I would concur  
17 because that is my recollection of those  
18 reports. They were done -- there were cost  
19 studies from the manufacturing standpoint done  
20 and provided by Europump to the EU in the  
21 process. I guess those are probably  
22 available, but we don't have them.

1 MR. BROOKMAN: Charles Llenza?

2 MR. LLENZA: Yes, I just want to  
3 bring back to the point again, when we go back  
4 to what EPCA requires the Department to do,  
5 and the seven factors, and our analysis is a  
6 little bit more complicated. I think the EU's  
7 system of adoption for standards is a lot more  
8 simplistic in many ways.

9 We have to go through a dragged-out  
10 process of going to the stakeholders and the  
11 manufacturers and the advocates and the U.S.  
12 public in general. We have to provide an  
13 extensive cost analysis of the impacts in all  
14 the different areas in order to move on with a  
15 standard.

16 So, I think that is part of what we  
17 are seeing, that maybe while the EU  
18 methodology might be more simplistic, they  
19 didn't have to go through as many hurdles as  
20 we do to get to our final levels.

21 MR. BROOKMAN: Steve?

22 MR. ROSENSTOCK: Steve Rosenstock,

1       EEI.

2                   So, again, what I am hearing, the  
3       EU process, they didn't have to have public  
4       meetings or let the end-users know that they  
5       were doing this?

6                   MR. MCKINSTRY:  Oh, yes, the EU  
7       process, believe me, had public meetings.

8                   MR. ROSENSTOCK:  Okay.

9                   MR.       MCKINSTRY:               They       had  
10       discussions,       multiple       discussions       with  
11       advocates   and   with   adversaries   and   the  
12       government.

13                   (Laughter.)

14                   And they weren't so lucky as to  
15       have the environmental NGOs as a portion of  
16       their pre-teamwork.  So, they were very heated  
17       activities, and there was a lot of discussion,  
18       and that is what surfaced, is what you see.

19                   MR. BROOKMAN:  Charles?

20                   MR. LLENZA:  What kind of timeframe  
21       for adoption did they use?

22                   MR. MCKINSTRY:  Well, I think they

1 call that process that they have been in 12  
2 years. They this year adopted the first one,  
3 13. They are going to adopt .4 in 2015, and  
4 then, they are going to start back in on the  
5 process with additional activities in 2015  
6 with additional products.

7 So, they view it, I think, as a  
8 continuum, as you do. In some cases, though,  
9 I hear you mention six years. But the process  
10 is well-vetted. It has been a lot of  
11 discussion.

12 I don't suggest you don't have to  
13 do these things. If the law says you have to  
14 do these things, you do them. I am suggesting  
15 that, as you have encouraged us to try new,  
16 innovative ideas, we would encourage you to  
17 comply with the law with new, innovative  
18 concepts, too.

19 (Laughter.)

20 MR. BROOKMAN: Okay. Back to Dan.  
21 Go, Dan.

22 MR. WEINTRAUB: All right. So,

1 resetting ourselves back where we were before,  
2 talking a bit about our tear-down and test  
3 methodology, this is our generic methodology.  
4 We would definitely have to tailor this toward  
5 this industry, as we have discussed. You are  
6 not going to expect to see a lot of difference  
7 in costs, manufacturing costs, of each pump,  
8 but it would all come in the front-end. But  
9 we would still, nonetheless, if we were to  
10 take this approach, I will take you through  
11 what it would look like.

12           And that would be selection of  
13 units. So, we have discussed that earlier.  
14 That would bring us to physical tear-down.  
15 And physical tear-down means taking these  
16 products down to their core components, as  
17 small as you can go, and creating a bill of  
18 materials and using our experience to break  
19 these out into either fabricated parts, parts  
20 that we would believe that were fabricated in-  
21 house by the manufacturers or purchased parts  
22 from outside sources.

1                   For fabricated parts, we use our  
2 models and our experience to come up with raw  
3 material plus labor plus manufacturing  
4 overhead. A whole variety of costs run into  
5 that to understand the cost of that part.

6                   And on the other side, we use the  
7 best-available data for the cost of these  
8 purchased parts, what is out there in the  
9 marketplace.

10                  Once you have these parts, you have  
11 your fabricated and your purchased, we then  
12 model the assembly process that you guys would  
13 go through in your own factories and how much  
14 that would cost to put it together.

15                  And when you bring that all  
16 together, you have a manufacturer production  
17 cost, which would be our estimate, which is  
18 one of the reasons we come up with this; we  
19 discuss these things with you, and we want to  
20 come up with the best estimates possible to  
21 understand these things.

22                  And that is key as we are looking

1 at changing, if we are looking at coming up  
2 with theoretical changes to designs, we want  
3 to understand what the baseline was and how  
4 costs will vary when we come up with these  
5 changes.

6 So, next we will take a closer look  
7 at manufacturer's selling price and what is  
8 and is not included in this, in our analyses.  
9 So, manufacturer selling price, MSP, would  
10 include manufacturer production costs, which  
11 we just discussed, and that is materials,  
12 direct labor, operating cost, maintenance,  
13 appreciation, taxes; all costs such as these.  
14 We then, estimate a markup, and that markup  
15 pretty much represents contribution margin.  
16 It is all the costs not associated with  
17 production. And when you multiply those two,  
18 it comes to a manufacturer selling price that  
19 we use within our models. And again, we  
20 intend to have these discussions with the  
21 manufacturers to try to validate our initial  
22 assumptions.

1                   What     is     not     included     in  
2     manufacturer   selling   price   is   conversion  
3     costs.   These   are   some   of   the   things   that   were  
4     just   discussed   earlier,   and   that   would   be   your  
5     front-end   costs.

6                   So,   conversion   costs   typically   come  
7     in   two,   well,   you   break   them   out   into   two  
8     sides.   That   would   be   product   conversion   cost  
9     and   capital   conversion   cost.   So,   product  
10    conversion   cost   would   be   those   engineering  
11    redesigns,   the   testing   costs   and   labor;   and  
12    like   we   said,   hydraulic   redesigns   would   fall  
13    under   those   types   of   costs.

14                  On   the   other   hand,   capital  
15    conversion   costs;   these   are   the   costs   of  
16    capital   investments   needed   to   meet   these  
17    standards.   And   that   would   be   new   machines,  
18    new   tooling,   basically,   anything   that   would  
19    fall   under   plant   property   and   equipment   that  
20    the   industry   would   need   to   invest   in   in   order  
21    to   meet   new   standards.

22                  Now,   although   they   are   not   included



1 in the MSP and in the engineering analysis,  
2 typically, they are included in the  
3 manufacturing impact analysis. And that is  
4 where these costs come into play, and we look  
5 at the impact on the manufacturers as a whole.

6 Now there are some precedents where  
7 we can look at bringing these costs in and  
8 amortizing them, if we truly believe there are  
9 going to be price increases due to them. And  
10 those are things that can be worked out down  
11 the line.

12 So, at this time, we have another  
13 comment box and Item 5-9. DOE welcomes  
14 comment on the markup approach proposed for  
15 developing estimates of manufacturer's selling  
16 prices. Do you want to start there?

17 MR. BROOKMAN: Sure. Yes, Gary?

18 MR. FERNSTROM: Gary Fernstrom,  
19 California Investor Owned Utilities.

20 I would like to reiterate my point  
21 about the importance of mature market cost.  
22 And I would like to relate an example.

1                   About five-six years ago, Pentair  
2 introduced an extended-product category pool  
3 pump. This product was the combination of a  
4 pump head, motor, variable-speed drive, and  
5 integral control. It wholesaled for about  
6 \$1800. Five years later, it is about \$1,000  
7 on the wholesale market. So, in a five-year  
8 period, that is a drop of \$800, which is  
9 really significant. It is almost half the  
10 cost.

11                   And I would encourage DOE, as they  
12 do these analyses, to look not just at the  
13 current cost of the transition to a higher  
14 efficiency, but to consider what might happen  
15 to those costs in the years following.

