UNITED STATES OF AMERICA

DEPARTMENT OF ENERGY

PUBLIC MEETING ON ENERGY CONSERVATION STANDARDS PROPOSED RULEMAKING FOR DISTRIBUTION TRANSFORMERS

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AGENDA

P R O C E E D I N G S

MR. BROOKMAN: Let's get started. Please take your seats. Good morning everyone and welcome. This is the U.S. Department of Energy's public meeting on Energy Conservation Standards Proposed Rulemaking for Distribution Transformers. Today is Thursday, February 23, 2012, here in the Forrestal Building in Washington, D.C. My name is Doug Brookman from Public Solutions in Baltimore. So glad to see you this morning. Glad you were able to make it here on time for an early start on the day.

I'm going to turn it over first thing this morning to Jim Raba for welcoming remarks.

Welcoming Remarks

MR. RABA: Good morning, and welcome to the Department of Energy today. I'm Jim Raba. This is our public meeting on the proposed rule for distribution transformers. Today to present the results of the Department of Energy's analyses of energy efficiency standards for distribution transformers thus far, but mostly we want to hear from you, your comments and recommendations, data,

and information.

But nevertheless we have a lot of things to cover in today's agenda, so before I go too far, I'll turn it back to Doug. Welcome, thank you for being here and participating right along from the beginning. We'll have more. Thank you.

MR. BROOKMAN: We typically start off with introductions around the room. I'm going to start to my left. You can get used to turning the microphones on and off. For those of you seated at table, the little green lights have to come on. Please say your name, and organizational affiliation.

Introductions

MR. HIRSCH: Bruce Hirsh, Baltimore Gas and Electric.

MR. BROOKMAN: Thank you.

MR. CASKEY: John Caskey, NEMA.

MR. POLINSKI: Ray Polinski, ATI-Allegheny Ludlum.

MR. SAINT: Bob Saint, National Rural Electric Cooperative Association.

MR. HYLAND: Mike Hyland, the American Public Power Association.

MR. COULTER: Greg Coulter, Consultant for

Prolec-GE.

MR. PHOUMINH: John Phouminh, PEPCO Holding, Inc.

MR. BALLARD: Casey Ballard, ABB.

MR. CORKRAN: Jerry Corkran, Cooper Power.

MR. HOPINSON: Phil Hopkinson, HVOLT, Inc.

MR. deLaski: Andrew deLaski, Appliance Standards Awareness Project.

MR. ROY: Robin Roy, Natural Resources Defense Council.

MR. HODGE: Jerry Hodge from Howard Industry.

MR. ROSENSTOCK: Steve Rosenstock, Edison Electric Institute.

MR. PETERSEN: Eric Petersen, AK Steel Corporation.

MS. GRACE-TARDY: Ami Grace-Tardy, Department of Energy, General Counsel’s office.

MR. CYMBALSKY: John Cymbalsky, DOE.

MR. RABA: Jim Raba, DOE.

MR. LOOBY: Kevin Looby, Lakeview Metals.

MR. BROOKMAN: Let’s start over here. Please stand up and say your name.

MR. BOLDUC: Christopher Bolduc, LBL.

MS. COUGHLIN: Katie Coughlin, Lawrence

Berkeley Lab.

MR. NARDOTTI: Matt Nardotti, Navigant.

MR. CARMICHAEL: Rob Carmichael, Navigant.

MR. COFFEY: Brian Coffey, Navigant.

MS. EDWARDS: Brenda Edwards, DOE.

MR. BROOKMAN: Please.

MS. BRUSH: Ned Brush, Consultant.

MS. STRONG: Zolaikha Strong, Copper Development Association.

MR. PATTERSON: Wes Patterson, Consultant for Navigant.

MR. BERMAN: Robert Berman, Berman Economics.

MR. RYAN: Paul Ryan, Hitachi Metglas.

MR. CREEVY: Jim Creevy, NEMA.

MR. BOSENBERG: Alex Bosenberg, NEMA.

MR. BALLO: Tim Ballo, Earth Justice.

MR. FOSTER: Chuck Foster, Counsel for EEI

MR. BUSH: Carl Bush, PEMCO Corporation.

MS. BISHOP: Jamie Bishop, ATI.

MR. RAKOWSKI: Jim Rakowski, ATI.

MR. HOFFMAN: Alex Hoffman, American Public Power Association.

MR. RACEY: Barry Racey, AK Steel Corporation.

MR. McCOY: Al McCoy, representing AK Steel.

MR. STEPHENS: Charlie Stephens, Northwest Energy Efficiency Alliance.

MR. BROOKMAN: Thank you. Thanks again for all of your for being here this morning. We should also acknowledge and welcome those that have joined us via the web. We have thirty-odd participants via the web today, so that's a goodly number of folks.

All of you received a packet of information as you came in the door. I'm going to refer to that packet. There's an agenda. There are some written statements. There is a slide deck which will be the basis for discussion and presentation as the day goes on here, and also the Federal Register notice.

Agenda Review

MR. BROOKMAN: Start with the agenda first. Immediately following this agenda review, there's an opportunity for anybody that wishes to do so to make opening statements, brief comments, hopefully fairly brief about the issues that matter to you, what you'd like to see focused on today from your perspective.

Immediately following that, we're going to talk – get a presentation and an opportunity for discussion on rulemaking history, schedule, scope and the negotiated rulemaking process. From there, a description of the EPCA factors, scope definitions, test procedure, equipment classes. Immediately following that, engineering analysis.

We'll take a coffee break round about 10:15 or so this morning, and following the coffee break, a description, lots of opportunity for discussion on markups, loading, distribution channels, life-cycle cost and payback-period analysis, national impact analysis, refurbishments. Then trial standard levels and proposed standards, discussion of proposed standards

And the schedule as listed here in the agenda is that we're going to finish today at 12:45. I think no one wishes to truncate the opportunity for comment and discussion. We'll go efficiently and rapidly forward, we'll just see how long it takes for us to do this. If we get to 12 or so, or 12:30 and we still have a fair piece to go, we'll pause for lunch. Then we'll return and keep at it.

Any questions or comments about the agenda? I see none at this point.

I'd ask for your consideration. Many of you are familiar with this process. Please speak one at a time. You're going to have to turn on the microphone each time you speak. Please say your name for the record each time you speak. I'm going to be cuing individuals by name as best I can, so you know who's in the queue. I also wish to encourage follow-on comments. The back and forth between individuals is sometimes very helpful to the Department as it is sorting through what to do with all this commentary.

Please keep the focus here. Turn your cell phones on silent mode if you would, please, and limit the sidebar conversations. If you can try to be concise, there's certainly a lot to be said. Having read the PowerPoint slides last night, there's a lot of content here. So let's see if we can keep it focused there. And I must say, if we're disciplined in the conduct of the discussion today as we were with the introductions, then that bodes well for all of us, I think.

So I turn it back then to – do you want to do opening statements first, or do you want to do some additional introductory slides?

MR. RABA: Introductory slides.

MR. BROOKMAN: Introductory slides – yours?

MR. RABA: Yeah.

MR. BROOKMAN: Okay.

Introductory Remarks

MR. RABA: Good morning again. Jim Raba, Project Manager, distribution transformers proposed rule and rulemaking. A lot of familiar faces. It's good. Hope these are friendly faces, as they say. You're certainly familiar and thank you for being here today.

Today, as I said before, we're going to present the results of the Department of Energy's analyses of energy efficiency standards for distribution transformers thus far as a proposed rule. More so, we want to hear from you and to encourage discussion of any issues surrounding this rulemaking. Also we encourage your comments, information and data as we look to a final rule by October of this year. Written comment period for this proposed-rule phase closes April 10th.

I mentioned issues. Today we're highlighting issues of interest with comment boxes like these throughout today's presentation. And

there are various ways to submit comments: email, postal, hand delivery by courier, and the like.

Flashback to the Energy Policy Act of 2005, EPACT started all the ball rolling. October 2007, DOE issued a final rule establishing standards for liquid-immersed and medium-voltage dry-type distribution transformers. But, the Department was ordered to reconsider. So, the Department agreed to an expedited timeline whether to amend standards for liquid-immersed and medium-voltage dry-type distribution transformers, and low-voltage distribution transformers were included with that.

So here we are today. This has been a unique rulemaking and a first for DOE. Let me show you. Here's the classic timeline, and here we are today. You can see it started out back in July, end of July 2011, and now we're at the NOPR stage there at the beginning of this year. So in July 2011, DOE issued a Notice of Intent to negotiate a proposed rule. And you know the rest. The comments, data, information exchanged in good faith by all interested parties was awesome.

DOE established two subcommittees, one for liquid-immersed and medium-voltage distribution transformers, and one for low-voltage distribution

transformers, and these included, both included manufacturers of transformers, steel, utilities, energy efficiency advocacy groups, trade associations, and other interested parties.

Now the medium-voltage and liquid-immersed distribution transformers committee reached consensus on standards for medium-voltage dry-type, but the committee was unable to reach consensus on liquid-immersed and low-voltage dry-type. So notwithstanding, I believe we all agree that the process was the best part. Congratulations and thanks to all of you that made it happen. Special kudos to the experts from Lawrence Berkeley National Laboratory and Navigant Consulting Incorporated, and our facilitator, Richard Parker at the time, that did virtually 24/7 work for all you and for today's proposed rule. So, in Doug Brookman's style, give yourselves a round of applause. Well done.

(Applause.)

So here we are. We're looking at the, again, at the essential seven: economic impact, operating cost savings, projected energy savings, performance, competition, national energy conservation, and other factors. So, we'll then proceed then to look forward now in this proposed

rulemaking phase and introduce then Brian Coffey who will continue from Navigant Consulting.

MR. BROOKMAN: We did still want to take opening remarks here at the outset.

MR. RABA: Okay. Still. Forgive me, thank you. We invite you, we want to hear from you, any opening remarks. We know there's some people, persons of interest here who like to make statements for the record, so raise your hand and Doug will recognize you.

MR. BROOKMAN: Brief opening remarks. Yes, please Ray.

Opening Statements

MR. POLINSKI: Ray Polinski from ATI-Allegheny Ludlum, and just want to read a prepared statement. ATI-Allegheny Ludlum fully supports the Department of Energy's preliminary ruling regarding more-stringent efficiency standards for distribution transformers. The DOE fully utilized the expert technical and manufacturing input from the negotiated rulemaking process in arriving at this decision. This results in higher standards for transformers with mandated efficiencies typically exceeding 99 percent, which ranks among the highest in the world. At the same time, the standard

protects thousands of U.S. manufacturing jobs.

The new efficiency standards maintain a competitive balance between grain-oriented electrical steel transformer cores and long-standing alternative materials. Grain-oriented electrical steel is an advanced, highly engineered material that uses nano-scale technology to produce a steel that is nearly a perfect single crystal throughout. This yields excellent electrical efficiency properties when properly designed into a transformer core. Grain-oriented electrical steel manufacturing is carried out economically on a mass-production basis with global production surpassing two million metric tons annually from a multitude of producers. These factors ensure adequate supply for all manufacturers of distribution transformers and vigorous competition on price.

More radical increases in mandatory efficiency would result in the wholesale replacement of grain-oriented electrical steel with a core material that is manufactured on a very limited basis relative to the size of the U.S. distribution transformer market, by a single foreign-owned company that currently exports much of its production. Regulation resulting in a monopoly

position for core materials is likely to result in uncontrolled price increases and supply shortfalls, particularly for small manufacturers of distribution transformers, and is likely that transformer prices will increase rapidly in such environment. This cost would invariably be passed on to consumers of electricity.

A scenario where grain-oriented electrical steel is not available as a core material option would damage the dwindling manufacturing base in the U.S. and could result in a long-term situation where no domestically owned company would produce the strategically important material for transformers that are the critical link in the U.S. electrical grid.

Ongoing investment to improve grain-oriented electrical steel efficiencies, while alternative core material options – excuse me. Ongoing investment used to improve GOES [grain-oriented electrical steel] efficiencies while alternative core material options that have been produced for over 30 years also remain available.

The DOE has arrived at a well-balanced update to the distribution transformer efficiency standard that results in significant additional

energy savings, is environmentally responsible, maintains the domestic manufacturing base for core materials and meets America's current and future needs for electrical energy conservation, cost effective delivery, and stability of supply.

Thank you.

MR. BROOKMAN: Thank you. I think all of you received a copy of that opening statement from Ray in your packet. Additional, and hopefully brief, opening statements. Yes, Phil.

MR. HOPKINSON: Phil Hopkinson, HVOLT, Inc. I'm not going to read the letter that I submitted –

MR. BROOKMAN: Which is in the record.

MR. HOPKINSON: -- which is in the record, but I would do something that I find that I like to do, which is to compliment those who deserve it when they do deserve it, and certainly to pick on those when I think that they don't deserve it. But in this particular case, I have to say that I am extremely pleased with the NOPR as it is submitted and as we are addressing it today. I think that there are benefits that come through to certainly energy savings, and as some of my colleagues have calculated, they've concluded that in liquid-filled

transformers, there is more than a 41 percent reduction in loss over the low first-cost design as a result of this NOPR, which is quite a change over what it had been back before we started to regulate distribution transformer energy efficiency.

So I think that the result of improved losses is clearly there. I think also that the ability to use multiple steels, including M3, which has become quite a workhorse to the industry, as well as amorphous core, which also is an evolving technology and material and is starting to take on wider use. Both materials are capable of being used, and I think that that part is good as well. And I think that it keeps the small manufacturers in business, which is something that I personally have worked hard to try to achieve in this process, and I've been fortunate to do work for Navigant and certainly my DOE friends as well as many of the manufacturers. So I have to conclude that just excellent work, and of course, Richard Parker, I thought, did a wonderful job also in the process.

So that's heartfelt and not read, but I think that's what I believe.

MR. BROOKMAN: Okay. Thank you. Additional comments here at the outset. It is John,

is it?