16                   MR. BROOKMAN: Thank you.

17                   Dave?

18                   MR. MCKINSTRY: Dave McKinstry,  
19 Colfax Fluid Handling.

20                   This is the required response from  
21 the Hydraulic Institute, that we can't talk  
22 about 5-9, 5-10, 5-11 because of our

1 requirements under antitrust. I am sure that  
2 the DOE can talk individually to companies,  
3 but we can't talk in a room with members of  
4 other companies. So, we decline any comment  
5 on those.

6 MR. BROOKMAN: Okay. Thank you.  
7 Steve Rosenstock?

8 MR. ROSENSTOCK: Steve Rosenstock.

9 Yes, just a quick thought. In  
10 terms of the tear-down and test methodology,  
11 depending on the regulatory regime that is  
12 chosen, at this point, then, you would have to  
13 really look at tearing down, I will say,  
14 standalone pumps, pumps sold alone, as well as  
15 the pumps sold with motors. So, you are  
16 tearing down the pump and the motor, and then,  
17 you might have to tear down a pump, motor, and  
18 VSD combination to really get the full range  
19 of costs.

20 MR. WEINTRAUB: Yes. So, that is  
21 correct. But the way that we would be looking  
22 at it, as I mentioned, purchased part versus

1 fabricated parts, and generally, these motors  
2 are going to be purchased, brought in. So, we  
3 understand the cost of the purchased motor.  
4 We understand the cost of a VSD system, if it  
5 is not made in-house, which doesn't add as  
6 much complexity. If, on the other hand, they  
7 are manufacturing things in-house, that does  
8 lead to a whole lot more complexity.

9 But we would consider whatever the  
10 regime leads us to. We would consider these  
11 products and tearing them down.

12 MR. ROSENSTOCK: Okay. Thank you.

13 MR. BROOKMAN: Do we have  
14 additional comments on 5-10 or 5-11? Because  
15 we are about to move on.

16 (No response.)

17 MR. WEINTRAUB: All right. I will  
18 move forward.

19 Finally, to wrap up the engineering  
20 analysis, we will look at outside regulatory  
21 changes, and this also will tie in a little  
22 bit to cumulative regulatory burden, which we

1 will discuss a little later.

2 But, just to touch upon this, the  
3 DOE will consider the effects of both DOE and  
4 non-DOE regulations that may impact  
5 manufacturers of the covered products. This  
6 is done with the understanding that other  
7 regulatory changes or other DOE changes may  
8 impact the efficiency of the product, how far  
9 you can go with efficiency based on regulation  
10 of other products, along with financial  
11 impacts that go with it.

12 MR. BROOKMAN: Steve?

13 MR. ROSENSTOCK: Steve Rosenstock,  
14 Edison Electric Institute.

15 As someone alluded to earlier,  
16 there have been a lot of significant  
17 improvements in ASHRAE 90.1, which covers  
18 commercial buildings in the United States.  
19 Some of them -- again, I didn't bring it with  
20 me -- but there are some requirements that do  
21 affect pumps in commercial buildings, whether  
22 they are new buildings or total renovations.

1                   And for 2013, there is always a  
2 whole slew of new sections or revised sections  
3 to ASHRAE. The 2013 version of ASHRAE will be  
4 published probably in October/November.

5                   And again, in terms of the  
6 analytics, the Pacific Northwest National Lab  
7 does the analysis and the progress reports for  
8 ASHRAE 90.1. So, in terms of any new language  
9 that has been approved into ASHRAE, you might,  
10 if you get a chance to talk to them about  
11 anything that affects pumping energy, I would  
12 strongly suggest that you -- or take a look at  
13 some of the historical analysis that has quite  
14 an impact on building energy use in the U.S.

15                   MR. BROOKMAN: Mark?

16                   MR. HANDZEL: Steve, they have been  
17 publishing some preliminary copies of that  
18 90.1 2013, and there is no additional changes  
19 planned at this time to variable-speed  
20 requirements in that document that we are  
21 aware of.

22                   MR. ROSENSTOCK: Steve Rosenstock.

1 Yes, they are not done yet.

2 (Laughter.)

3 MR. HANDZEL: Oh, I know that. I  
4 know that they have been progressively moving  
5 down horsepower. But, from what we  
6 understand, there is not a plan to drop the  
7 horsepower requirements on variable loads in  
8 this next document.

9 MR. ROSENSTOCK: It's not over yet.

10 (Laughter.)

11 MR. HANDZEL: Okay.

12 MR. BROOKMAN: Louis?

13 MR. STARR: Oh, no.

14 MR. BROOKMAN: No? Okay.

15 MR. WEINTRAUB: So, if there is no  
16 more discussion on the engineering analysis,  
17 that will conclude that section.

18 And now, we are going to go through  
19 a very brief overview of the manufacturer  
20 impact analysis, and we will take you through  
21 that.

22 So, here, the purpose of the

1 manufacturer impact analysis is threefold. It  
2 is to assess the impact of standards on the  
3 manufacturers. So, this is where we are  
4 looking at the financial effect on you, the  
5 manufacturers; identify and estimate impacts  
6 on manufacturer subgroups that may experience  
7 greater impact than the industry as a whole,  
8 and examine the impact of cumulative  
9 regulatory burden on the industry.

10 And the way that we get, the  
11 methods that we use, are to analyze industry  
12 cashflow and net present value through the use  
13 of our Government Regulatory Impact Model,  
14 which the acronym is GRIM, aptly named.

15 (Laughter.)

16 And then, we would go ahead and  
17 interview the manufacturers to refine our  
18 initial inputs that we have gathered. And we  
19 would also develop subgroup analyses and  
20 address qualitative issues as we go through  
21 it.

22 So, next I will take you through an



1 overview of the process. So, here we have  
2 broken it out into three phases. Phase 1  
3 occurs in the interim or preliminary analysis,  
4 which we will be entering soon. Phases 2 and  
5 3 occur during the NOPR phase. And I will  
6 walk you through it a bit. We are going to  
7 try to go through this quickly.

8           So, it starts with developing an  
9 industry profile. This is where we identify  
10 the industry structures; we evaluate market  
11 characteristics; we develop average financial  
12 parameters based on publicly-available  
13 information. This is where we start to get  
14 ourselves grounded in your industry, so that  
15 when we come to talk to you, we have a  
16 baseline to start discussing, a place to  
17 start.

18           From there, we go through initial  
19 MIA interviews. And these will be in  
20 conjunction with engineering interviews. So,  
21 they will both be together. They usually work  
22 out well that way.

1                   And here, we will identify issues  
2                   that are important to manufacturers, and we  
3                   will also look to gain as much information as  
4                   we can on a preliminary basis. And this will  
5                   also feed into the preliminary engineering  
6                   analysis that goes on. So, we will look to  
7                   get as much information as we can in those  
8                   early phases.

9                   At the start of Phase 2, we will  
10                  tailor a generic GRIM model, and that is what  
11                  we mean by developing a strawman GRIM. We  
12                  will tailor that to the industry structure,  
13                  now that we have spoken with manufacturers and  
14                  we have a better understanding of the standing  
15                  of the industry.

16                 At that point, we will develop an  
17                 interview guide. This will be a written  
18                 document. It will have all of the questions  
19                 that we are looking to ask manufacturers, at  
20                 that time, and those will be sent out ahead of  
21                 time in front of our interviews. So that you  
22                 have as much time as possible to prepare any

1       answers to questions you do and do not want to  
2       answer and, also, give you time to prepare any  
3       questions you have for us or additional  
4       concerns that have come up along the way.

5               So, then, when we enter Phase 3,  
6       that is when we go into interviews and perform  
7       the analyses. So, at this point, we will meet  
8       with you, and it is generally conducted in our  
9       confidentiality agreements. We go through the  
10      interview guide. We discuss all these key  
11      issues. We look to see what information can  
12      be shared, what can't, to see how you feel  
13      about our assumptions we have made so far, and  
14      try to bring it all together and get all the  
15      additional input that we need to finally run  
16      our financial model, the GRIM.

17              And that is the final stage. That  
18      is where we run our models and we estimate the  
19      impact to the industry, net present value, and  
20      domestic employment. And that is using that  
21      model.

22              Then, along with these estimates,

1 we will also assess the cumulative regulatory  
2 burden -- that is kind of done in parallel --  
3 and the effects on industry competition that  
4 this may have, and any disproportionate  
5 effects to subgroups, especially small  
6 businesses. We will always be looking at  
7 effects on small businesses. And, again,  
8 input from the industry on that front is  
9 always very, very useful.

10 So, that is a quick overview of a  
11 much larger process. At this time, I will go  
12 into the comment section. So, Item 12-1, the  
13 DOE seeks comment on the subgroups of pump  
14 equipment manufacturers that should be  
15 considered in a manufacturing subgroup  
16 analysis.

17 And I guess we will start with  
18 that, see if there is any input.

19 MR. BROOKMAN: Subgroups that you  
20 would identify?

21 MR. WEINTRAUB: Would there be any  
22 subgroups that may not be represented by the

1 industry as a whole if we were to start  
2 aggregating data?

3 (No response.)

4 All right.

5 MR. BROOKMAN: No comment, yes.

6 MR. WEINTRAUB: Move on to Item  
7 12-2. DOE seeks comments on what other  
8 existing regulations or pending regulations it  
9 should consider in its examination of  
10 cumulative regulatory burden.

11 (No response.)

12 All right. And finally, we have an  
13 additional item that has been added on. It is  
14 not in the framework. And that is 12-A. That  
15 would be DOE seeks comments on small  
16 businesses that could be impacted by potential  
17 energy conservation standards for commercial  
18 and industrial pumps as well as what these  
19 impacts might be.

20 And at this point in the game, we  
21 are really just looking for names of small  
22 businesses in your industry that you know of

1 that would fall under the Small Business  
2 Administration, a headstart for us because you  
3 guys are more familiar with your industry than  
4 we are.

5 (No response.)

6 MR. BROOKMAN: No? Okay.

7 MR. WEINTRAUB: All right. Well,  
8 at that point, I think we are done with this  
9 section.

10 MR. BROOKMAN: On to Sarah. Mark-  
11 ups analysis, energy use analysis.

12 MS. WIDDER: Okay. Good afternoon  
13 again, everyone.

14 As the afternoon wears on, we seem  
15 to be getting less comments, which is good.

16 (Laughter.)

17 So, maybe we will all go home by  
18 5:00 or close to that.

19 So, Dan just talked to you a little  
20 bit about the economic analysis we do to  
21 understand the impacts on manufacturers. We  
22 also spend a lot of time thinking about how

1 those costs and changes in manufacturer's  
2 selling price trickle down to the consumer.  
3 And this is all part of our big economic  
4 model, trying to cost-justify the standard  
5 level that we will end up setting for  
6 different product classes.

7           So, I am going to talk to you right  
8 now a little bit about the mark-ups analysis  
9 we do to get to that final consumer price.  
10 And as has been noted previously, the market  
11 for pumps is very diverse and there could be a  
12 lot of ways a consumer gets a pump or a  
13 pumping system. And we are going to have to  
14 account for that in our mark-up analysis.

15           The purpose of this analysis is to  
16 convert that manufacturer's selling price,  
17 sort of like a wholesale price, to what a  
18 consumer would pay. It could be through an  
19 OEM dealer, through a distributor; there's a  
20 number of different paths that that pump could  
21 reach the customer, and we will want to  
22 account for each of those mark-ups. And that

1 is where we get into the method here. We are  
2 going to identify some representative  
3 distribution channels and apply representative  
4 mark-ups to each of those channels.

5 So, here are some representative  
6 distribution channels that we have used. It  
7 is similar to the distribution channels we see  
8 in other commercial equipment, commercial and  
9 industrial equipment. The manufacturer  
10 selling directly to the customer, and that is  
11 a wholesale-type distribution channel. The  
12 manufacturer selling through an OEM or an OEM  
13 distributor, and we talked about that being  
14 perhaps common for a lot of pumps where the  
15 distributor is associated with the  
16 manufacturer; that is an OEM channel. The  
17 manufacturer selling through a wholesaler, who  
18 then sells to the customer. Or a manufacturer  
19 selling to the wholesaler who sells to a  
20 contractor who, then, sells to the customer.  
21 And each of those is going to have different  
22 economic implications for that end-customer



1 who we are concerned with in this analysis.

2 We try to look out at, I guess, the  
3 litany of publicly-available information to  
4 try to determine what each of these  
5 incremental mark-ups should be and that might  
6 vary by application or by market segment that  
7 the pump is being sold into.

8 There is a lot of data available  
9 from the U.S. Census Bureau; also, RS Means  
10 data, and industry reports about where pumps  
11 are going and through which distribution  
12 channels, based on the application, and then,  
13 the incremental mark-ups that that  
14 distribution channel might incur.

15 In our mark-ups analysis, we also  
16 want to account for efficiency improvements  
17 that might occur because of standards. So, we  
18 are going to look at, similar to our  
19 engineering analysis, we are going to look at  
20 a baseline mark-up that is currently applied  
21 right now and is applicable to all the  
22 equipment that is available in the market, and

1 would have those incremental pieces that we  
2 saw on the previous slide.

3 And then, we also want to look at  
4 the incremental mark-up and how the mark-up  
5 might change based on an efficiency  
6 improvement. So, some things might not change  
7 the mark-up.

8 Transportation is a good example.  
9 So, we do want to account for shipping costs  
10 or transportation costs sometimes in our mark-  
11 up. But if an efficiency improvement doesn't  
12 change the weight or the size of a piece of  
13 equipment, that doesn't always need to be part  
14 of the mark-up or part of the incremental  
15 mark-up.

16 MR. BROOKMAN: Louis?

17 MS. WIDDER: Go ahead.

18 MR. STARR: Actually, on your  
19 previous slide, slide 111, you have  
20 manufacturer like a sales rep for a  
21 manufacturer. Which one of the channels is  
22 that, and is that different than like buying a

1 pump from Granger, although I don't think you  
2 could probably buy it? It looks like your  
3 third one. Where is that captured? Which one  
4 of those market distribution channels would be  
5 manufacturer's sales rep be on that?

6 MS. WIDDER: From a sales rep? It  
7 would probably depend on how that piece of  
8 equipment is marked up. I would think it  
9 would either be manufacturer -- I think it  
10 would be the OEM channel, is probably what  
11 would be most representative.

12 Dave, if you want to answer, go  
13 ahead.

14 MR. MCKINSTRY: Yes, I would  
15 suggest No. 1. Most companies put the sales  
16 agent channels as a cost of sales, which is in  
17 their cost rollup. If you sell to a  
18 distributor, then you sell to a distributor at  
19 a price, and he marks it up. If you sell with  
20 agents, which was your example, then,  
21 generally, you set the price because it is  
22 your produce, and, then, you pay the agent a

1 commission.

2 MR. STARR: Okay. Well, I know  
3 from experience in buying stuff, when we did  
4 contracting work, it seems like, depending on  
5 which ones you were, you paid a different  
6 price for the piece of equipment. It wasn't  
7 pumps, but on valves and things. So, it seems  
8 like it can be that your price can be a lot  
9 different if you are really big than if you  
10 are small.

11 MS. WIDDER: And that is part of  
12 what this analysis is trying to account for,  
13 the difference from a wholesale or large  
14 company price that you might get versus a  
15 small company price. Way back when the pump  
16 was manufactured, that same pump cost the same  
17 amount to manufacture, regardless of where it  
18 went and got sold.

19 And maybe these distribution  
20 channels are totally the wrong ones and we  
21 should have different distribution channels.  
22 And if that is the case, please comment to

1       that effect.