MR. CASKEY: Yes. John Caskey, NEMA. I did prepare some remarks and sent them to Jim. I'm not sure if you got them or not for the record.

MR. RABA: I've not received them yet, but they will go into the record.

MR. CASKEY: Okay. So I'll get you the more official version, but I'll just read this very quickly, a part of it. NEMA would like to thank the Department of Energy and its staff for providing NEMA and other stakeholders the opportunity to participate in the innovative negotiated rulemaking process for energy conservation standards for distribution transformers. From NEMA's perspective, this process has been extremely valuable in helping all the stakeholders understand the interest and concerns of the other stakeholders. In addition, it provided an opportunity for the transformer and steel manufacturers to explain existing technologies and markets, and for the Department's consultants to refine the various models and input assumptions used in the analysis.

From NEMA's perspective, the energy efficiency levels presented in the NOPR represent the highest level of energy savings that are

economically justified and maintain a healthy transformer industry in the United States. Going beyond the proposed levels will disrupt the steel and transformer industries in the U.S. Further, we are concerned that transformer efficiency levels higher than what are contained in the NOPR could lead some utilities to rebuild old transformers in place of buying new, high efficient transformers, which would be counter-productive to the objective of greater energy efficiency.

In short, NEMA strongly recommends that the DOE adopt the efficiency levels stated in the NOPR, because we believe these are the highest efficiency levels that are economically justified and support a healthy utility, steel, and transformer industries in the United States. Thank you.

MR. BROOKMAN: Thank you. Other comments here at the outset? Jerry.

MR. CORKRAN: Jerry Corkran, Cooper Power Systems. I also have a letter in the information. I won't read the whole letter, but the key sentence in it is that Cooper considers the proposed ruling the best choice for the distribution transformer industry and for the American people who will

receive more efficient transformers in a cost-justifiable manner.

MR. BROOKMAN: Thank you very much. Yes, please.

MR. COULTER: Greg. Greg Coulter, Prolec-GE. I have a short statement. Prolec-GE would like to thank you for the opportunity to attend this public hearing and to offer our perspective on the proposed rule as it relates to medium-voltage liquid-immersed distribution transformers. It would also like to thank the Department for allowing us to participate in the recently concluded negotiated rulemaking sessions.

Although we were disappointed the process did not result in a negotiated agreement for liquid-immersed distribution transformers, we feel it did provide a critical venue for concerned parties to communicate their perspectives and positions that we believe has enhanced and resulted in the proposed rule.

In the negotiation sessions we were party to and supported the NEMA proposal for liquid-immersed distribution transformers, which we believed provided significant energy savings while maintaining manufacturers' ability to utilize a

range of materials and sources to achieve those savings. We are pleased to see that the proposed rule is consistent with the NEMA proposal for improving efficiency levels while preserving the flexibility in materials and designs needed to serve the varied requirements of the customers. We commend the work of the Department and offer our support of the proposed rule.

However, we remind the Department that NEMA position included provisions relating to special handling of covered products for specialized applications where physical constraints are an ongoing issue. Since GE also manufactures network and vault distribution transformers at our Shreveport, Louisiana location, we want to emphasize that many of our customers for these unique products have critical size, weight, and other physical performance limits that can conflict with changes in efficiency standards.

Our written comments which will be provided to the Department will support the recommendations of the working group for networks and vaults established as part of the negotiated rulemaking activities.

MR. BROOKMAN: Thank you. Other comments

here at the outset. Andrew, do you have a comment?

MR. deLASKI: (off microphone comment) So actually, this is going to be a little lengthy, Doug, if you'll forbear –

MR. BROOKMAN: Who are you? (Laughter)

MR. deLASKI: My name's Andrew deLaski and I'm the Executive Director of the Appliance Standards Awareness Project. ASAP is a coalition project that is led by a steering committee that consists of consumer organizations, energy efficiency advocates, environmental organizations, a major public utility, and state government representatives. We are an organization that advocates for cost-effective energy efficiency standards across a range of products, and have been involved in DOE rulemaking processes for about the last 15 years.

In this opening statement I want to do five things:

- One is I want to correct the record with respect to the positions taken during the negotiation process;
- Secondly, I want to make some overall brief observations with respect to the selected levels for low-voltage dry-type transformers;
- Third, I want to make two specific recommendations for additional analysis that's needed with respect to low-voltage dry-type transformers;
- Fourth, I'm going to shift from low-voltage dries to the medium-voltage liquid-immersed, and I'll make some overall observations with respect to medium-voltage medium-voltage liquid-immersed transformers;
- And then close with three specific recommendations for additional analysis that's needed with respect to medium-voltage liquid-immersed transformers.

First of all, let me correct the record. If you look at page 2292 of the NOPR, the Department attempted to characterize the positions taken at the

end of the negotiation process. In here it states, this is on the right hand side of 7292, lower right hand corner, the document states, "For medium-voltage liquid-immersed distribution transformers, the advocates represented by the Appliance Standards Awareness Project recommended efficiency level, also referred to as EL-3, for all design lines."

So we made it clear during the negotiation that we reserved the right to push for higher efficiency levels in a contested rulemaking. We also made it abundantly clear that we were very prepared to accept EL-2 as a negotiated outcome. I think everybody who was part of that process knows that there was a set of us in that negotiation process who were prepared to accept EL-2 as the outcome, the transcripts from that negotiation process reflect that.

So let me just remove any ambiguity. We think EL-2 would be a good outcome as a final rule. EL-2 is best represented by TSL-4. Unfortunately, and this is a little shocking, the Department did not set up a TSL which reflects EL-2 despite the fact that a broad set of stakeholders supported that as a likely or as a good outcome, but TSL-4 is the closest to EL-2 as a – most closely represents EL-2

as a TSL.

So, I want to shift to correcting the record with respect to low-voltage dries. On low-voltage dries, on the following page, the document states that "ASAP recommended EL-4 for all design lines." Again, this is incorrect. We recommended EL-4 for design lines seven and eight. We did not make a recommendation with respect to design line six.

MR. BROOKMAN: Will you state where you are again in the record, Andrew?

MR. deLASKI: So I'm in the middle of page 7293.

MR. BROOKMAN: Thank you.

MR. deLASKI: Now I recognize that the Department was under extreme time pressure in preparing this NOPR, and I think we saw that during the negotiation process, and again I also applaud the consultants and the team for what was an extraordinary amount of work last fall and working under time pressure to both support a negotiation and to develop a NOPR at the same time, and I suspect that the NOPR, frankly, doesn't reflect the full negotiation because we were still talking in December 22nd, and you guys probably had to write

this earlier in December. So I think that the record is, if you go back to the complete record, you'll see that some additional work needs to be done to have the final rule reflect the complete record of the negotiation process.

I also think, you know, it resulted in having to rush and, in rushing, mistakes get made and I understand that, but I just wanted to take the time to correct that record, and there are other items within the NOPR that also will need to be corrected I think, based on the negotiation record.

I want to then shift to low-voltage dry-types. The choice that DOE made for low-voltage dry-type transformers, which is TSL-1, in our view does not adequately weight the consumer, environmental, and energy saving benefits from selecting higher levels. And specifically we recommend TSL-3, which is the same as EL-4 as the recommended standard that we think would be a better balancing of the seven factors and would lead to more significant energy savings.

Now DOE, in choosing the lower efficiency level leans very hard on concerns about manufacturers. In fact, if you would choose the level that would maximize consumer benefits, you

would choose the level that we've recommended. In leaning on impacts to manufacturers, there's really a focus on the capacity of small manufacturers to be able to miter transformers or shift to wound-core construction.

We think that the impact on small manufacturers is an important factor to consider in the rulemaking, but it's not the only factor, and the decision-making here seems to have turned on this one critical question of what are the impacts on small manufacturers. If you look at the data, the Department says that about 50 percent of low voltage dry-type transformers manufactured in the rulemaking. And so specialty – there are a lot of specialty low-voltage dries, and this is where most of the small manufacturers have the bulk of their business that is outside the scope of this rulemaking.

The Department also concludes that 75 percent of low-voltage dry-type transformers are manufactured in Mexico. These are the commodity-grade transformers that make up the bulk of the market, and also make up the bulk of the opportunity for energy savings, are being manufactured in Mexico by high volume transformer manufacturers, as opposed

to by the small manufacturers that appear to be the primary concern the Department raises with respect to going to higher efficiency levels.

So then turning to small manufacturers, the concern the Department raises is the access to mitering machines. To go to EL-4, we recognize, would require manufacturers to miter their cores. You've got two options, to buy a mitering machine, which the record shows is an investment of about a half a million dollars for a basic mitering machine, or you can source your cores. About 50 percent of small manufacturers, according to DOE, already have a mitering machine. Half a million dollars is a significant investment, but it's not an investment that's outside the reach of most viable businesses.

Manufacturers readily acknowledge that they already source their cores. Big manufacturers, the biggest manufacturers to the smallest manufacturers, source cores today. So the notion that you can't have a viable business that sources cores is inaccurate. It is part of the business today. There is no reason why it can't be a continuing part of the business in the face of a new efficiency standard.

So we think that DOE's rationale for not

selecting the higher level, EL-4, is poorly argued, is not substantiated by the record, that manufacturers can choose to either source cores or to invest in mitering machines to get to the higher efficiency level of EL-4, that DOE should reconsider and reevaluate the options of small manufacturers to comply with the standard.

Finally, I would say that it would be irrational, almost silly, to deny the public billions of dollars in net consumer benefits for want of a few million dollars in investment capital in mitering machines. We're talking about – how many mitering machines are we talking about? What's the investment? The Department's analysis doesn't address this question. We're talking about significant benefits for consumers and for the environment that are being left at the table for want of a small amount of money to invest, relatively small amount of money to invest in mitering equipment.

So, two recommendations, which are somewhat related but not entirely. One is that the Department needs to do additional analysis to fill in the gaps in the engineering curves. This was discussed during the rulemaking process. If you

look through the negotiation process, if you look at the results of DOE's analysis of the national impact analysis and the LCC, what you'll see is there's not a big difference between TSL-1, TSL-2, and TSL-3. The Department shows, in fact, that the life-cycle cost analysis is identical between TSL-1 and TSL-2. That's a shocking result. It's a result that's inconsistent with the record, because the manufacturers and everyone sitting around the table said the consumers buy the low-voltage dry-type transformers based on first cost. The market is exactly at the DOE standard, the lion share of the market. Yet the DOE analysis shows that if you go from TSL-1 to TSL-2, there's no change. And we discussed this during the negotiation process, the reason for that DOE has modeled a flat or virtually flat curve, no change in LCC results as you move from TSL-1 to TSL-2 to TSL-3. And that's simply not what's being observed in the marketplace. Purchasers are deciding to buy low cost transformers because they're focused on first price and to go up to higher efficiency levels does entail an increase in first cost, and that's not reflected in the numbers. So DOE needs to do additional analysis to fill in those gaps in those scatter plots so that we

know what the shape of that curve is. DOE's consultants during the analysis said on the record, during negotiation, that the analysis for TSL-3 was robust, but they were concerned that the analysis for TSL-2, for EL-2 and EL-4 was inadequate, and that's the case. It's inadequate analysis. We don't have a curve that reflects the actual changes in costs as you go from TSL-1, EL-1 to 2, to 3, to 4. When you fill in those gaps, I think you'll see a shape that would suggest that there's a more significant change in national savings as you go up from 1, to 2, to 3.

One of the gaps that we think needs to be filled in is to look at M4 butt-lap designs for low-voltage dry-type transformers. This is a gap that we think will show that there's a more cost-effective standard at that level.

So this leads to my second recommendation which is that DOE needs to more fully investigate the limits of butt-lap manufacturing methods with material substitution. And the Department has concluded in the NOPR that TSL-1 is the highest level that you can go to and still use butt-lap manufacturing techniques. And says, we can't go to TSL-2, which is the NEMA premium level, because you

can't butt-lap at TSL-2. Yet during the negotiation process, manufacturers said they butt-lapped at EL-2. So here we have a decision based on an assertion which is not supported by substantial evidence on the record.

So DOE, by investigating what are the limits of butt-lapping manufacturing techniques using material substitution will be able to more fully make a decision based on that criteria, which is apparently quite important to the Department. Now, don't get me wrong, we don't think butt-lapping should be the criteria by what DOE makes its decision. We think, as I said in my opening remarks, that standards that can be achieved by mitering or wound cores are fully justifiable based on the record. But if you're going to decide, make a decision based on the limits of butt-lapping, then you need to look for those limits thoroughly.

So let me shift to medium-voltage liquid-immersed. For this equipment super class, the level proposed by DOE is far below the point which would maximize consumer benefits. As with low-voltage dries, the Department has put an inordinate amount of weight on the impacts on manufacturers to the detriment of the potential for consumer benefits.

Indeed, the difference between the level the Department proposed and the level that we support, which is EL-2, and EL-2 being best represented by TSL-4, a difference of a multiple of four. So four times the energy savings, four times the net consumer benefits going from the level proposed to the level that we support.

The Department leans, in this determination, on impacts on manufacturers, clearly leans on three things: impacts on the transformer manufacturers, particularly small manufacturers, the availability of amorphous metal, and impact on steel manufacturers. These are the three concerns outlined as to the reason why DOE hasn't gone to levels that would result in larger benefits for consumers. And the crux of each of these points is the crossover point. We all discussed at length last fall, where is this magical crossover point? Where is it that you find that you get robust competition between manufacturers of grain-oriented electrical steel and amorphous metal. We think finding that crossover point is a critical part of the decision. We think it's appropriate. We want to have an outcome where we have robust competition amongst core steel suppliers, core material suppliers. We

think it's valuable to have three domestically based domestic manufacturers of core material suppliers who are competing robustly in the marketplace to provide core material. In the market today, the grain-oriented electrical steel manufacturers have the lion's share of the market, AK and Allegheny Ludlum are the incumbent players in the core steel market, so we have two – two competitors who have the lion's share of the market. Move into a market where we have three competitors we think would be a better competitive outcome than the status quo.