2                   But what we are trying to get at in  
3 this analysis is exactly what you mentioned.  
4 That pump ends up being a lot of different  
5 prices out there in the marketplace. And how  
6 can we analyze that and account for that in  
7 some representative way?

8                   MR. BROOKMAN:     Let's go to the  
9 comment boxes. You can see the comment boxes  
10 listed there on 113. Information about  
11 distribution channels, comments and additional  
12 information on appropriate way to establish  
13 distribution channel percentages across  
14 equipment classes and applications, and then,  
15 finally, 6-3, sources of relevant data that  
16 could be used to characterize mark-ups.

17                   Mark, do you want to start?

18                   MR. HANDZEL: Well, much like the  
19 answer that veDave gave earlier, while we are  
20 all here in the room as members of the  
21 Hydraulic Institute, you know, we are all  
22 competitors.

1 MR. BROOKMAN: Yes. Right.

2 MR. HANDZEL: So, we all have  
3 different ways that we deal with this. So, we  
4 don't have an industry answer for you on this  
5 subject.

6 MR. BROOKMAN: Okay.

7 MR. HANDZEL: So, you will have to  
8 get it from us individually.

9 MR. BROOKMAN: Yes. And that is  
10 what the interview process will accommodate.

11 Other comments on this series of  
12 comment boxes?

13 (No response.)

14 Is there a different distribution  
15 channel than those that are arrayed here on  
16 the previous --

17 MR. MCKINSTRY: I thought that she  
18 captured them pretty well.

19 MR. BROOKMAN: Okay. Thank you,  
20 Dave.

21 MR. MCKINSTRY: Dave McKinstry,  
22 Colfax Fluid Handling.

1 MR. BROOKMAN: And Mark?

2 MR. HANDZEL: Mark Handzel.

3 I would agree that she captured  
4 them. There are many variations that could  
5 adapt those further, but you have the gist of  
6 it.

7 MR. BROOKMAN: Okay.

8 MR. HANDZEL: Okay?

9 MS. WIDDER: Thank you.

10 MR. BROOKMAN: And then, the next  
11 comment box, 6-4 and 6-5?

12 MS. WIDDER: So, these Requests for  
13 Comments are related to the baseline and  
14 incremental mark-ups, to the extent that that  
15 is applicable for pumps where some efficiency  
16 improvements might require an incremental  
17 mark-up, and that wouldn't be captured in the  
18 baseline mark-up. And comments on that  
19 approach?

20 And then, DOE seeks comments  
21 specifically on the appropriate transportation  
22 and shipping costs to include, and then, how

1 to best allocate those costs as part of the  
2 baseline mark-up or incremental mark-up or a  
3 manufacturer's selling price.

4 MR. BROOKMAN: David?

5 MR. McKINSTRY: David McKinstry,  
6 Colfax Pump.

7 You are going to get tired of  
8 hearing this, but those, again, would be  
9 things we couldn't discuss among our  
10 competitors.

11 MS. WIDDER: Right, which is  
12 certainly reasonable, and that is why we do  
13 the manufacturer interview process. That  
14 data, then, we can use in our analysis and  
15 have that information without having it in  
16 this public forum.

17 MR. BROOKMAN: So, we are moving on  
18 to the energy use.

19 MS. WIDDER: Yes. Oh, go ahead.

20 MR. ROSENSTOCK: Hi. Steve  
21 Rosenstock, EEI.

22 And again, this gets back to the



1 regulatory regime. It is kind of the same  
2 question. So, under the regime, where you are  
3 looking at the pumps and the motors and the  
4 VSDs, you are going to have to contact the  
5 manufacturers of each of the separate products  
6 in this case, right?

7 MS. WIDDER: That is a very --

8 MR. ROSENSTOCK: Separate  
9 components. Excuse me.

10 MS. WIDDER: That is a very good  
11 point. I think that is something that we will  
12 have to consider as we -- to be honest, we  
13 haven't gotten that far yet because we are  
14 still talking about scope and what the  
15 extended-product approach would look like just  
16 from a regulation-of-pumps standpoint.

17 But when we look at market impacts  
18 and the manufacturer price, we would certainly  
19 need data about that. Whether or not that  
20 would be going to those individual  
21 manufacturers as well and doing a similar  
22 analysis, it probably would be more looking at

1 what available data there was in the public  
2 domain as well as the knowledge of the pump  
3 manufacturers who worked probably closely with  
4 those manufacturers to get something  
5 representative we can use in our analysis  
6 without having to redo the whole process. But  
7 that is certainly something we will have to  
8 consider, based on the scope we decide to move  
9 forward with.

10 MR. BROOKMAN: Gary Fernstrom?

11 MR. FERNSTROM: I was going to say,  
12 aren't we something of a common opinion here  
13 that these integrated products or extended  
14 products would be sold as a unit? So, you  
15 would probably want to start with the  
16 manufacturer because they would be buying and  
17 putting the drive on the product. And then,  
18 to double-check to see whether or not the  
19 information you are getting is reasonable, you  
20 might want to check drives in the market.

21 MS. WIDDER: Certainly. That is a  
22 good suggestion.

1 MR. BROOKMAN: Dave?

2 MR. MCKINSTRY: Yes, Dave  
3 McKinstry, Colfax Fluid Handling.

4 Well, we really fundamentally agree  
5 with Gary. We think under the extended-  
6 product, the manufacturer assumes the price  
7 responsibility for those.

8 MS. WIDDER: Uh-hum.

9 MR. BROOKMAN: Okay.

10 MS. WIDDER: Great.

11 Okay. So, now we are going to talk  
12 a little bit about -- the one thing I will say  
13 about mark-ups before we move on is just to  
14 emphasize the cost analysis that DOE does. It  
15 is really based on cost to the consumer and  
16 cost-effectiveness to the consumer, while  
17 accounting for manufacturer impacts.

18 And so, these mark-ups fall into  
19 the life-cycle cost analysis and, then, the  
20 payback period analysis. The reason I bring  
21 that up is the other component of the payback  
22 period analysis is this energy use

1       characterization that I am going to talk about  
2       now.

3                       So, we look at the price to the  
4       consumer through these different channels.  
5       And then, we do this energy use  
6       characterization to try to describe, based on  
7       all the different applications you could put  
8       pumps in, what is the energy use, what is the  
9       total current energy use and how will our  
10      standards impact that energy use or conserve  
11      energy.

12                      And then, those two pieces are  
13      really what get us to the life-cycle cost and  
14      payback period analysis, and let us flow down  
15      to set standard levels.

16                      So, I am going to talk at a high  
17      level about what that analysis looks like. As  
18      we all sort of are aware and Tom brought up,  
19      this is going to be a very complex question.

20                      I think what we are talking about  
21      in these few slides is similar to the semi-  
22      analytical approach that HI has developed to

1 look at part-load performance of pumps. So,  
2 hopefully, we are consistent on that, but it  
3 is certainly going to be very important that  
4 we develop representative curves for large  
5 market segments that pumps are sold into, to  
6 make sure that we get at least the baseline  
7 energy use characterized well.

8 So, the purpose, again, is to  
9 identify how pumps are actually operated by  
10 users in representative market segments and,  
11 then, vary the efficiency of those pumps,  
12 based on those load profiles or those specific  
13 applications, to determine energy savings in  
14 the field.

15 And we estimate that annual energy  
16 consumption, again, for baseline and higher-  
17 efficiency designs. There are a lot of issues  
18 that we sort of talked about.

19 One is that there is a lot of duty  
20 profiles that are expected to vary across the  
21 equipment classes. Also, as we know and as  
22 has been stated, pumps are often designed to

1 exceed the flow rate capacity and head  
2 requirements as an engineering precaution.  
3 And to what extent is that done? And what is  
4 an average operating point for that pump? It  
5 may not be exactly the best operating point,  
6 or the design point even, all the time.