So the question is, where is that crossover? During the negotiation – so DOE seems to have concluded that sticking with the status quo where we have two competitors is a good outcome. That's essentially what we have. During the negotiation, two of the largest manufacturers said on the record that this crossover point, where you get robust competition between amorphous metal and conventional electrical steel is roughly at EL-2. So again, roughly TSL-4. A third major manufacturer on the record said that it's roughly at EL-1.5.

Steelmakers and unions endorsed EL-1 in a written letter submitted to the Department shortly after the new year. EEI, APPA, and NRECA also

endorsed EL-1 in a letter submitted to the Department in January. So these positions reflect a diversity of views as to where that crossover point actually is. Now, incredibly, and this is really shocking, the Department actually took the standard below a level recommended by any of these stakeholders in their written comments. Now, I'm not surprised to hear backpedaling this morning, the folks say yeah, the proposal looks good, but it's actually lower than what they recommended. So for the lion's share of the transformers on the market for the small single-phase transformers, liquid-immersed transformers, the proposal was EL-point four. Yet all the stakeholders I just named supported a level higher, EL-1. EL-1.5, EL-2 as the likely crossover point. You know, it's almost mind-boggling the Department would go to a level that's below that recommended by anybody.

So we think it's reasonable to consider going to higher levels in the final rule, as I know the Department does too and has been clear about its proposal. As we think about where that crossover point is, we think it's reasonable to look to the data and the information from the record during the negotiation by manufacturers which show that that

crossover point is roughly at EL-2 or EL-1.5.

However, the Department needs independent analysis, so our recommendation is that DOE needs to do a thorough, independent analysis of its own of what the likely crossover points are. Now it's unlikely to be a single point. This analysis needs to recognize that there's pricing power in the market for materials. These are large companies that have significant market share. They aren't price takers. Financial data, financial reporting indicates that grain-oriented electrical steel is a very high profit margin product. Indeed, it is the profit-making center for the steel makers, and that indicates a market in which these folks have some pricing power. So to suggest that they're going to stand idly by and leave prices unchanged while a competitor enters the market just isn't accurate. Prices are a factor that will shift in response to new market entries or nearly competitive market entries.

So DOE needs to do a new analysis, independently analyzing the competitive – where are these materials competitive - and recognizing that you're not going to get a single point answer because the prices of the materials will shift in

response to the new standards.

And the final concern is the impact on the steel manufacturers. This is, of course, a legitimate and important area for the Department to investigate and of concern to, I think, all of us. The incumbent steel manufacturers, of course, have a strong interest in the outcome. Jobs in manufacturing steel, there are jobs in manufacturing amorphous metal. DOE asserts their concern for steel manufacturing jobs, yet has not provided any analysis on what the impact on steel manufacturing jobs are - simply assertions. So the rule will undoubtedly affect steel manufacturers and the manufacturers of amorphous metal, but how? Overall the demand for silicon steel will go up as a result of the low-voltage dry- type rule. It will go up as a result of the medium-voltage dry-type rule. Indeed, a press release issued when the NOPR came out, AK said, looks like our demand is going up because of this rule. The demand for silicon steel went up as a result of the 2007 rule. So the conventional steel manufacturers have seen significant increase in demand for high value electrical steel as a result of the 2007 rule, and again they will as a result of this NOPR if it's

finalized as a final rule.

What we don't know is, at what point does the demand start to go down, because DOE hasn't done the analysis. We're seeing increased – there will be increased tonnage for more stringent standards. What you don't know is at what point does that increased tonnage turn into decreases in tonnage, because they start to lose market share to amorphous metal. Finding that point is a critical charge for the Department, as it moves to go to a final rule. What's the current tonnage? What changes would you see at different standard levels? And what are the overall domestic jobs at stake? What's the current employment levels in steel manufacturing for electrical steel and what are the potential impacts of standards on – improved standard levels – for manufacturers of core material, whether those jobs are in Pennsylvania or South Carolina. This analysis simply hasn't been done, yet the Department bases its decision, in part, on it. There's no substantial evidence on what the Department has based its decision on when it comes to steel manufacturers thus far.

So our second recommendation is that DOE do that analysis. I'm going to close with a

discussion of product classes. Greg raised this in his comments about NEMA's recommendations for specific treatment for transformers. We all discussed this at some length last fall. In our comments at the PTSD [preliminary technical support document] phase, we suggested that DOE should investigate separate standards for pads versus poles. We still think this is a valid approach, and that DOE should investigate and consider trial standard levels that set different standards for pads versus poles. Indeed, the whole analysis is based on that. The proposed rule then combines the pad and poles into a proposal, which again is not – the LCC results in the document don't even reflect the actual standards proposed because the analysis is based on pads versus poles.

So we think that looking at separate standards for pads versus poles would be a way to go forward that would recognize the differences between pads and poles, and potentially be able to reap some of the significant savings going to higher levels with pads than you do with poles. Now we heard a lot about poles during the transformer negotiations, particularly from the rural utilities, and we heard those concerns and we think that separating these as

separate product classes would make good sense.

There also was a discussion of high BIL ratings during the negotiation. We think that looking at separate standards for high BIL ratings and low BIL ratings make sense. The bottom line is that the bulk of the market is in the low BIL ratings. You don't want the standards to be held back by the high BIL transformers because of the difficulties of making those more efficient than making low BIL transformers reach higher efficiency levels, such as EL-2 or TSL-4.

So our final recommendation is that DOE needs to evaluate some new trial standard levels. We would recommend that DOE first evaluate a trial standard level that reflects EL-2 across the board. We second would recommend that DOE evaluate a trial standard level that evaluates EL-1.5, a level identified by one of the major manufacturers as a likely crossover point. We also would suggest TSL-A1 and B1, that is for each of those then lower the standard by one EL for the poles. So that would be EL-2 across the board, except for EL-1 for pole-mount transformers and EL-1.5 across the board, except for El-.5 for poles.

We think if DOE evaluated those TSLs and

did the additional analysis that we've described, that you then would have before you a set of choices that would enable you to better balance the seven factors. As we stand right now, the entire weighting on, you know, what is the minimum disruption for manufacturers, and for steel manufacturers, and the result is that consumers are left with billions of dollars of net savings that are not being achieved, and considerable benefits for the environment that are being left on the table. Thank you.

MR. BROOKMAN: Thank you. I want to hear from someone else first, and then I'll bring it back to you, Phil. We don't want to do the entire session here based on opening remarks. We want to be rather structured and go through the content that's here in the slides, but these opening remarks I think are important, so we'll keep doing this for a little bit. Is it Mike? Mike.

MR. HYLAND: Mike Hyland, the American Public Power Association. No consumers have spoken yet, in my opinion. We've had environmentalists and manufacturers, and we represent 2000 municipalities that represent about 47 million consumers, and every single dollar increase in cost, guess what, gets

passed directly to those consumers. We aren't for profit, so costs are a big issue for us. We are very happy with the way the rule came out. We can stand by it. But I also worry about the rule of unintended consequences. We sat here two years ago, or I sent comments here two years ago in a different rule and we agreed with what the agency came up with, and then between this point and the final rule in a certain area, we agreed, it increased.

And now we're sitting here in a real mess where the environmentalists are not happy either because this country is poised to actually have a less efficient situation going on as of 2015 if we don't correct it. So when we look at unintended consequences, when you look at this rule, some of the reasons we're concerned, if we did go higher at this point, is the refurbish market which you did not talk about in your comments. The refurbish market is a concern for us. We have some utilities doing that already. It's an unintended consequence. Amorphous cores – many of our members are using it. They're also showing us that they don't last as long. We've heard some arguments there, but we have proof from one of our anecdotals that they don't

last the same amount of time as the steels we're using today. And the other is the allocation of resources in these small communities. Every dollar you spend on an increased transformer budget is a dollar you're not spending in another energy-efficiency manner, whether that is energy auditing, or that is lighting, or whatever it may be, those dollars are precious, and we're getting whatever at this point in increase, and it's going to decrease over here a lot more. So the unintended consequences of going higher, at this point, are actually going to hurt the communities that I represent.

That's all I have. We're really happy with the process, everything went great. Really enjoyed the process since July. Thank you.

MR. BROOKMAN: Other comments here at the outset? Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. Again, we were part of the process. We appreciated being part of the process. Just a couple of general thoughts in opening. I think DOE and the consultants have done quite a bit of analysis, in fact, it seemed like we were getting a new analysis every week somehow from the consultants. It was

very amazing how they were able to put out so much work product.

In terms of impacts on manufacturers, it does show in the NOPR, Table 5.38 on page 7359, what the impacts are on transformer manufacturers, based on the types of – this is for liquid-immersed distribution transformers. The NPVs [net present values] are all negative across all TSLs. They did the analysis. They've already done the analysis in there. I don't know what redoing that analysis is going to do, but they have shown summary results on the manufacturers.

I heard a lot of discussion about the consumers. Well, APPA, NRCEA, and EEI, we're – EEI is the largest consumer of transformers. We buy new products. We operate them, we maintain them, we replace them. We're the consumers. I heard a lot of things about consumer benefits. With all due respect, as the actual consumer at the table, we're happy to speak for ourselves, thank you very much. We have looked at the numbers. We look at them every day. We have our own way of analyzing them, and we think that the – we have some issues with the rule, especially because right now in the NOPR there is no discussion about how vaults and networks are

going to be treated. Hopefully this session today we can discuss that and hopefully there can be some changes before the final rule.

In terms of more analysis, because of the court-ordered settlement, DOE has to get this rule out October 1, 2012. If they do significant more analysis, they might have to do a supplemental NOPR and have more public hearings, and I don't – the way the schedule is right now, which is the parties that sued the Department had agreed to this schedule, and some of them are sitting in this room, the rule has to get out October 1, 2012, period, end of quote. So the idea of certain analysis might be nice, but I don't think the Department has time under the settlement. Thank you very much.

MR. BROOKMAN: Other comments, before we start doubling back? Okay. Jerry first.

MR. CORKRAN: Jerry Corkran, Cooper Power. I want to speak just on the medium-voltage liquid-filled. The DOE says in the proposed ruling that the crossover is EL-1. That's what our computer programs agree with Navigant on. It's an equal playing field at EL-1 between amorphous and silicon core steel, and when you go – whether you go to EL-2 or EL-3 it's totally dominated by amorphous, so it's

like a teeter-totter when you go past El-1, it's not a level playing field any more. I want to emphasize that point.

MR. BROOKMAN: Okay. Thank you. I might suggest pretty quickly we move towards a more systematic discussion of the content that's in the record. We'll take a few more comments. Phil, please.

MR. HOPKINSON: Phil Hopkinson, HVOLT, Inc. My good friend, Andrew deLaski, made some comments and I must certainly put something on the record, and having been an engineering manager for both GE's low-voltage dry-type products as well as Square D's low-voltage dry-type products, and having done a considerable amount of work on market size, what I can tell you is if we take the low-voltage dry product in total, that there are about 600 million sheets of steel that would make up a stack-core product that covers the industry of low-voltage dries in a normal year today. And as having looked at the investment required to do that with mitering, it would be something that takes not just half a million dollars, but millions and millions of dollars to be able to do that, and that has always been the concern of the low-voltage dry industry, of

how much investment can be mustered to support that industry.

The small manufacturers that exist in Virginia, in Pennsylvania, in New Jersey, in California, and a good many other states, absolutely cannot afford that investment, and so the issue is will we put those manufacturers out of business, or will we force them to, in effect, purchase cores and perhaps run out of work for them anyway? So that's low-voltage dries.

The other piece is in medium voltage, and I could summarize everything by saying that as Jerry Corkran had indicated, the cliff between M3 and amorphous is at design efficiency level one. If you go past that, it's a hard move to amorphous and it cuts off M3 core steel and therefore domestic grain-oriented electrical steel and moves it to a Hitachi product that's out of the country, so that it is not a case of well, maybe we can negotiate a little bit. It's a hard move. That's all I have.

MR. BROOKMAN: Thank you. I'd like to proceed then with the presentation slides, get Brian Coffey up here. I presume that most of what's been said here in these opening remarks is embedded in this content, and I'd like to go through and get the

varying and different perspectives based on the presentation material.

Many of you have participated in the negotiation. Some of you have not participated in this kind of a meeting where there's a real structured opportunity following presentations to get a vigorous discussion going. So let's do that now. Brian.

Rulemaking History, Schedule and Scope

Negotiated Rulemaking Process

MR. COFFEY: Brian Coffey with Navigant. I think because of the negotiation process many in the room are more familiar than usual with some of the details of how DOE does its analysis, so I'll try to move quickly through these slides. For the NOPR stage of the rulemaking, DOE revises several analyses first presented during the preliminary analysis phase and they conduct some other specific to the NOPR. For the final rule, DOE performs revisions to the NOPR analyses as needed.

Here's an overview of the current standards for distribution transformers. I mentioned earlier that low-voltage dry-type has standards set by EPACT 2005, and that both liquid-immersed and medium-voltage dry-type were regulated

in the 2007 final rule. Medium-voltage dry-types were unique in that they had standards that varied by BIL rating, and DOE is considering extending this practice to liquid-immersed units as a result of the stakeholders' discussion during the negotiated rulemaking process.

EPACT 2005 had also presented the definition of distribution transformer, which was refined by the 2006 test procedure rulemaking. I'll skip reading it aloud for brevity. You can find the text in your handouts.

Here's the second half of that definition. This is how the terms liquid-immersed, low-voltage dry-type, and medium-voltage dry-type are defined.

MR. BROOKMAN: Pause there for a moment. Any comment on these definitions? Okay.

MR. COFFEY: So here are two requests for comment on the definitions. DOE received comment that rectifier and testing transformers should indicate on their nameplates that they are for such purposes exclusively, and request comments on its proposal to require that.

Currently, underground mining transformers are not subject to standards. DOE received comment that transformers used in certain other underground

activities, but not mining per se, may face constraints similar to those faced by underground mining transformers. DOE has not proposed to expand the definition of underground mining transformer, but requests comment and information useful in precisely expanding the definition to encompass any activity that entails remove of material underground, such as digging or tunneling.

MR. BALLO: Tim Ballo, EarthJustice. A couple things on this issue. In the preamble for the Federal Register NOPR there is a discussion of including a nameplate on rectifier and testing transformers. I think in principle that's a good idea. However, there wasn't, at least I don't believe there was actual proposed regulatory language in the proposed changes to the CFR [Code of Federal Regulations]. I don't know that's critical, but it is usually helpful to see that in case there are issues with that proposed language. The only question I think I have on the nameplate requirement is whether that's sufficient. I think we heard during the negotiations quite a bit from the manufacturers about potential loopholes, some of the transformers that are defined in the regulations

that are exempt from the standards for distribution transformers, particularly other than the rectifier and testing units, the uninterruptable power supply units, and the sealed and non-ventilating transformers. So, I think we had a really productive couple of work groups during the negotiations to arrive at some consensus definitions for networks and vaults and for data center units, and I am happy to continue with those discussions for any of the other transformers that are of concern as a potential loophole for these standards and to jointly recommend with the manufacturers some proposed changes to the regulatorily defined exempt products. So, happy to have those discussions.

MR. BROOKMAN: Thanks, Tim. We can see the two comment boxes. Comments to in response to these: the issue of nameplates and precisely extending the definition to encompass any activity that entails the removal of material underground. Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock,EEI. So does this mean, in Issue 5, that DOE would regulate these nameplates as part of the efficiency standard?

MR. COFFEY: The proposal is to expand the requirement that such transformers that are for these purposes indicate that on their nameplates. So, that would be part of the regulation, yes.

MR. ROSENSTOCK: So DOE would have to enforce that as part of their regulations?

MR. COFFEY: Just as any other regulation, sure.

MR. BROOKMAN: I'm not seeing anybody wanting to comment on those. Nothing to be said. Phil.

MR. HOPKINSON: Phil Hopkinson, HVOLT, Inc. I'm making the presumption that if a transformer is a rectifier transformer and perhaps a three-phase, and perhaps it's a delta primary with a delta and a Y low voltage or some multiple low voltages, that it would be pretty obvious just by the way it's configured that it's for rectifier applications. But are you suggesting that the word rectifier needs to be added to the nameplate as well? It just adds more congestion.

MR. COFFEY: So that's helpful feedback.

If there's not room on the nameplates, you could comment on that.

MR. BROOKMAN: Okay. So with no additional comments, we're going to move on.

MR. COFFEY: DOE published a test procedure for distribution transformers in 2006, which is used to assess compliance today. DOE is considering making updates to that test procedure and has requested comment on a number of test procedure-related issues. Some of the issues that have been raised with respect to test procedure. Currently DOE requires that transformers be tested in the winding configuration that produces the greatest losses, but it has received comment that this may significantly disadvantage certain types of transformers. Allowing compliance in any configuration, however, allows transformers to be operated in a mode less efficient than that in which they comply.

DOE seeks comment on winding configurations as they relate to energy efficiency, data on how often transformers may be operated in each configuration, and on characteristic efficiency differences between the two configurations, two or more configurations.

Also, DOE requests comment on its proposal to require compliance at only KVA ratings that correspond to passive cooling in cases of units with more than one KVA rating.

Okay. We'll move on.

MR. BROOKMAN: Hang on, one moment.

MR. ROSENSTOCK: Steve Rosenstock, EEI. It's actually a bigger, kind of a general question. If you're talking about – you're saying update the test procedures. Is there a separate rulemaking going on for updating these test procedures, because I thought there's supposed to be finalized before a new rule takes effect. Am I – is that –

MR. COFFEY: That's right. DOE hasn't published anything yet, but is considering doing so.

MR. ROSENSTOCK: Steve Rosenstock, EEI. Is it – but at what stage? Is it – would it be at the preliminary analysis stage, the NOPR stage for the test procedure? Or a final rule stage for the test procedure? The reason I'm asking is because of the timing.

MR. COFFEY: Sure. And you're correct to point out that there's a requirement that test procedure must be finalized so many days before the final rule is published. So DOE would have to

observe that requirement.

MR. ROSENSTOCK: Okay. So – again, Steve Rosenstock, EEI. Is there a schedule for this test procedure update?

MR. COFFEY: None that has been publicly announced yet.

MR. ROSENSTOCK: Okay.

MR. BROOKMAN: Jim Raba.

MR. RABA: Right now we're just taking – Jim Raba, DOE – comments from interested parties about the test procedures and could they be amended, could they be upgraded? Should we take a look at them? If it's going to be scheduled, there's time yet to entertain this as a possibility for the future.

MR. BROOKMAN: Phil.

MR. HOPKINSON: Phil Hopkinson, HVOLT, Inc. As I sit here thinking about the implications of the passive cooling, it's close, but I don't think it quite captures everything, because some transformers will have a 55/65 degrees C rise rating, and there's a different KVA that goes with both ratings. So the question I would have is, does it go to the base rating, which I really think is probably the right answer, or does it go truly to

this area that makes it somewhat metaphysical?

MR. BROOKMAN: John.

MR. CASKEY: John Caskey, NEMA. Two points. One is that we really didn't intend to address all of these issues in the meeting today. We really intend, as NEMA, the organization, to basically submit formal comments by the due date I think is April 10th or something on that order. So, as an industry, will get together and try and address all of these things effectively, then get a written response to them by the April due date.

The other point dealing specifically with testing, since NEMA does essentially own the testing standard at this point, we would be happy to work not only as the industry to try and address any concerns that DOE might have and make sure that they are addressed in the next version of that standard, but we'd also be happy to work directly with DOE to make sure that we can – we can get the industry's view on whatever changes that they propose relative to the testing standards, just to make sure they do – they are sort of validated that they will work effectively with the industry.

MR. BROOKMAN: Okay. Thank you. You can see the comment boxes there. Additional comments on

these two issues? Okay,Brian.

MR. COFFEY: With respect to BIL ratings, DOE proposes to maintain the requirement that transformers comply with standards at the BIL rating of the winding configuration that produces the greatest losses. So this is currently what is required today. But DOE requests comment on this proposal. It's worth noting that this is currently only applicable for medium-voltage dry-type units.

Another issue raised during negotiations was that of test procedure loading. DOE requests comment on its proposal to maintain current loading values for all types of distribution transformers within its scope, and any data useful in considering the matter.

MR. BROOKMAN: So let me say that it's also helpful to comment if you think the Department is going in the right direction. Yes, Greg.

MR. COULTER: This is Greg Coulter, Prolec-GE. I guess I'd like to make some general comments on what's been said here. During the negotiated rulemaking there was a lot of discussion about this dual voltage issue, as well as the BIL issue. Andrew mentioned it in his comments, and I think these were important points, as we thought

that for dual voltage units either on the high side or the low side, they ought to line up with IEEE standards. While there's not a big difference in losses, it makes it a real complication in the whole process of manufacturing transformers to have a whole different methodology for DOE than exists for the industry, that these ought to line up.

The same is true – we discussed the BIL, having different levels for different BILs, and maybe even for dual voltage. That doesn't change. That issue is still on the table, especially as the whole issue of what final efficiency is going to come out is still on the table. It's important to keep these issues on the table and we comment to them. It's tough to comment when you don't know what efficiency you're trying to hit and a few other things, but those issues remain, and we think they ought to be segregated in any final rule that comes out. It would require a change in the testing standard. We wonder if that really could happen, but we think that's the appropriate thing to do.

MR. BROOKMAN: Okay. Phil.

MR. HOPKINSON: Oh, I'm – Phil Hopkinson, HVOLT, Inc. I would ditto what Greg just suggested, that – and especially I can think in the dual

voltage area that sometimes we'll have two ratings that require two different BIL ratings, so the transformer fundamentally gets insulated for the highest BIL. But the testing, I certainly would concur that if we can align that with IEEE's requirements, it makes life much better for those who are manufacturing the transformers.

MR. BROOKMAN: Brian, is there anything specific you want to get out of this that you want to ask in addition to the comment boxes?

MR. COFFEY: No, I think just to Steve and John's points, these are in here not because the matter needs to be fully discussed or decided today, but because DOE wants to draw attention to these issues so that people can start thinking about them, and submit detailed comments so that if DOE does decide to take some action on the test procedure, it can be as informed as possible.

MR. BROOKMAN: Additional comment? Yes, Bob?

MR. SAINT: Yes, I'm Bob Saint with National – NRECA. And just an observation. I don't know that much about testing, but just remind folks that the testing procedure has little relationship to the loading – actual loading and operation of the

transformers. And they just define the way that we define the percentage, percentage of loading, of efficiency. And if we go and change the testing procedures, keep in mind that it's still not going to reflect the operation of the transformer. We can't, because all transformers are operated differently. But they will change the way that the numbers come out. So to me it will confuse the issue more than help this situation. But, again, I'm not the expert on testing, but it seems like opening up this part of the process with the short time we have is not a productive use of our time.

MR. BROOKMAN: Okay.

EPCA Factors, Scope, Definitions, Test Procedures, Equipment Classes

MR. COFFEY: So here's the rulemaking diagram again, and we'll start by looking at the market and technology assessment.

Here's a mapping of DOE's scope of coverage into equipment classes. These have not changed since the preliminary analysis, by the way. Each transformer type has classes for single and three-phase units, and then medium-voltage dry-type is further subdivided by BIL rating. So, just a reminder.

Here's a scope issue. DOE received comment that step-up transformers which are currently not subject to standards may be used as step-down transformers in certain cases to circumvent standards. DOE is not currently proposing to set standards for step-up transformers, but does request comment on whether or not they represent a potential loophole.

MR. BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. The second bullet, I'm just – you know, on distribution network, they're using step-down transformers to serve commercial and residential buildings. Can you give me an example of why you would replace a step-down transformer with a step-up transformer? I'm really curious.

MR. COFFEY: I think the question is, if they're not subject to standards and significantly cheaper, will a consumer opt to use a step-up running backwards?

MR. ROSENSTOCK: Oh, I see.

MR. BROOKMAN: Greg, please.

MR. COULTER: This is Greg Coulter, Prolec-GE. We do want to make a comment here, and that is we believe this is an issue, step-up

transformers being used for step-down transformers. It's easy for a customer to say sell me a step-up transformer. For us, it's the same thing. We don't care. We give you voltages, what it will do, it can go up, it can go down. We believe somehow this needs to be recognized and we think it ought to be recognized the same way that it ought to be recognized for rectifier transformers, test transformers, everything else. It ought to be identified on the transformer. If you're going to exclude step-up transformers, it ought to be specified on the transformer, this is for step-up applications only. We think for rectifier transformers they ought to say for that application only. For test transformers, that application only. For mining transformers, that application only. You can find room on a nameplate someplace. I mean, they don't take a lot of space, but they ought to be either specified that way or not and excluded in the standard.

MR. BROOKMAN: Thank you.

MR. HOPKINSON: The only area – this is Phil Hopkinson, HVOLT, Inc. The only area that I think that I would have to take my good friend Greg to task on is not that I would disagree that it's a

good idea to do it, it's just that if I was the customer buying the transformer and I was smart enough to know that it didn't matter, I could buy this so-called step-up transformer and use it in a step-down application anyway. So my good friend, Greg Coulter, just said he thinks it's happened, and that doesn't surprise me. So that I guess I would look at it more matter-of-factly, which is, you're either going to regulate them or you're not going to regulate them, and the one area, of course, that we think of immediately is wind farm transformers.

PARTICIPANT: Those are special. Yup.

MR. BROOKMAN: Thanks Phil. So any other thoughts on this subject? Okay.

MR. COFFEY: So, moving on, during negotiations DOE received comment that certain types of liquid-immersed transformers may be especially disadvantaged in terms of meeting higher standards. Two of those are network transformers and vault-type transformers, and because these are new, we'll read the proposed definitions.

Network transformer is designed for use in a vault for occasional submerged operation in water, and to feed a variable capacity system of interconnected secondaries – secondary windings.

And that it's built per the requirements of IEEE C57.12.40.

Vault-type transformer is similar but not identical. It's designed for use in a vault and for occasional submerged operation in water, and built per the requirements of IEEE Standard C57.12.23 or IEEE C57.12.24.

And so these proposed definitions came directly out of the negotiation process and DOE is now requesting feedback on whether this is appropriate.

MR. BROOKMAN: Did the committee reach agreement on this?

MR. COFFEY: There was a smaller subset of members that got together and talked about what would be a sensible definition, so this is the result of what they came up with. Yes. Yes.

MR. BROOKMAN: Not by the entire committee?

MR. COFFEY: I think most of the committee didn't give input to this.

MR. BROOKMAN: Greg, please.

MR. COULTER: I think I would like to give just a bit more emphasis to this, since I did in my opening comments.

MR. BROOKMAN: Were you a part of that working group?

MR. COULTER: I personally was not, GE was. It was led by Wes Patterson, my colleague sitting here in the audience, I'm glad to see him here today.

MR. BROOKMAN: Let me just – your impression was that the committee, the working group, agreed in principle to what's being described here>

MR. PATTERSON: (off microphone) There was unanimous agreement on the working group, but it was also presented to the formal committee and there was no dissension from the formal committee on either of these definitions.

MR. BROOKMAN: Okay. That's an important point. That wasn't on the record. He said it was formally presented and there was no decision by the larger committee.

MR. PATTERSON: (off microphone) No, I said there was no dissension.

MR. BROOKMAN: No dissension, thank you.