7           And then, pumps are often sized  
8 based on peak load and knowing how often that  
9 pump actually even operates at peak load. We  
10 are going to have to have some data that helps  
11 us make estimates about that.

12           So, here is the just fundamental  
13 framework for an approach that we have talked  
14 about. I think it sounds similar to what HI  
15 was proposing where we would define for each  
16 application - and some common applications  
17 that we might consider are wastewater and the  
18 construction industry, HVAC, cooling towers,  
19 food processing. We can talk about what the  
20 most representative market segments or  
21 applications are for particular pump classes.  
22 And then, for those applications, for those

1 pumps, define load profiles based on the flow  
2 rate and the head throughout the year.

3 So, you can see there is a flow  
4 rate, a head, and operating hours at that  
5 point. And then, we would calculate that AEC  
6 for each perhaps pump class in each  
7 applications. And it becomes this big  
8 exponential, as it were, analysis.

9 And then, we try to take account  
10 for the efficiency of the pumping system in  
11 this analysis. So, for pumps that are sold as  
12 pumps alone, we will have to assume, make some  
13 assumptions about what type and efficiency of  
14 motors and if they have controls that were  
15 added after market, et cetera, et cetera.

16 So, this is really getting to how  
17 we justify standards levels and decide how  
18 much energy we are going to try and save, but  
19 there is going to be a lot of work developing  
20 these profiles. And so, I certainly hope that  
21 the manufacturers can help us get that right.

22 MR. STARR: Yes, I was just

1 thinking your equation should probably -- I  
2 think maybe your transmission one is trying to  
3 capture this, the VFD efficiency. But if it  
4 is not that, I don't know, transmission could  
5 also be, depending on whether it is direct-  
6 drive or belt, or whatever, but I don't know  
7 if you were trying to capture that, but it  
8 probably needs to be in there.

9           And then, also, the efficiency  
10 changes based upon where the VFD load is. If  
11 it is more fully loaded, it is more efficient.  
12 If it is less loaded, it is less efficient.

13           MS. WIDDER: Right.

14           MR. STARR: So, that is another  
15 element in there.

16           MS. WIDDER: You know, just to tie  
17 this all together, but not to make it too  
18 complex, it is going to get back to what  
19 metric we have to start with pump efficiency,  
20 so how we rate pumps, how we define their  
21 efficiency, at what flow rates, full or part  
22 load, and then, how we use those rated



1 efficiencies to extrapolate to a more  
2 annualized energy use.

3 MR. BROOKMAN: Gary Fernstrom?

4 MS. WIDDER: Yes, go ahead.

5 MR. FERNSTROM: I was going to say  
6 you might argue that the VFD efficiency is a  
7 function of the control system efficiency  
8 because it is controlling the mother.

9 MS. WIDDER: Yes, directly to your  
10 question, I believe the control system  
11 efficiency --

12 MR. BROOKMAN: Steve?

13 MR. ROSENSTOCK: Steve Rosenstock.

14 Yes, I think on this one, because  
15 you are looking at the non-electric systems as  
16 well, you are going to have to add an  
17 indicator for like a fossil fuel and turbine  
18 in terms of some of this equation as well for  
19 those applications.

20 And in terms of the VFD, the  
21 control system, again, just thinking of the  
22 VSD or VFD, is that the efficiency of the

1 driver, the efficiency of the motor after --  
2 it is really how it affects the motor, the  
3 pump motor efficiency, not the VFD efficiency,  
4 right?

5 MS. WIDDER: Sorry. Just to make  
6 sure I understand your question, so we are  
7 looking at the motor efficiency, which may be  
8 a function of the VFD efficiency?

9 MR. ROSENSTOCK: And then, could  
10 incorporate the N sub C.

11 MS. WIDDER: Right, right.

12 MR. ROSENSTOCK: Because the VFD is  
13 having an impact on the motor efficiency.

14 MS. WIDDER: Yes, yes. That is  
15 certainly true.

16 MR. ROSENSTOCK: And then, I guess  
17 the other thing would be -- again, this is all  
18 generic -- but there is going to be a control  
19 system energy usage that is going to be  
20 separate from the motor. There is going to be  
21 a control system, there is going to be extra  
22 kilowatt hours just of the control by itself

1 regardless of what is happening with the pump.  
2 So, there is an extra, I will say, constant or  
3 something in there to account for that.

4 MS. WIDDER: Right, right.

5 MR. ROSENSTOCK: Okay.

6 MS. WIDDER: And that will have to  
7 certainly be part of --

8 MR. ROSENSTOCK: For the extended  
9 ones.

10 MS. WIDDER: If we are going to  
11 account for the efficiency, we also have to  
12 account for the VFD energy use, yes.

13 MR. ROSENSTOCK: Thanks. Thanks.

14 MS. WIDDER: Definitely.

15 MR. BROOKMAN: Gary?

16 MR. FERNSTROM: Well, another way  
17 of saying that is, with this particular  
18 extended product category, we are talking  
19 about potential standby power.

20 MS. WIDDER: Uh-hum.

21 MR. ROSENSTOCK: It is not just  
22 standby.

1                   This is Steve Rosenstock.

2                   Yes, it is not just standby; it is  
3 active as well.

4                   MS. WIDDER: Yes.

5                   MR. BROOKMAN: Let's go now to the  
6 comment boxes.

7                   MS. WIDDER: Yes, and this will  
8 come up a lot. You will hear about this more.  
9 But now we have some preliminary requests for  
10 comments that will at least help us get  
11 started on developing the dataset we will need  
12 to understand energy use of pumps in the  
13 field.

14                   DOE requests input on a lot of  
15 things, recommendations for identifying those  
16 high-volume applications, those representative  
17 applications that we can use to develop  
18 profiles. We are not going to get every  
19 application of every pump, but what suite of  
20 profiles would be representative enough to  
21 give us a good picture?

22                   Recommendations on data sources,

1 and they could be application-specific or  
2 market-level. And we can make those estimates  
3 work together to try to verify our analysis.

4 DOE requests inputs on ways to  
5 characterize pump sizing and selection  
6 practices for different equipment classes.  
7 So, maybe pumps are more regularly oversized  
8 in particular applications. We want to  
9 account for that in this analysis.

10 And the last, 7.5, is requesting  
11 comment on the nominal duty profiles to  
12 consider in the rulemaking. So, perhaps there  
13 are some applications that can be rolled up  
14 and have more representative duty profiles.  
15 And this HI nominal assessment that they have  
16 done, nominal analysis of EEI, I think it is,  
17 might be appropriate for those nominal duty  
18 profiles.

19 MR. MCKINSTRY: Just as a bit of  
20 information for you, when the EU looked at all  
21 these different load profiles, they found that  
22 the load profile didn't really make a whole

1 lot of difference.

2 MS. WIDDER: And that would be  
3 wonderful if we found the same thing.

4 (Laughter.)

5 MR. BROOKMAN: Now Louis. That was  
6 Dave. Louis?

7 MR. STARR: So, the last thing is  
8 Item 7-4, the other thing you might think  
9 about, there is a certain amount of oversizing  
10 that happens as kind of good engineering  
11 practices.

12 MS. WIDDER: Uh-hum.

13 MR. STARR: Design, you know, is 10  
14 percent more than break horsepower you want.

15 But the other element that happens  
16 is, once you have selected the motor, there is  
17 never a 2.3 horsepower motor. It is either 2  
18 or 3. And so, even if you just did a random  
19 analysis of sticking in numbers, because the  
20 operating system points on systems are random.  
21 And therefore, if you start sticking in  
22 numbers, you can actually start to see there

1 is inherently a certain amount of oversizing,  
2 and then you are doing your break horsepower  
3 oversizing. So, you are getting two elements  
4 that are playing there together.

5 That is why the discussion of using  
6 a VFD, even on a constant load application,  
7 can actually save power, just by being able to  
8 dial that system in when you actually know  
9 what the system losses really are.