MR. COULTER: No dissension, and that's my point. I believe what Wes is trying in a backwards way to say is there was agreement on this. We

charged that committee to come forth with this. I think even Andrew mentioned in his comments this. There was participants from the advocates as well as the manufacturers and users. We thought this one here was well vetted during the negotiating committee, and general consensus reached. Unfortunately, we did not vote finally in the total committee because we could never reach agreement on other issues to get to this point. But what we would like to do is see that work come forward and be presented again and utilized as the basis for reaching what we thought was basic agreement during the negotiation committee.

MR. BROOKMAN: Okay. So what we're doing here today is present some boundaries in what these meetings are supposed to accomplish and seeking consensus is not one of the things we typically do in these kinds of meetings, although – we don't do it here. So, but what we do want is full and complete comment from anybody that wishes to make full and complete comment. So let's hear it – we've heard from you, Greg, thanks for that. Let's hear from others that have comment on this subject. John.

MR. PHOUMINH: John Phouminh, PEPCO

Holding Inc. I, as the utility company, we certainly are behind this proposal. Basically, in the District of Columbia here, where we – that's our service territory, we use a lot of network transformers, and we are facing with space constraints. Typically the old manhole is four and a half by seven, eight. If we were to follow what the proposal will be, the new transformer would not fit in that manhole, and that requires retrofit of course. The cost of retrofit manhole, pass it on to the rate payer, and the customer will not be happy.

MR. BROOKMAN: Okay. So just to confirm, you see the comment box, DOE requests specific comment on the proposal to establish a separate equipment class, so let's here from others on this point. Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. This was discussed during negotiation meetings and I think this is a very key issue for any utility with urban, especially in urban areas with the networks – with existing networks and vaults. And I think the thought was there should be a carve-out for existing vaults – not new ones, but existing ones, just because, especially because of the size issue. There is just – there's no room. And if the higher

efficiency units need more space, or need more area for cooling, et cetera, and ventilation, it's just not there. It won't operate properly. So again, if there was a way to do it in the final rule to have some sort of carve-out for the efficiency levels required for network and vault transformers, we would be in favor of it. Thank you.

MR. BROOKMAN: Thank you. Final comments on this? We've got a lot to cover here. Keep going. Andrew.

MR. deLASKI: So – we've discussed this and we agree that there should be – this definition makes sense. I don't know where it takes you in terms of efficiency levels. Steve's comment that there's no room, sometimes there's no room. I mean there's often the case that there's no room and we don't know what the incidence of that is. DOE has attempted to characterize this. Table V.18 of the NOPR presents the LCC results for vault transformers, and these LCC results indicate that there's a range of results and if you wanted to minimize the cost for utilities and utilities – those costs then flow through to their customers, would indicate that you would look at TSL – you want to minimize cost, you're going to go to TSL-5. So I

think the question is, you know, what level would you choose once you have a separate standard and the notion that it would stay at zero isn't supported by the record.

MR. BROOKMAN: Where you started was that conceptually you're okay with this proposal.

MR. deLASKI: I'm okay with the definition and I think – I'm not sure if levels will be discussed later. I don't want my support for definition to be – to imply that I support leaving the standard unchanged.

MR. BROOKMAN: I understand. Okay. So I'll take final comments on this and then we're moving on. For those of you that are wondering, probably in the next 15 minutes or so, we're going to take a break, okay, if you're getting antsy.

MR. COFFEY: So also on scope, DOE received comment that a certain type of low-voltage dry-type transformer, those designed for data centers, may be disadvantaged in terms of meeting higher standards. DOE has proposed to establish a separate equipment class for data center transformers and defines them as the following:

It's designed for use in a data center distribution system and has a nameplate identifying

the transformer as being for this use only. Has a maximum peak energization or inrush current less than or equal to four times its rated full-load content multiplied by the square root of two as measured under certain conditions, and is manufactured with at least two of the six additional attributes, which are not on the slide, but I'll read them.

- It's listed by NRTL for K factor rating greater than K4;
- temperature rise less than 130 Celsius with class 220 insulation, or less than 110 Celsius with class 200 insulation.
- A secondary winding arrangement that is not delta or Y,
- copper primary and secondary windings,
- an electrostatic shield or multiple outputs at the same voltage.
- A minimum of 50 degrees apart, which when summed together equal a transformer's KVA capacity.

So the definition is a little bit cumbersome and not wonderfully lent to be fitting on a slide, but I did want to read it since it was new,

and DOE requests comments on the proposal to establish a separate equipment class for data center transformers and on how such transformers might be defined.

MR. BROOKMAN: Phil.

MR. HOPKINSON: Phil Hopkinson, HVOLT, Inc. I applaud the concept of having a data center transformer. The concept of the inrush current held to four times rating is not accurate, and what really needs to be – the first half-cycle is likely to be in the order of 15 times rated current, so that you would not be able to achieve that. But if it's measured at a 1/10th second point, and sometimes these are, then perhaps that can be achieved.

MR. BROOKMAN: Okay. Other comments on the class thing. Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. Actually, kind of a bigger issue. In terms of a separate equipment class, again, maybe I didn't read that section, does that – I'm neutral on it, you know, if there's a need for it, then by all means, but the issue at this stage is, I don't know were there separate efficiency levels in the NOPR for these products? If the answer is no, we have an equipment class that still has to meet the standards

that have been set for all the other low-voltage dry-type transformers. If yes, then people need an opportunity to see what those proposed efficiency levels would be.

MR. COFFEY: So there are none proposed right now. This is sort of a low-voltage dry-type analog of the network and vaults for liquids, where the committee said, hey, these certain types of transformers may be especially disadvantaged, let's get a group together and come up with the definition, and then request comments on the appropriateness of that, and how best to treat transformers. So we're hoping that those that have knowledge and opinions on the subject will be able to submit some comments to help DOE reach a decision.

MR. BROOKMAN: Andrew deLaski.

MR. deLASKI: Just to follow on Steve's comments. I mean it is hard to disentangle this question of these definitions and the levels. We discussed these definitions in the context of the negotiation. I think many of us were thinking that the proposal and the final standards may ultimately be higher than what are already contained in the proposal. And the definition may become unnecessary

if the proposal ends up being as modest as the initial – the final ends up being as modest as the initial proposal. If we go to higher levels, such as we've recommended, then I think some of these definitions become necessary to test for the data centers and the vaults.

MR. BROOKMAN: Okay. Thank you. Yes, John.

MR. CASKEY: John Caskey, NEMA. I think actually we're missing a significant point here, both I think in issue nine as well as in issue ten. You're asking for comment specifically how such transformers might be defined. I think the group working on the network and vault transformers did a good job of defining what they are as well as here, what's for data centers. But the thing that's not asked for, which I think is pretty critical, is how should they be treated relative to the proposed energy efficiency rating. So it's both the definition and the treatment in terms of energy efficiency ratings.

MR. BROOKMAN: Is that covered elsewhere?

MR. COFFEY: No, I think that that information, any opinions, or data on how these transformers may be specifically affected would

absolutely be helpful to DOE.

MR. BROOKMAN: Thank you, John.

Okay. Let's keep going.

MR. COFFEY: DOE also received comment that pole- and pad-mounted transformers, and a couple of folks in the room today have brought this up, may face different incremental cost behavior as efficiencies rise. Although not currently proposing to establish separate equipment classes for pole- and pad-mounted units, DOE does request comment on whether those would be warranted.

MR. BROOKMAN: Yes, please, John.

MR. PHOUMINH: John Phouminh, PEPCO Holding Inc. PHI supports the proposal to separate pole-mount versus pad-mount transformers. We have a situation where pole-mount is too big, especially the bigger size 333, 500 KVA. It's just like a size of a Volkswagen on top of a pole, and that is not pleased with the customers, and we have to go a different route, which is more expensive, and of course, that cost being passed on to the customers. PHI supports the issue number 11. I will write it up to be sent to the DOE.

MR. BROOKMAN: Thank you. Additional comments on pole versus pad. Bruce.

MR. HIRSCH: Bruce Hirsh, Baltimore Gas and Electric. I'd like to reiterate that too, that the conditions under which we've got to mount pole-mount transformers compared to pad-mounts are a lot different, and that affects – the efficiency of the transformer affects the size and the weights, and the size and the weights when you've got to hang it on a wood pole becomes a major problem for the utility industry and major cost to change out. And so I think that falls right in line with some of the other discussions that we've had. Andrew's pointed out a lot of times we don't want to hold up a whole class because of a certain grouping, and I think by separating them out, we could handle each class better that way. So we support it too.

MR. BROOKMAN: Okay. Any additional comments. Andrew.

MR. deLASKI: So we certainly would be interested in seeing, as I said in my opening remarks, trial levels that reflect these classes. Now ultimately whether you – whether the analysis would support setting different standards is, I think, again a separate question. It has to be looked based on analysis, and we can't conclude that until we see the separate analysis. And

fortunately, DOE does have this analysis because they have done pads and poles separately in the analysis, and they set a standard which seems to be somehow an averaging of the two. So the proposed standard, for example, the design line 1, is a 3.3 percent reduction in losses, whereas the EL-1, the level that many stakeholders supported, was an 8.7 percent reduction in losses for that transformer. So I think getting to analysis that specifically addresses – or basing the standard on the analysis which has been done, I think makes totally good sense, and I think LBL and the Navigant team did a good job of coming up with analyses for – taking into account full cost, and that was something that was vetted, I think, pretty thoroughly during the negotiation, and that basing – coming up with appropriate levels for poles and pads would make good sense. And it's also – I think one thing that I've noticed that you know a pole versus a pad, and you're not going to put a pad-mount transformer on a pole, so I don't see a loophole problem here in defining these things and creating those classes should be well within the scope of what can be accomplished in the final rule.

MR. BROOKMAN: Okay. Thank you.

Additional comments on pole versus pad? I think maybe we should take a break at this point. The engineering analysis section has got a lot of content and may take a little bit of time.

Looking ahead for the rest of the day, I figure – it's now almost – we're going to return here at five minutes to 11 to resume. Probably, when we return we'll continue working at least to a late lunch, perhaps 12:30 or 12:45 or so, see how far we can get before we start to crater, and then we'll see how far we get, but there's a lot of content yet to be covered here, so I'm thinking we're probably going to not reach the original end time as stated in the agenda, and no one wants to truncate your opportunity for comment.

So those of you that are not familiar with the Forrestal Building? You need to wear this, it needs to be visible above your waist. There are rest rooms on both ends of the hall. There's a coffee shop down on the ground floor that's G, ground floor, just below us. So go to the elevator banks, go down and get it. Please go quickly, 15 minutes will fly by and they're not very efficient down there at times, and we will resume at 10:55.

And let me – this is a good start on the

day, we're getting some really good comment here. We'll see you back here at 10:55.

(Whereupon, at 10:40 a.m., the meeting was recessed for a 15-minute period.)

MR. BROOKMAN: Okay. Let's resume. Many of you have received a photocopy of the business cards of everybody who's attending here today. That's available, in the event you didn't get hold of one, Brenda Edwards has them, and she's handing them out, so that will be a copy of who all's here.

We left off with the engineering analysis, that's where we're going to resume, and back to Brian Coffey. Let's start folks. Okay, Brian.

Engineering Analysis

MR. COFFEY: Yes, thank you. So this brings us to the engineering analysis wherein DOE analyzes the cost efficiency behavior of different types of transformers. Here are the liquid-immersed equipment classes one and two. I mentioned liquid-immersed BIL ratings earlier and DOE is requesting comment on the possibility of establishing equipment classes by BIL rating for liquid-immersed as it currently does for medium-voltage dry-type units, and if so, on an appropriate methodology for doing so.

MR. BROOKMAN: So you can see the classes listed there. Comments on this method of rating and also the methodology? Phil.

MR. HOPKINSON: Thank you. Phil Hopkinson, HVOLT, Inc. I think that – a couple of thoughts. One of them is that there is less of an impact for BIL in liquid-filled than there is in dry-type only because it takes a lot more separation between the windings to achieve a 125 BIL or 150 KV BIL in dry-types than it does to move up in liquid-filleds from 95 to 125 to 150. So, depending on how far the efficiency gets pushed, it may be an issue. But if it's a minor impact, then maybe not so important.

MR. BROOKMAN: Okay. Comments related to using BIL ratings as the differentiator? No additional comments on this. Okay.

MR. COFFEY: During the negotiation process, stakeholders discussed the appropriateness of certain design option combinations for certain design lines. As a result, DOE removed step-lap mitering as a core construction method for design line six which represents small single-phase low-voltage dry-type units. It also added mitering cost for ordinary full mitering and for step-lap mitering

to better reflect the added cost of manufacturing transformers in this way. Finally, DOE received comment that few, if any, transformers are built in the United States using ZDMH steel, and as a result, DOE removed ZDMH from consideration in the base case.

Here's a table of – the first table of materials prices DOE uses in its analysis. I would point here that the economic results, so life-cycle cost, payback period, national impacts are based on an equal rating of the 2010 and 2011 materials price cases.

So I won't linger here for too long. You all have the prices. Here's the second table. And DOE requests comment on these as they are in continuous fluctuation.

MR. BROOKMAN: Yes, please, Ray.

MR. POLINSKI: Ray Polinski, ATI-Allegheny. I think it's clearly on the record. You know, Brian, there was a lot of discussion about the M3 price for 2011 during our meetings, and it was clearly incorrect or whatever in 2011, so I just want to reiterate that. I think we actually – the transformer producers kind of did a little poll, the prices that they were paying, and the M3 price was

very important price in the analysis. It was understated in 2011.

MR. BROOKMAN: That's in the record. Okay. Thank you. Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock. A couple things. At one point there was data shown, especially for transformers, I don't know about materials, showing just the fluctuations. There was 2006, 2008 and 2010, just kind of showing the wide range of what was happening, especially on the commodities market. And then later on in negotiations, it was just, oh, we're going to – now we want to use 2011 prices for the analysis. I never really got a clear explanation about why DOE had to use 2011 prices and I did look through the slides, it's not showing up, and I asked the question, well, to be analytically consistent, why aren't you using 2011 power prices? I never received an answer for that either. It was like we're going to take A of 2011, and some 2008 data, and we're just going to extrapolate, then use the exact, most recent power prices which based on EIA, especially at the wholesale level which has an impact on transformer cost savings, were significantly lower in 2011 than 2010, the order of

18 percent in the Pacific Northwest, and in other parts of the country, let me see, they show the percentage – EIA shows the percentage here, at least a good 10 or 15 percent. They don't show the exact numbers here, unfortunately. Much, much lower than AEO 2011 would have indicated. So it's kind of a bigger picture, but it seemed like there was a rush to say we have to use 2011 prices, even though you had this range from 2006 to 2010 on the materials side, which affects the transformers, but in terms of on the cost savings side, well, we'll just use the old projections and we're not going to be as critical to use the 2011 power prices. That's analytically inconsistent and I never received an answer for it. I hope to receive an answer for it at some point, but again, just very analytically inconsistent to say we're going to try to use the most recent prices for one part of the analysis, we're not going to worry about it for another part of the analysis. Thank you.

MR. BROOKMAN: Mike Rivest.

MR. RIVEST: Mike Rivest. I'm not going to speak for the Department, but I had a similar thought process going on that you just had. One thing that I thought about, which might make the

inconsistency a little less inconsistent, is that in the case of the AEO, we're talking about an update to a forecast, I believe. Whereas here we're using existing prices as a proxy for a future price. And so this 2011 price is the price of steel in 2011. It's no one's forecast. It's no one's 2011 forecast for 2015 of the price of steel. So that's the difference, and by averaging two years, maybe it's a more robust range of pricing, if you will, of what might happen in 2011. And it is consistent to what was done in the previous rulemaking where it was the averaging of five years.

MR. ROSENSTOCK: Steve Rosenstock, EEI. I appreciate that and have just – it seemed like I thought they were going to use an averaging of five years, 2006, 2008, 2010, and the impression that I got, and if I was wrong, please, please correct me and please forgive me as well, that no, we're going to try to use the 2011 prices as the starting point and then extrapolate, and then use that for the future projections, the future analysis.

MR. RIVEST: I remember hearing that. I didn't say that, though, but I remember hearing that.

MR. ROSENSTOCK: So, again, and my point

is, if you're so intent on using 2011 material prices then extrapolating it, forecasting, why not use the 2011 power prices? That's my – that was my question, just in terms of just an analytical consistency, because there was significant drop in power prices in many parts of the country that AEO 2011 did not pick up, so it just seems rather inconsistent to use one but not the other.

MR. BROOKMAN: Let's see if we have any additional comment. Mike, you have anything additional to say.

MR. RIVEST: Well, maybe the misstatement was the previous statement about consistency being using 2011 prices of steel being consistent with using AEO 2011 forecasts for 2015, maybe that was the inconsistency, and not what we did this time.

MR. BROOKMAN: Katie Coughlin.

MR. RIVEST: And why we didn't use five-year steel prices, I just don't think we had five years of steel prices.

MR. BROOKMAN: Katie Coughlin has joined us here. Go ahead.

MS. COUGHLIN: Yes, this is Katie Coughlin, Lawrence Berkeley Lab. I want to clarify something. The reason why we need – okay, so the

LCC, the purchase price increase is an up-front cost that occurs in the sort of first year of the LCC. And then the payback occurs over the forecast period, so the LCC requires essentially an evaluation of the cost of the unit in one year, and then a forecast of energy prices over up to 30 to 40 years. That's why we need to use AEO forecast data to get the LCC. And as far as updating the base year electricity prices, analytically, it actually doesn't make any difference because everything has to be scaled to the current version of the AEO in order to give us a consistent data set across all of the years of the analysis period, and all of the regions that we're using in the analysis, sort of spatial breakdown. But there's no analytical inconsistency because the purchase price is just a one year increase, it's not projected over time.

MR. BROOKMAN: Steve.

MR. ROSENSTOCK: Steve Rosenstock, EEI. Well, that purchase price, though, that will have an impact on incremental cost which has an impact on the life-cycle cost analysis, so if it changes dramatically as some of these numbers do between 2010 and 2011, that could have a significant impact on the incremental cost which spills over into the

savings and the economic paybacks, as well as the net present values. And in terms of some of the power prices, I understand that you're projecting over 40 years, but depending on where you start, that could have a huge difference. If you're starting at a level that's 20 percent higher at the beginning, that's going to have an impact over the 30 years if you're using the same projection pattern.

MR. BROOKMAN: Okay, Steve.

MR. ROSENSTOCK: Thank you.

MR. BROOKMAN: Thank you. Greg – oh, Bob.

MR. SAINT: Bob Saint, NRECA. So, as a result of all these numbers we're using, we're using steel prices 2011, which are artificially low or historically low because the demand for transformers is down because of the economy. And in the last negotiations in 2007, we were all concerned about the cost of steel is going crazy, availability is still six months, eight months, a year out – that's not the case in 2011. Cost of steel is down, availability is up, so yeah, we're using the 2000 data for steel costs, so we use – on the other hand, we're using artificially high prices for the cost of power, sometimes two, three times more than we're

paying currently for wholesale power. So as a result, the analysis shows the total owning cost because of the cost of materials is low, the cost of power is high, it shows a total owning cost, more than we think it should be. So, these cost analysis, total owning cost, the payback periods – we're not comfortable with the analysis, so we're taking those numbers with a grain of salt, because of the method that were used for the cost of materials, lower than we think they should be, cost of power, higher than we think they should be, so the results are – we're not comfortable with those results.

MR. BROOKMAN: This is the kind of analysis – your analysis, everyone's analysis that the Department would really like in great detail. So I'm hoping everybody understands that at the table. Your opportunity to set the record straight.

MR. SAINT: And we have been working with the consultants, and we will continue to work with the consultants.

MR. BROOKMAN: Okay. Great. Which is not to diminish the opportunity to comment as fully as possible right now. Any additional comments on this subject before we move on? Okay. Okay.

MR. COFFEY: So now just to talk quickly about scaling, DOE set standards for all KVAs by analyzing 14 design lines and then scaling the results from those to all KVA ratings within its scope of coverage. Previously, DOE had scaled losses by KVA using an exponent of .75 which is a theoretically derived result and which it had heard, was generally good. DOE had received a number of comments, however, that depending on transformer type, the true behavior can deviate slightly from .75, and that fixing the scaling exponent may result in a standard that is far more stringent at certain KVA ratings than others. And so for the NOPR, DOE allowed the exponent to float to align with the selected ELs.

So here are the scaling exponents used for the ten equipment classes. They range from, I guess, a low of .67 to a high of .79, so not radically different, but it's a slight adjustment that we wanted to note.

MR. BROOKMAN: Greg.

MR. COULTER: This is Greg Coulter, Prolec-GE. Brian, the scaling exponent, we understand why you're using it. It's a crude methodology to come across for great variations in

KVA. Experience in transformer design says it only works well across short distances of KVA because you get into many other design concerns. For instance, high KVA, three-phase pad have to meet a 5.75 percent impedance. You don't get a smooth scaling like this across the higher KVAs. You may not get a smooth scaling across even single-phase poles or single-phase pads. This works across a small range of KVAs, across small range, those differences don't mean much either. So, we think it's important to look across the bigger, broader KVA. You might be able to use the high KVA three-phase, you might be able to find a scaling factor that works across all the high KVAs, and another one that works across the low KVAs. We're concerned that you even use a technical way to come up with this versus a curved fit after the fact to meet your numbers. It wasn't clear to me from your explanation. This may not be the best way. That said, our company generally uses stuff between .75 and .8, so I can't argue too much with the numbers, we just think it doesn't work across big KVAs swings.

MR. BROOKMAN: Okay. Thank you. Additional comments on these scaling exponents? Yes, Phil.

MR. HOPKINSON: Phil Hopkinson, HVOLT. I'm not saying it's wrong, but I am very curious that the dry-types seem to be the ones that have particularly low factors – so the .67, I really don't know what drives that. Having been a veteran of the use of the three-quarter power and even for dry-types, so I don't know. It may be correct, I just haven't looked carefully enough at it.

MR. COFFEY: I think that comes mostly from the fact that the committee – so in medium-voltage dry, the committee reached a consensus, and the consensus that it reached had a lower EL for the lower KVA models than for the higher ones, and so the scaling behavior that reflects that decision is going to be a little bit lower than .75.

MR. BROOKMAN: Thanks, Brian.

MR. COFFEY: And so here are the formal request for comment for what we just talked about, and also for the fact that in addition to scaling within an equipment class, DOE is faced with determining how single and three-phase transformers – single and three-phase equipment class of the same transformer type rather, should be related. And so the request for comment is on how best to scale across phase counts for each transformer type and

how standards for either single or three-phase transformers may be derived from the other type. And the second comment box is on the previous slide, on the scaling exponents.

MR. BROOKMAN: Perhaps we've covered 14. What about 13? Phil.

MR. HOPKINSON: Phil Hopkinson, HVOLT. I think really the only way that you'll truly know what the answer is, is to request a whole lot more data and then curve-fit it, and then you'll know, but I think that you don't have really time to do it, so at this point we really cannot truly refine anything, I think, logically.

MR. BROOKMAN: Greg.

MR. COULTER: Greg Coulter, Prolec-GE. I'm not positive there's any reason to scale single-phase to three-phase. Scale them separately. There is no good single- to three-phase scale. Just don't bother with it.

MR. BROOKMAN: 'Cause there's so much variation?

MR. COULTER: Exactly.

MR. BROOKMAN: Additional comments on how you would handle single, two-, three-phase? Okay.

MR. COFFEY: So there's some additional

engineering design constraints that manufacturers face. I'll read these comment boxes.

DOE request comment on the current and future availabilities of high grade steels, particularly amorphous and mechanically scribed steels in the United States.

Issue 20, DOE requests comment on its steel supply availability analysis presented in Appendix 3A of the technical support document.

MR. BROOKMAN: Ray.

MR. POLINSKI: Ray Polinski, ATI-Allegheny. Once again, Brian, I think it was agreed by the entire committee that mechanically scribed material was of very limited availability. Capacity to produce, import producers, and nothing's available in the United States, so that product, I think, was not going to be considered in the analysis from my recollection.

MR. BROOKMAN: Thank you. Please say your name.

MR. RYAN: Paul Ryan, Hitachi Metglas. We, Metglas, made it a letter on record to DOE regarding issue 18. So I just want to reconfirm that that's on the record. It wasn't included in the packet, but there is a letter to DOE.

MR. BROOKMAN: Do you want to summarize that now or –

MR RYAN: Well, essentially it says that there is enough capacity to support the marketplace and depending on where the final rule ends, we would accommodate the marketplace in capacity. Those comments were made during the proceedings as well.

MR. BROOKMAN: Ami Grace-Tardy.

MS. GRACE-TARDY: Yes, we do have that letter.

MR. RYAN: Okay. Thank you.

MS. GRACE-TARDY: It will be included in the docket.

MR. RYAN: Thank you.

MR. BROOKMAN: Thank you, Ami. Any additional comment on these issues related to the availability and also price, right –

MR. COFFEY: Availability.

MR. BROOKMAN: Please, Andrew.

MR. deLASKI: I'm having a little trouble with disaggregating the conversation with respect to low-voltage dries and liquid-immersed. So these questions are with respect to both equipment super classes?

MR. COFFEY: Yes, they're general I think.

The high grade steels have been more of a concern in the liquid-immersed phase than the low-voltage dry.

MR. deLASKI: I just think that one of the things that we have to keep in mind in considering the difference of the two is that the low-voltage dries, as the Department's analysis shows, 75 percent of the volume is manufactured in Mexico. And some of the constraints on core materials are not the same for those transformers are they are for parts that are primarily manufactured in the United States, so let's be careful that we consider those low-voltage dry market and liquid-immersed markets should be considered separately.

MR. BROOKMAN: Okay. Other comments on these two issue boxes? They're referring to Appendix 3A if you want to take a peek there. Okay.

MR. COFFEY: And here's one last constraint, and this may have been partially if not wholly addressed by the discussion on network and vault transformers and on separating pads and poles earlier, but as a catch-all, DOE requests comment on particular applications in which transformer size and weight are likely to be a constraint, and any data that may be used to characterize the problem.

MR. BROOKMAN: We've had a little bit of

comment on this already this morning. Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. Just as a reiteration that member companies of all trade associations and the Association [...] have submitted data to DOE on this issue and providing real world examples of the actual impacts and costs, and hopefully that information that we submitted will be used in your – in the final rulemaking. Thank you.

MR. BROOKMAN: Thank you. Other comments? No additional comments. Okay.

MR. COFFEY: This brings us to markups and energy use and now I'll invite up Chris Bolduc – or Katie Coughlin, actually, I'm sorry.

Markups, Loading, Distribution Channels

MS. COUGHLIN: I'm Katie Coughlin, Lawrence Berkeley Lab. It's good to see you all again. So I'm going to review very briefly the markets and energy use, life-cycle cost, and shipments and NIA, and we'll be recapping only those subjects where the Department has already received comments which were extensively discussed during the stakeholder – the negotiation, but you're of course free to comment on any aspect of the analysis, but I

will be highlighting a few issues.

So to begin with, the markups and loading - for the loading analysis, the issue here is always getting more data, so we have two separate load models, one for the liquid-immersed and one for the dry-type. The liquid-immersed we were trying to do two things. We were trying to capture the correlation between variable hourly prices and variable loads on the transformer, and that was done with a two-stage model. We used Form 714 data to capture the shape of the price-load curve. Price as a function of system load, and then we used a statistical model based on hourly meter data to try to represent the statistical relationship between the transformer hourly load and the system hourly load.