10 MS. WIDDER: Right.

11 MR. STARR: And so, there is a lot  
12 of value there.

13 MS. WIDDER: Yes.

14 MR. BROOKMAN: Bruce?

15 MR. LUNG: Just to kind of  
16 piggyback on that, there is another little  
17 comment I would like to make on this 7-4.

18 There are also times where you could have a  
19 manufacturing plant that, properly sized, it  
20 pumps for a given application, but over time  
21 the end-use requirements may have declined.  
22 But, because they focus on production and,

1 then, they switch production equipment, they  
2 leave the existing cross-cutting stuff in  
3 place. This is true for pumps as well as for  
4 compressors and some other type of equipment.

5 So, you could have a situation  
6 where, because they don't take account of the  
7 true end-use needs, they keep oversized pumps  
8 in place; whereas, at the beginning the pumps  
9 were properly sized. And they end up  
10 diverting the flow, so they have to keep  
11 operating that BEP.

12 MS. WIDDER: And that certainly  
13 could be the case, to the extent that we have  
14 data about how prevalent that practice is and  
15 in what particular market segments. That is  
16 how we would be able to account for that in  
17 our analysis. Just anecdotally noting that  
18 that sometimes occurs, it is difficult for us  
19 to incorporate.

20 MR. BROOKMAN: Tom Eckman?

21 MR. ECKMAN: Yes. You and Dave  
22 should check with Graham Parker on the load



1 shapes. We have all the ELCAP stuff that was  
2 put up on the web. So, all the hourly data is  
3 out there now.

4 MS. WIDDER: Yes.

5 MR. ECKMAN: So, I don't know;  
6 there is lots of commercial. I don't think  
7 there is any industrial, but there is lots of  
8 commercial. And we can also run down some  
9 industrial load shapes --

10 MS. WIDDER: Yes, yes.

11 MR. ECKMAN: -- particularly for  
12 food processing and irrigation.

13 MS. WIDDER: And that often is a  
14 ripe data source for us.

15 MR. ECKMAN: Yes. Well, Graham  
16 knows where it is at now.

17 MS. WIDDER: Yes.

18 MR. BROOKMAN: Gary Fernstrom.

19 MR. FERNSTROM: So, I would like to  
20 go back to swimming pools as an example, even  
21 though they are not a subject of this  
22 rulemaking. And that is, for commercial

1 pools, the Health and Safety Codes require  
2 that pool pumps be designed to pump against 60  
3 feet of head at their design flow, when in  
4 reality the actual head they see is rarely in  
5 excess of 15 feet. So, there is an example of  
6 built-in overdesign.

7 MS. WIDDER: Uh-hum.

8 MR. BROOKMAN: Okay. Louis?

9 MR. STARR: In terms of oversizing  
10 and information, I think it is Evan Mills  
11 with, I think it is California Energy  
12 Commission, but they do actually have numbers  
13 on kind of what approximately - from  
14 retrocommissioning - in terms of what the  
15 oversizing is. So, they can kind of give you,  
16 because they did a bit of a study, I think on  
17 238 samples or something. So, there is  
18 information out there. I will probably try to  
19 look for it. But Evan Mills is --

20 MR. BROOKMAN: So, let's scan these  
21 Request for Comment boxes one time before we  
22 move on, make sure we have covered what we

1 can.

2 MS. WIDDER: Yes. Okay.

3 MR. BROOKMAN: Okay. Now we are  
4 moving on.

5 MS. WIDDER: Moving on, we actually  
6 have another page of Requests for Comments.

7 MR. BROOKMAN: Right. I know that.

8 (Laughter.)

9 MS. WIDDER: Can't wait.

10 This is related to -- and this came  
11 up earlier -- about coming up with our  
12 baseline assessment of energy use, so that we  
13 can, then, add on the impact of any standards  
14 that were to be set.

15 So, for that, we will need  
16 information about the current penetration of  
17 VSDs. And again, that may vary by application  
18 or type of pump. And to the extent it does,  
19 we will need information on that.

20 We just really want, in order to  
21 understand how standards will impact the  
22 market and impact energy use, we need to

1 understand first how pumps are currently  
2 impacting energy use. And so, any data about  
3 that -- I think we don't need to accept more  
4 comments on that.

5           Comment on the recommendation on  
6 the range and number of sizes over which the  
7 analysis should be carried out. So, this  
8 analysis could actually get very complex since  
9 there is a number of specific speed  
10 applications where the same pump could be sold  
11 into any number of different applications.  
12 And to think about looking at each one would  
13 be nearly impossible. And so, trying to  
14 characterize what are the representative,  
15 maybe a high, a low, and a middle, maybe 5 or  
16 10 representative duty profiles and speeds  
17 that we could apply our analysis to and get a  
18 pretty good picture. So, information about  
19 that.

20           And we are requesting comment on  
21 establishing the mean value and the ranges of  
22 likely values for some of those efficiencies.

1 And also, to the extent that they are  
2 dependent on one another, we will want to take  
3 account for that, by receiving comment on that  
4 dependency. And we are looking for ranges of  
5 those values because we probably will do  
6 sensitivity around some of those ranges.

7 So, that is the extent of this  
8 comment. I don't know if there is other  
9 information. We will probably just need to go  
10 and consider and we will accept written  
11 comments, Doug.

12 MR. BROOKMAN: So, then, now we are  
13 moving on.

14 Thank you, Sarah

15 And back to Alison.

16 MS. WILLIAMS: Thank you.

17 So, we are going to move on to the  
18 life-cycle cost and payback period analysis,  
19 which is very related to the energy use  
20 analysis. It is from the customer's  
21 perspective.

22 The standards usually have the

1 effect of increasing purchase price and  
2 decreasing operating cost. So, the LCC is  
3 basically looking at those relationships, the  
4 customer price plus the sum of annual  
5 operating cost.

6 Again, it is customer perspective,  
7 and it is always the difference between a  
8 baseline and the standard level. And we also  
9 look at payback period in this analysis.

10 So, the center of this approach is  
11 to look at the pump selection process. So,  
12 basically, matching pump duty points with pump  
13 equipment. And it is based on the  
14 distribution of equipment efficiencies  
15 expected for the compliance year. So, some  
16 customers will not be affected by the  
17 standard, and the LCC accounts for that.

18 Again, it aggregates the annual  
19 energy consumption over the pump's lifetime,  
20 and it uses probability distributions to  
21 characterize operating costs and other  
22 parameters. And it is all run using a Monte

1 Carlo simulation to look at a lot of the  
2 distributions and determine the percent of  
3 customers benefitting from, being burdened by,  
4 or not being affected by the standard.

5 This is a little visual  
6 representation of the approach. So, you can  
7 see at the center is the pump selection box.  
8 We are basically going to match duty points of  
9 pumps with the pumps themselves and, also,  
10 motors.

11 And then, we will use the energy  
12 use analysis that Sarah just discussed to get  
13 the annual energy consumption and combine that  
14 with other parameters, including lifetime,  
15 discount rate, energy price, potentially  
16 efficiency degradation factor over time, and  
17 installation cost to arrive at the final life-  
18 cycle cost.

19 So, I will just discuss a little  
20 bit of these inputs. So, installation costs,  
21 labor, and overhead, and other miscellaneous  
22 materials and parts. We will look at energy

1 prices by customer sector, including looking  
2 at energy tariffs, focusing on the EIA's  
3 Annual Energy Outlook to estimate future  
4 energy prices over time, and we may consider  
5 reactive power prices.

6           Ideally, we also will include the  
7 maintenance and repair costs in the LCC. We  
8 expect that they won't change with incremental  
9 increases in efficiency, but may potentially  
10 change with significant improvements, and we  
11 are interested in information on that.

12           We also will look at equipment  
13 lifetime. DOE believes the average lifetime  
14 is about 10 to 15 years with a max around 25.  
15 However, this depends on various things, such  
16 as higher values of pump head, horsepower and  
17 speed, or higher values of temperature. In  
18 addition, some pumps are basically thrown away  
19 when they break; whereas, others have repair  
20 cycles that may be repeated.

21           And finally, DOE will look at  
22 discount rates for commercial and industrial



1 users.

2 So, this Request for Comments on a  
3 variety of these parameters, including  
4 installation cost, electricity prices, repair  
5 costs lifetime, any data on degradation of  
6 efficiency over time, and approaches for  
7 estimating discount rates.

8 MR. BROOKMAN: Steve Rosenstock?

9 MR. ROSENSTOCK: Steve Rosenstock,  
10 EEI.

11 Just a comment on 8-2. In your  
12 approach, you said that DOE will also survey  
13 reactive power prices. And I was kind of  
14 curious about why you might do that, because  
15 that only comes into play if the entire  
16 facility, the power factor for the entire  
17 facility, goes below the requirement of the  
18 utility where they have the reactive meters to  
19 check on power factors.

20 You know, most motors and drives  
21 are designed to make sure that they don't  
22 cause power factors to degrade. So, reactive

1 power prices can add to the cost to the end-  
2 users, but especially large commercial and  
3 industrial, they always make sure that they  
4 meet the requirement. So, I personally don't  
5 necessarily see the need of why you would have  
6 to check on reactive power prices, unless you  
7 know that some of the technologies considered  
8 would definitely guarantee that the building  
9 power factor would go below a certain level.

10 MS. WILLIAMS: We will take that  
11 into account.

12 MR. BROOKMAN: Gary Fernstrom?

13 MR. FERNSTROM: That caught my  
14 attention, too, reactive power cost. And the  
15 way we do it, over, let's call it, an  
16 objective power factor of 85 percent, you get  
17 a credit on your bill; below that, you get a  
18 penalty on your bill. So, no matter where you  
19 are, power factor makes a difference in the  
20 customer's bill.

21 And no matter where the whole plant  
22 is, any individual contributor makes a

1 difference in the whole plant's power factor.  
2 It may not be one-for-one. It may be diluted,  
3 but it makes a difference.

4 So, I think that you definitely  
5 ought to consider the effect or the cost of  
6 reactive power for consumers because it is a  
7 real cost.

8 MR. BROOKMAN: Steve?

9 MR. ROSENSTOCK: Steve Rosenstock.

10 Yes, again, I appreciate that.  
11 There are other utilities that I am aware of  
12 -- we did a survey; actually, we did it for  
13 our national key account customers, a survey  
14 of investor-owned utilities. That is going  
15 back several years.

16 And for the most part, again, there  
17 are a couple of utilities that have credit  
18 versus penalty based on the level of where the  
19 entire building is at the entrance to the  
20 building, basically, but there are a lot of  
21 utilities that also have -- if you are below  
22 it, you get penalized; if you are above it,

1 you don't get penalized. So, you don't get  
2 credit for going above the power factor, but  
3 you do get penalized if you go below it. So,  
4 it can make an incremental difference, but is  
5 it enough to push you into the penalty side?  
6 If it is every single pump in the building,  
7 maybe; if it is an individual pump, then  
8 probably not, I would say.

9 MR. BROOKMAN: Gary?

10 MR. FERNSTROM: Okay. So, I think  
11 we have two competing arguments here. One is  
12 maybe you ought to treat it the way that it is  
13 prevalent in this country among the most  
14 utilities. On the other hand, even for those  
15 that don't give a credit above a certain  
16 level, it still has an impact on their cost,  
17 and they are simply distributing those costs  
18 differently among those customers. So, it  
19 does represent a cost to society, no matter  
20 which way it goes.

21 And I had a comment on degradation.  
22 That is, we ought to be looking at the

1 degradation of the higher-efficiency pump  
2 relative to the degradation of the standard-  
3 efficiency pump.

4 So, that should only be a factor if  
5 we think, for some reason, the higher-  
6 efficiency pump is going to have a greater  
7 degradation than pumps in general. And it  
8 might work the other way, where the higher-  
9 efficiency pump has less degradation.

10 MR. BROOKMAN: Louis?

11 MR. STARR: If you are going to  
12 look at that reactive power, you should  
13 probably be looking at the demand charge side,  
14 too, I would think.

15 MR. BROOKMAN: Did we hear anything  
16 about installation costs or repair costs yet?  
17 I don't think so. No comments on those?

18 MR. HANDZEL: Mark Handzel for  
19 Hydraulic Institute.

20 We didn't prepare a response on  
21 these. So, we will probably be able to give  
22 you some information in our written response.

1                   MR. BROOKMAN:     Okay.     That is  
2 helpful.   Okay.

3                   Then, we are moving on.

4                   MS. WILLIAMS:   Okay.   So, the next  
5 analysis is the shipments analysis, which  
6 serves as the foundation for both the national  
7 impact analysis and the manufacturer impact  
8 analysis that Dan discussed earlier.

9                   So, the purpose is pretty  
10 straightforward. We want to project future  
11 shipments by equipment class, so that we can  
12 have the proper baseline from which to  
13 calculate energy savings and other  
14 information.

15                   We will look at a number of data  
16 sources, anything that we can find.  
17 Typically, DOE projects shipments for a 30-  
18 year period, beginning on the expected  
19 compliance date of a standard.   DOE will  
20 attempt to tie growth indices from industrial  
21 and commercial sectors to the shipments  
22 projection. And in some cases, the shipments

1 projection in the standards case may differ  
2 from that in the base case because of changes  
3 in purchase price or operating cost.

4 So, we request comments on the  
5 shipments methodology as well as historical  
6 shipments and bookings data for the equipment  
7 classes and any information available on how  
8 the standards might impact shipments for the  
9 standards case as compared to the base case.

10 MR. BROOKMAN: Comments at this  
11 time?

12 (No response.)

13 No comments at this time.

14 MS. WILLIAMS: Okay. Then, moving  
15 on to the national impact analysis, the  
16 purpose is twofold: to derive national energy  
17 savings and net present value. Where the LCC  
18 focuses on customers, this is at a national  
19 level.

20 So, we will look at the annual  
21 series of both energy and economic impacts.  
22 Again, as I mentioned, it is based on the

1 shipments model. It also includes costs and  
2 energy use per unit from the LCC. It involves  
3 efficiency trends over time. And all this is  
4 aggregated over the years. And so, we will  
5 report both the national energy savings in  
6 both primary and full-fuel cycle savings as  
7 well as the national customer NPV, and it  
8 takes into account discount rates.

9 MR. BROOKMAN: I don't see the  
10 comment box.

11 MS. WILLIAMS: I have no comment  
12 box, but feel free to comment.

13 (Laughter.)

14 MR. BROOKMAN: Yes.

15 (No response.)

16 We are going to keep going.

17 MS. WILLIAMS: Okay. So, the  
18 remainder of the analyses are for the NOPR  
19 analyses, not the preliminary. So, in the  
20 interest of time, we could choose to not go  
21 over those today.

22 MR. BROOKMAN: Why don't you just



1 mention them and see if they are familiar?

2 MS. WILLIAMS: Okay.

3 MR. BROOKMAN: These are what they  
4 call further downstream, that is, later.

5 Charles?

6 MR. LLENZA: Let me just mention  
7 this section is just basically we lay out the  
8 foundation and the framework, and then the  
9 preliminary analysis. And then, at the NOPR  
10 stage, we actually construct a very  
11 comprehensive TSD with all this information.

12 So, what you see in the NOPR part  
13 here is, again, a part of a process here. You  
14 are putting the frosting on the cake, as I  
15 call it, and the candles. And so, it is a lot  
16 of detail, but it is also been built up  
17 through the prior two processes, and lots of  
18 work, by the way.

19 MR. BROOKMAN: So, just take a few  
20 moments to list them.

21 MR. LLENZA: Yes, just go through  
22 this.

1 MS. WILLIAMS: Sure. So, we have  
2 the customer subgroup, which is basically just  
3 the LCC for certain disproportionately-  
4 impacted subgroups.