We did receive some data from the stakeholders. Overall our findings of the data was consistent with what we have, the biggest drawback is that the transformer data that we received is almost exclusively for low capacity, so units with KVA of 50 or below. So it would be somewhat difficult to verify or to extrapolate that to higher capacities. For dry-type transformers we used CBECS building data to estimate load-factors shapes month

by month for the transformer population, and again, we used hourly metered building data to develop a model that relates the monthly load factor to the parameters that determine transformer loading.

So DOE seeks comment on any additional sources of distribution transformer load data that could be used to validate the energy use and load characterization analysis. And as I mentioned, we are particularly in need of data for higher capacity and three-phase units.

MR. BROOKMAN: Additional data sources. Phil.

MR. HOPKINSON: Katie, very interesting. One source of data that frankly I have, when I was working for Square D, we looked at all of the low-voltage dry-type transformers in the DOE building right here, the Forrestal building, and that data is public record. Be glad to send it to you if you don't have that, but that was the basis of coming up with, for example, with the 35 percent equivalent load for low-voltage dries.

MR. BROOKMAN: Okay. Thank you. So this is always a quest, trying to find this data. Any additional sources?

MS. COUGHLIN: So the next issue is the

markups. So these are the markups that occur after the unit leaves the manufacturer in the distribution channel. So we have again, since we have two broadly different types of products, we have two different distribution channels. For the liquid-immersed transformers, the Department is currently using a model in which it's assumed that the majority of transformers are purchased directly from the manufacturer, so that there is no distributor markup. And to estimate the number of purchasers who purchase directly, we used data from EIA and essentially we have a cutoff on the size of the utility. For smaller utilities the assumption is that there may be a distributor and therefore there will be a distributor markup. So the – under the current parameters, about 80 percent of liquid-immersed transformers are purchased directly from the manufacturer with no distributor markup. For dry-type transformers, they are primarily purchased and installed by electrical contractors, and so there are a variety of markups that are applied in that distribution channel.

So the table shows the two sets of markups, what are the two types of products. In the dry-type the values in parentheses correspond to the

low voltage and the other values correspond to the medium voltage. Overall the markups on liquid-immersed is about 1.54 if it's purchased directly from a manufacturer, and 1.61 if it's purchased through a distributor. The markups on dry-types are 1.96 for medium voltage, and 1.79 for low voltage.

So DOE –

MR. BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. I know in other rulemakings you kind of carved out for a commercial product where there's a multi-site or what we call a national account customer and some of them are also not using distributors as well. And there could be a percentage of the units, just like other products, I'd say lighting products or heating or cooling products, where they're also kind of going directly to the manufacturer because they have a multisite account with the manufacturer.

MS. COUGHLIN: This is for building operators.

MR. ROSENSTOCK: Yeah.

MS. COUGHLIN: Yes. Okay.

MR. ROSENSTOCK: It has been used in other rulemakings as I recall. Off the top of my head, I can't remember exactly which one, but there might be

similar percentages for those type of customers and that might have an impact on some of these as well. Again, I can't remember the exact specific commercial rulemaking, it might have been like – actually it might have been lighting actually, that there was research done by DOE in terms of how many of them were again direct manufacturer sales to them.

MS. COUGHLIN: Okay.

MR. BROOKMAN: So these kind or markups can be difficult to disclose at times, but comment from anyone surrounding what you see here? Yes, please, Bruce.

MR. HIRSCH: Yes, Bruce Hirsch, Baltimore Gas and Electric. As an investor-owned utility who buys a fair amount of transformers a year, I guess I would like to point out that even though we may deal very closely with manufacturers, a lot of time the manufacture have a local rep that takes care of all the issues and problems. So when you say that most are bought directly from the manufacturers, I'm not sure that's completely true. I don't know what the numbers are right now but I'll go back and look at a typical utility, like Baltimore Gas and Electric and see what I can provide to you.

MR. BROOKMAN: There's something of an intermediary there.

MR. HIRSCH: Right.

MR. BROOKMAN: Okay. Yes, Phil.

MR. HOPKINSON: Phil Hopkinson, HVOLT. The only question that I have, Katie, is as opposed to the cost of purchasing the transformer, you actually have the cost of installation, and it would imply that you're going to take a transformer out and replace it with another transformer in order to make this comparison, and I wasn't aware that you were actually going to do that kind of work.

MS. COUGHLIN: I'm not sure I understand the question.

MR. BROOKMAN: I didn't either, Phil.

MR. HOPKINSON: Okay. Well, let me try that again. So that if we look at a transformer that's already providing service to a location, and we then consider what it might take to get a new transformer that would be more energy efficient and put it in the same spot, then it would seem to be important to have all of the in and out costs it would take to get the new one functionally doing the work of the old one. But if we're only looking at the two representative new transformers, sold to an

end location, then the installation cost wouldn't seem to be important, only the purchase cost. So I was scratching my head as to why you show the cost of installation in this markup. Or am I incorrect? Because you have the installation labor.

MR. ROSENSTOCK: Steve Rosenstock, EEI. Even in this situation there's still going to be some sort of extra cost for the actual installation and labor, isn't there?

MR. HOPKINSON: Well, there is, but I'm making the presumption that we are not removing a transformer and replacing it with another, but simply we have a new service, and we have a choice of two transformers to go into the service, one of them being more energy efficient than the other. So it wouldn't matter what the installation cost in that particular case was.

MS. COUGHLIN: You're right. In the LCC what is compared is the base case which includes installation, and the standards case which includes installation. So we are netting out the base case installation cost.

MR. HOPKINSON: I see.

MS. COUGHLIN: So this is just a record of the way the costs have been tabulated.

MR. HOPKINSON: Okay. Thank you.

MR. ROSENSTOCK: Steve Rosenstock, EEI. In the analysis, they're assuming that certain percentage is replacement, in their analysis

MR. HOPKINSON: But you still, even if it was replacement, then it wouldn't – you would still have the in and out cost, whether it was more efficient or not.

MR. BROOKMAN: Mike Rivest.

MR. RIVEST: Mike Rivest. In some situations, if it's a heavier transformer, I assume that the installation cost actually goes up.

MS. COUGHLIN: Yes, so –

MR. HOPKINSON: I see.

MR. RIVEST: So it doesn't always net out.

MR. HOPKINSON: So then you consider it. I understand.

MR. BROOKMAN: Okay. Yes, we're moving on.

MS. COUGHLIN: Pole replacement. So again, we had a good deal of discussion of this in the negotiations. This issue is specific to design line two which is the only representative unit that is installed on poles, and the issue arises because

more efficient transformers can be significantly heavier than the base case unit, and that may necessitate early replacement of the pole. So the current model assumes that the pole will be replaced when either the transformer is 150 pounds or 15 percent heavier than the unit that would be chosen in the base case. And we currently cap the pole replacement at 25 percent of the population in the LCC.

Replacement costs were developed with reference to RS Means construction data that includes costs of removing pole, and labor, and the amount of labor will depend on the size of the transformer, whether you need one-, two-, three-man crews, et cetera. So we have a broad range of costs, bounded by about $2-6,000. And we also use a – since the poles typically have a lifetime of on the order of 30 to 40 years, we actually have what is essentially an early replacement cost associated with the poles. So we don't – we assume that the pole has already been in the field for some number of years before it's replaced.

So with this methodology, DOE continues to seek comment on any data or advice that could improve the implementation of this methodology.

MR. BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. I like the methodology, but I remember especially from PEPCO saying it wasn't necessarily the weight increase, it was just the fact if you went, I think the number was over 900 pounds, that even if there wasn't a replacement, there was a whole host of things that they had to do extra because of that weight issue.

MR. PHOUMINH: John Phouminh, PEPCO Holding, Inc. In certain service territory of our area which is on ACE [Atlantic City Electric], we have a union contract. If the pole weight is more than 900 pounds – I'm sorry, if the transformer weight is more than 900 pounds, we're required to have at least two-men crew, which is total, four people, as well as the arrow board, the traffic signal. It's not as exactly putting your pole. It's more involved to it. Of course the pole has to be big, and it's not only one pole, it will be two poles stands next to each other and put a ... the rail the size of this table next to it, and that final KVA transformer pole, pole-type transformer is weight about 3,000 pounds, probably give or take. That will be three of them, that's 10,000 pounds.

That's a lot of weight.

From PHI perspective, we would like to keep it the way it is, especially the larger size of the pole-type transformers, because anything big – it won't be big up there and it will be a sore to the eye and the public will be up in arms against it. Of course, you know, and this is one of the things that we'd like to separate between the pole-type and the pad-mount, we'd like to – we want to propose to DOE to consider that approach.

MR. BROOKMAN: Okay. Steve Rosenstock.

MR. ROSENSTOCK: And again, another issue that Bruce brought up to me was the fact that, especially in urban areas, it's not necessarily – the pole might not be replaced, but then there's the actual – the collocation of other utility equipment on that pole, whether it's cable or telephone or internet or whatever, that you have to move those services as well. There could be extra cost for that that may or may not be represented in the analysis. So again, I don't know, Bruce, if you have some thoughts about that, but again, it's not a replacement issue, it's simply a pole issue that can have an impact, especially if you're changing the size of the transformer.

MR. BROOKMAN: Bruce.

MR. HIRSCH: Just to follow up with Steve's. It's not just the weight, but the size also becomes a problem. If we've got to fit it in, especially in a replacement case, to an existing system like Steve said, there's other utilities there, but also we have clearance issues that arise, and that's a safety problem, and that's all covered by the National Electric Safety Code. So all of these things lead to issues and problems that we have in the utility trying to utilize overhead transformers that are heavier and larger. So those are issues, and we've talked about them before, so I suspect you've factored some of this in.

MR. BROOKMAN: Other comments on the methodology described here?

MR. ROSENSTOCK: I guess my only other comment – sorry, Mr. Brookman – the only other comment is you kind of have it capped at $6,000 in terms of your distribution, I don't know if that's too low or not. It might be too low, especially for some of the situations you just heard about. Again, I don't have the actual data, but there might be – especially in urban areas, that $6,000 could be significantly low, especially for the larger

transformers.

MR. BROOKMAN: So to receive those comments from you in writing, the Department would really appreciate that.

MS. COUGHLIN: Let me just comment that that is for design line two, which is I believe 50 KVA, and then we scale those costs upward for larger capacity units.

Life Cycle Costs and Payback Period Analysis

Okay, so moving on to life-cycle cost. The Department issue that remains open on this is the number of purchasers of transformers – this is really for liquid-immersed transformers, whether they are evaluators as they have come to be called. So the model of the LCC assumes that some fraction of purchasers evaluate the losses of the transformer and express to the manufacturer a preference for more efficiency. So the no-load losses are valued by a parameter that's called A, and load losses are valued by a parameter referred to as B. And the Department has survey data for A and B values and – so in the model, if a purchaser is an evaluator and A and B values are selected, and then there's the possibility that the purchaser will choose in the base case a high-efficiency unit. And if that's the

case, then, this purchaser is essentially unaffected by the standard. So these rates of evaluation will affect the net benefit associated with the trial standard level and the effects are carried through into downstream analyses.

So we initially started, and I believe the 2005 rule used relatively high rates of evaluation, but based on comment from the negotiation process, we've changed these evaluation rates so that they're in the table below. So for liquid-immersed, the default is the ten percent of purchasers are evaluating, and for the dry type, based on comment, we lowered the number of evaluators. It's not zero, but it's pretty close to zero.

So DOE is soliciting any further comment on these evaluation rates.

MR. BROOKMAN: Phil.

MR. HOPKINSON: Phil Hopkinson, HVOLT. I'm not certain that I understand what you said there, Katie, and so on the default for liquid-immersed, you show ten percent – does that mean ten percent of the purchasers go to those who take the default efficiency, and –

MS. COUGHLIN: No, the default refers to the default scenario that's in the tables.

MR. HOPKINSON: I see.

MS. COUGHLIN: At TSD, and then you have an appendix of sensitivity cases, and there are sensitivities for no evaluators and 100 percent evaluators.

MR. HOPKINSON: Okay. I understand.

MR. BROOKMAN: Chuck. Please use the microphone.

MR. FOSTER: Chuck Foster, EEI. Katie, I'm going to follow up on Phil's question. I just want to make sure I understand this. Is that – looking at design lines one through five, the assumption built into the – into your analysis then is that ten percent of the purchasers actually do an analysis are evaluators.

MS. COUGHLIN: That's right.

MR. FOSTER: I think that's too low. I think that – I think that that's too low, but we'll submit a comment on it.

MR. BROOKMAN: Andrew deLaski.

MR. deLASKI: And one thing that came out in the negotiation is that just because you evaluate, you can evaluate and still buy the minimum transformer on the market.

MS. COUGHLIN: That is correct. Yes, or

you can evaluate and still be below the TSL.

MR. deLASKI: Right.

MS. COUGHLIN: So this may have not a large impact, especially for the higher proposed trial standard levels, the evaluation rate becomes less and less relevant.

MR. deLASKI: Right. Think of utilities that are using [...] equivalents to make their decision, you see them defaulting to whatever is the minimum cost transformer on the market.

MS. COUGHLIN: Correct.

MR. BROOKMAN: Bruce.

MR. HIRSCH: Bruce Hirsh, Baltimore Gas and Electric. I've done some surveys of utilities, so I've got some numbers I can pass on. I think I may have passed them on already to you, but I'll get them back to you. The one point I would make with this, though, was that I think what you're finding is that prior to 1910 more people evaluated than they are now because their evaluations may have come in under the DOE required numbers, so if that's happening, then what happens is they're not necessarily evaluating. Some utilities are still evaluating, but actually buying the DOE numbers because they are higher than some of the evaluations

that are coming out, so it's a moving number is what I can say. But I'll get you some numbers that I have.

MR. BROOKMAN: Okay. Bob.