5 We do an emissions analysis for  
6 several of these emissions, you can see here,  
7 and, also, monetize some of them, currently,  
8 CO2 and NOx.

9 We do a utility impact analysis to  
10 look at avoided capacity.

11 An employment impact analysis.  
12 While the MIA looks at direct employment  
13 impacts, this looks at indirect ones resulting  
14 from shifts in consumer expenditures.

15 And we, finally, do a regulatory  
16 impact analysis that looks at the potential  
17 for other non-regulatory alternatives to  
18 affect the energy efficiency of pumps.

19 MR. BROOKMAN: So, that concludes  
20 the PowerPoints that we have been trying to go  
21 through.

22 I know, we are not quite done yet.

1 (Laughter.)

2 But, in the interest of being  
3 efficient, I am going to hand out these  
4 evaluation forms now, so you can ponder how  
5 you will fill them out.

6 (Laughter.)

7 Tom, yes?

8 MR. ECKMAN: Yes, I am going to get  
9 on my saw again.

10 MR. BROOKMAN: Before you do,  
11 though -- (laughter) --

12 MR. ECKMAN: Very quickly.

13 MR. BROOKMAN: -- just reminder  
14 that now is an opportunity for anybody that  
15 wishes to, to make final comments, brief,  
16 summary comments, anything that didn't get  
17 covered sufficiently during the day.

18 Tom Eckman, you are up.

19 MR. ECKMAN: Yes. Before starting,  
20 I don't know, maybe a year or two years ago,  
21 DOE began monetizing the emissions. Those  
22 prices cover a wide range of costs. They use

1 the intergovernmental estimate of that. That  
2 is wonderful. But they neglect to monetize  
3 the cost of avoided new electric capacity,  
4 which are real costs paid by real ratepayers.

5 And the social cost of carbon, we  
6 are going to pay sometime; I don't know what  
7 it is. But the reality is, when we avoid  
8 plants by doing these things, which is the  
9 purpose of doing these things, it saves people  
10 money. And I would encourage the DOE, once  
11 again, to take a look at that and try to  
12 monetize the cost of avoided capacity that is  
13 affected by these rules. Whether they are in  
14 individual rules or cumulatively, it is  
15 significant, but we have never figured out how  
16 much it saved us. And it is an important  
17 number to know.

18 MR. BROOKMAN: Okay. Steve?

19 MR. ROSENSTOCK: Steve Rosenstock.

20 Yes, I am going to go back, also,  
21 to the emissions analysis. There is a lot  
22 going on, and it will impact the analysis,

1 especially because for this analysis, for this  
2 rulemaking, we are talking about a rule that  
3 is finalized in 2016 with standards that go  
4 into effect, at the earliest, in 2019.

5 At the current time, EPA is about  
6 to finalize CO2 emission standards for new  
7 power plants. They are also working on a rule  
8 for CO2 on existing power plants. I don't  
9 know how soon that will be out, but probably  
10 within the next few years.

11 The EPA is also about to finalize  
12 rules on mercury at power plants, which will  
13 go into effect by 2016. Basically, they will  
14 get three; 2016, 2017 is the timeframe before  
15 this rule goes into effect.

16 So, my point is and, also, I have  
17 had issues, and I have discussed this, so  
18 mercury will be capped. Of course, nitrogen  
19 oxides, there has been an issue because the  
20 monetized nitrogen oxide seems to be based on  
21 a study that was done in 2001. Okay.

22 And they keep it changing it to

1 reflect current dollar values. But, again, if  
2 you look at the emissions, look at EPA data,  
3 nitrous oxides emissions from the electric  
4 power sector since 2001 have gone down well  
5 over 50 percent. So, the monetized value has  
6 been inflated while the actual emissions have  
7 gone down. Therefore, there seems to be  
8 confluence, a disconnect there in terms of the  
9 value versus the actual what is happening out  
10 there.

11 Also, as part of the analysis,  
12 which I have agreed with, it is wherever  
13 emissions have been capped like SO2 or NOx,  
14 that basically there is zero impact from  
15 efficiency upgrades because of the way the  
16 caps work.

17 Well, DOE is not taking into  
18 account their CO2 caps in New England, and now  
19 one just started in California, starting this  
20 year. So, again, that has not been taken into  
21 account, into the analysis. In my view,  
22 eventually, when it is monetized, it is

1 overstating the impact because it is not  
2 taking into account the significant amount of  
3 the caps that are going into effect here.

4 So, I will write some of this down,  
5 but I believe that changes are significant and  
6 that some of this monetization is overstating  
7 the eventual domestic benefit of the emissions  
8 reductions.

9 Thank you.

10 MR. BROOKMAN: Thank you.

11 So, now, yes, please. Your name?

12 MR. LEMMOND: Jon Lemmond, AHRI.

13 One quick thing. AHRI is  
14 supportive of the positions held by HI.  
15 That's all.

16 MR. BROOKMAN: Thank you. Thank  
17 you.

18 I have a final invitation for final  
19 remarks before I turn it back to Charles to go  
20 over all of the details surrounding submission  
21 of comments and all of that.

22 MR. FERNSTROM: Great job. Thank

1       you.

2                   MR. LLENZA:   And I will be brief on  
3       that.

4                   MR. BROOKMAN:   Gary, say it again?

5                   MR. FERNSTROM:   Good job.   Thank  
6       you.

7                   MR. BROOKMAN:   Oh, thank you.

8                   Thanks to all of you.

9                   Final   comments,   additional   final  
10       comments?   I don't want anyone to be closed  
11       out here.

12                   (No response.)

13                   Then, my final comment is to thank  
14       you all.   It was a very, very constructive  
15       meeting today, a lot of really good content.  
16       We really covered a lot of ground, especially  
17       the   new   participants   in   this   rather  
18       complicated regulatory process generally and a  
19       very   complicated   subject,   and   traversed  
20       adequately, competently as the day went on.  
21       So, many thanks to all of you and for your  
22       endurance; I appreciate that as well.



1                   Back to Charles.

2                   MR. LLENZA: Yes, thanks, everybody  
3 for attending. I know this has been a little  
4 bit long and winded maybe.

5                   But I also just want to put one  
6 thought in everybody's mind. We have a  
7 regulatory process. We have an obligation to  
8 fulfill our regulatory mandate via a process  
9 that we have that is pretty rigorous and that  
10 is inclusive of your comments.

11                  I also want to make sure that you  
12 understand that the consensus process may  
13 provide you alternatives that you don't have  
14 through the regulatory process. And we sort  
15 of have to fill in all the boxes and cross all  
16 the "T's" and dot all the "I's". In the  
17 consensus process, you may have different  
18 flexibility.

19                  I have provided a website for the  
20 ASRAC Committee. It is something that  
21 probably would be beneficial to bring this up  
22 to ASRAC and to see if you could explore

1 alternative methods for being out of the box  
2 of our regulatory process in terms of  
3 achieving kind of the same objectives, which  
4 is saving energy through improvements in  
5 eliminating the bad actors in terms of pumps  
6 in the U.S. economy.

7 MR. BROOKMAN: If they wish to  
8 interact or pursue ASRAC as something to  
9 consider, how would they do that?

10 MR. LLENZA: Yes, there is a  
11 website. I already sent a website link, and I  
12 think it has been distributed. So, feel free  
13 to attend. I think there is a webinar on it,  
14 too. So, you probably attend remotely. You  
15 don't have to necessarily travel. And they  
16 have a comment period, just like any process  
17 here at DOE. So, you are more than welcome to  
18 send in your comments, written comments,  
19 within their time limits.

20 So, I just want to again thank you  
21 for attending. This has been long and winded.  
22 I am not going to go everything. The

1 extension of the comment period closes May the  
2 2nd. And then, here is the process,  
3 basically, on how to submit comments.

4 Again, thanks, and safe travels  
5 back.

6 (Whereupon, at 4:42 p.m., the  
7 meeting was adjourned.)

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