MR. SAINT: Bob Saint- I was going to say almost the same thing that you were saying Bruce, in that with these higher efficient transformers that we're required to purchase now, I think fewer people, especially the small utilities are evaluating. But that's really a misnomer, because we will encourage everybody to evaluate transformers because the standard is based on 50 percent loading, the testing and loading, and if you use a different A and B factor, you can get a different transformer that is more efficient for the way you load the transformer, and it still may meet the 50 percent loading percentage, but it has a different A and B, no load or load loss. So really encourage folks to evaluate transformers to get the most efficient, most cost-effective transformer that they could. So, ten percent - it's hard to tell how many are evaluating. We do know that we think more folks should be evaluating. But it's really not an easy process, especially for a small company that doesn't have the resources to do the analysis.

MR. BROOKMAN: Okay. Final comments.

Shipments, National impact analysis, Refurbishments

MS. COUGHLIN: So for the shipments and national impacts analysis, the issue here is the refurbishments. So first of all, let me make a couple clarifying comments. We distinguish in our language between refurbishments, which is sort of general maintenance that may extend the life of the unit, and a rewind which is where you actually, instead of replacing a unit that's out of service, you take it apart and rebuild it using the old core. And both types of extended – lifetime extending repairs can be modeled in the national impacts analysis. So we don't have a problem with implementing that type of model, but at the moment we don't have any data that gives us the criteria that we need to put into the model.

So DOE is seeking comment on what are the economic criteria that a utility purchaser would use in deciding to rewind a transformer rather than purchase a new unit, and the second issue is, what are the – what is the expected lifetime of a rewound unit if it might differ from the lifetime of a new unit? And would there be other types of changes to maintenance practices that could extend transformer

lifetimes beyond the lifetime that is currently typical?

MR. BROOKMAN: Yes, Please.

MR. BERMAN: Robert Berman, Berman Economics. Katie has DOE done any analysis as to what – how many transformers, what percentage of transformers in different categories are rewound now or how transformer rewinds have changed, say between 2007 and 2010? Do you have any data?

MS. COUGHLIN: We have no data.

MR. BERMAN: You have no data at all?

MS. COUGHLIN: No.

MR. BERMAN: Thank you.

MR. BROOKMAN: Phil.

MR. HOPKINSON: Phil Hopkinson, HVOLT. What I would say about the rewinds and life is it depends on the rewinder. If we have an equivalent manufacturer to the original manufacturer, who is a high quality transformer producer, I would expect a life comparable to a brand new transformer. On the other hand, if we have one made by a Joe down the street, then I would always be suspect as to what Joe used.

MR. BROOKMAN: And would you comment on maintenance practices?

MR. HOPKINSON: Maintenance practices, my impression is certainly most small transformers don't get any maintenance other than when the transformer is cleaned up. So let's say we took a transformer in to rewind it, I think in every case, the casing is cleaned up and repainted, and some of those repaint jobs are very nicely done and some of them are very poorly done, and of course if they rust out, then end of life comes before the winding gets done.

MR. BROOKMAN: Okay. Mike.

MR. HYLAND: On the maintenance one, I was just saying to Bob, I think it's more about protection practices than maintenance practices will affect the life of transformers, such as lightning arrestors and CLFs, things like that. I did hand some information over to you guys, I think I may have sent some in to Chris on the – what's the criteria for a utility decision to rewind. We have municipals that now are rewinding 100 percent. That criteria is past. And they have a great guy down in Tennessee, North Carolina area that does rewinding and –

MR. HOPKINSON: Is his name Joe?

MR. HYLAND: But it does tie into to

Phil's comments that we have other parts of the country that they are afraid to have it rewound by the gentleman who's near them, but it goes back to my original comments in the beginning, you know, a utility, at least municipal, in this economy right now, every dollar means something, and $50,000 means they get rid of an employee. That's the facts. That's what they're going to do. And they're looking at eking out without passing on any costs, so rewinding has become for them, a market, and every time you add to that market and costs, that market's going to increase and we have an engineering ops meeting where they're starting to share these success stories of refurbishing. It's not something we want to encourage. We would rather them go back to A and B analysis, follow the DOE standards, we're even big proponents of amorphous core, but that's the utility decision. And the most you push upward on cost, that's what it's going to come down to for our members.

MR. BROOKMAN: Would you reiterate that - for high quality rewind, the lifespan is about the same?

MR. HYLAND: Well, you can't tell until you - I mean it's only become a market in the last

few years for some of our members, and if the typical transformer is lasting them in their analysis, 35 years, well, we'll know in about 25 years, won't we.

(LAUGHTER)

MR. BROOKMAN: Bruce.

MR. HIRSCH: A comment on the rewind market, at least from my company's point of view is that the more valuable, the more expensive, the larger the transformer is, the more inclined we are to rewind it if we have problems with the windings. And to answer your last question, you know, we feel that a rewound transformer by a reputable company is like buying a new one. So we do that. We don't rewind a lot of distribution transformers, but the maintenance refurbishment standpoint, Katie, our philosophy at BG&E is if the transformer is less than ten years old, comes back in out of the field, we'll go over it. If we can refurbish it and maybe paint it up a little bit, maybe replace a bushing or something, if we had to do that, if we could do that for 20 percent of the cost of a new one, we will do that. We will refurbish the transformer and reuse it. So as the transformer prices from an efficiency standpoint, go up, that range where we would be able

to afford to refurbish goes up also. So, you know, I would expect, with no change in philosophy, that we will refurbish some more transformers, maybe not a great number more, but we will refurbish more transformers.

MR. BROOKMAN: Bob.

MR. SAINT: Yeah, there's very little real evidence on this. We've discussed this quite a lot. However, there's quite a lot of anecdotal evidence and we've discussed this a lot too. And just a couple of comments on those anecdotal things. Today our members, the electric co-ops in the U.S., mostly use RUS [Rural Utilities Service] loan funds to purchase transformers and other equipment. And right now, RUS will not loan money on refurbished transformers. However, we have been getting a lot of pressure from our membership to persuade RUS to change that policy. So if we are successful in persuading RUS to change that policy and, like Mike, personally I'm not as keen on using refurbished transformers as some of our members are, but if they do change their policy, then I think you'll see a lot more people using refurbished transformers for their original purposes.

My second point is that we already – we're

talking about two things here, we're talking about rewinding the transformer, a company taking down a transformer that has failed, or for some reason sends it to a shop to rewind that transformer, and give it back to them. And that's what Bruce was talking about. The other option is for a utility to go out and buy a new transformer to them that has been discarded by someone else and rewound by the transformer manufacturer, and that's the real questionable one in my mind, whether Joe down the street has done it or a reputable manufacturer does it. Even the reputable manufacturer, we really don't know, we really don't have a great track record on how good those transformers are and have they been tested and, you know, we don't know the efficiency. We can't, before they're rewound know the efficiency until after they're rewound and measured.

MR. BROOKMAN: They're not required to test or anything?

MR. SAINT: No, not at this point, and there's no requirements, DOE requirements or anything, that they be at a certain efficiency because they are remanufactured transformers.

MR. BROOKMAN: Andrew deLaski.

MR. deLASKI: A couple points. Bob, you said that – you started mixing up refurbished and rewound in your comments. I thought Katie drew a distinction between what we meant by refurbished and rewound.

MS. COUGHLIN: Yes.

MR. deLASKI: And what I heard you say, is that RUS, you're dealing with RUS, and you're thinking – you're getting pressured to ask for approval to get loans to purchase refurbished transformers, not rewound. Or maybe you meant rewound.

MR. SAINT: Well, new transformers, I guess not newly manufactured transformers, but okay, refurbished –

MR. deLASKI: I'm just trying to draw a distinction between refurbished and rewound in your comments.

MR. BROOKMAN: Refurbished is not as extensive as rewound?

MR. SAINT: Correct.

MR. deLASKI: That's what Katie said.

MR. BROOKMAN: In most cases?

MS. COUGHLIN: Yeah, at least conceptually, if we are going to model this. A

refurbishment would be some kind of repair or perhaps related to protection that would simply extend the life of a given transformer without changing its engineering characteristics. Whereas a rewind is you actually take the unit, take it apart, keep the core, and rebuild everything else.

MR. deLASKI: Right, so the point I want to make is I think that DOE needs to consider whether a rewound transformer is a covered product, and the reason why is that you've added the value of the product is, if you're a manufacturer – who's doing the rewinding, right? It's not the utility company that's doing the rewinding, although perhaps. It's more likely a manufacturer, someone that's going to remanufacturer, so they're entering the market as a transformer manufacturer and instead of buying steel from AK, Allegheny, or – they're buying cores, and then they're going to wind them. Sounds like transformer manufacturing to me, and I think DOE ought to really consider a guidance that would say those are covered products and subject to the standards. So this is something that needs to be considered.

MR. HOPKINSON: Phil Hopkinson, HVOLT. Now some people have said that I disagree with

Andrew, and actually in this case, I 100 percent agree with Andrew, so let me say that I really think that if we want to improve the efficiency of transformer energy efficiency across the board, then we really need to look at the refurbish rebuild market as well.

MR. BROOKMAN: Robert.

MR. BERMAN: Robert Berman, Berman Economics. It seems to me that when you're talking about rewinding a transformer, scrapping everything, say, except the core, that all you're doing is talking about sourcing the core as a used core as opposed to a newly built core, and if a transformer with a sourced core is considered under the standards, then a transformer with a sourced core regardless of that source, whether it be a new core or a core from scrap, the transformer is being rebuilt. So I think the model – I think I agree with Andrew that the rebuilt transformer, the rewound transformer needs to be brought under the standards.

MR. BROOKMAN: Greg, did you have a comment here?

MR. COULTER: Yes. This is Greg Coulter, Prolec-GE. I want to echo Andrew and Phil. But I

want to make a little clarification here. One of the problems with these rebuilt refurbished transformers is one is – I don't want to pick on utilities, but sometimes utility does it himself, and he ought to be free to do what he wants with his own transformer. However, a high percentage of these are sent out to somebody else, ownership may or may not change, and they do rewind transformers. May or may not use the same core. That's why I get concerned about reuse of the same core. It may not even be the same core in that transformer. They mix and match all the parts and make something work. We find another unfortunate part of this quite often our nameplate goes right back on that transformer. It doesn't even get nameplated differently, or there may be a sticker on there that says refurbished. This is a tough area, but it's an area that's a loophole in this thing, by the comments you heard today, is growing, that's a real concern to us, especially as a new transformer manufacturer.

MR. BROOKMAN: I'm going to entertain comments straight down the line here, starting with Ray first. Go ahead.

MR. POLINSKI: Ray Polinski, ATI-Allegheny. And again, this refurbishment thing, not

being a transformer engineer or a utility, but it was the – I think everyone got their arms around it, including the advocates. This refurbish thing is a bad thing because really, the transformers that are failing are some that are 50 and 60 years old, and they're some of your most inefficient ones on the grid. I mean so it's kind of like an exponential problem where now you're taking the most inefficient ones and you're putting them back in service as opposed to – and so again, one thing that the group talked about, the DOE's in the business of incenting more efficiencies and they don't want to do the opposite here, but a program that was discussed that I think everyone got their hands around is another option, another thing for the DOE to consider would be almost like automobiles, a cash for clunkers program where you incent utilities to take out the oldest 60 year old transformers that are maybe 95 percent efficient and replace it with a 99 percent efficient transformer. Think about the energy savings – and you could start doing that – there's sufficient capacity in the grain-oriented supply chain and in the core steel supply chain and in the transformer industry to do that almost immediately. So I just wanted to comment on that.

MR. BROOKMAN: I think I saw Bob, Mike and John, and then I'll go over here to Richard.

MR. SAINT: This is Bob Saint from NRECA, and just a small comment, you know, I can't disagree with the discussion that's been going on here, but I heard from DOE that they thought it was clear to them that these types of transformers were not and could not be included in the rulemaking.

MS. COUGHLIN: Yeah, let me –

MR. SAINT: And so as far as DOE's concerned, this may be a moot point in deciding whether or not to include them.

MR. BROOKMAN: Let's hear from Katie. Go ahead.

MS. COUGHLIN: I just wanted to clarify. If the ownership of the unit is retained by the original purchaser, it's definitely not covered. I think if you were to develop a new industry where you were recycling transformer cores, I think that would be more open.

MR. BROOKMAN: I think actually we're getting ground on this subject here, but let's try and keep these comments brief.

MR. HYLAND: My comment was very similar to Bob's. I was looking for Dan Cohen. He's the

one who came to our meeting and made it quite clear that DOE has no authority in this area.

MR. BROOKMAN: John, final comment before I go over here? Is your mic on? Thank you.

MR. PHOUMINH: John Phouminh, PEPCO Holding Inc. I want to make comment that utility like us we would not refurbish the transformers because we don't have the expertise in that field and the manpower to do that. We might as well buy new transformers.

MR. BROOKMAN: Richard.

MR. PARKER: Yes, Richard Parker. First, my apologies for arriving late. I spent 30 minutes on the Red Line waiting for a train to come. The Washington denizens know that experience. Anyway it's just been a pleasure listening to this discussion. Just quickly on this one point, since Dan isn't here, we did have a very significant discussion about this during the rulemaking process, and what I took away from it was something in between Andrew and Mike, that there are significant issues about where the title passes, and there are opportunities for utilities to sort of game the system by structuring the transaction in a certain way. As a lawyer, I know that the Department also

has the means to put substance over form instead of form over substance and perhaps recharacterize some of these transactions if they turn out to be an evasive tactic.

So as I recall where we left it was that this would be an issue that the Department would look at, not one that was resolved one way or the other, but an important one for people to discuss.

MR. BROOKMAN: Thanks for that clarification. Steve, thanks for being patient.

(Fire alarm required exiting building.)

(Whereupon, the meeting in the above captioned matter was adjourned for lunch recess.)

AFTERNOON SESSION

1:45 p.m.

MR. BROOKMAN: Okay, so good afternoon, welcome back. It's now 1:45 here in the Forrestal Building. It's still February 23rd. We had a fire drill. We had to empty the building out. I'm pleased to see a lot of folks made it back. There's some others that will still be joining us, but in the meantime, we're going to proceed with the content, provide an opportunity for each person in here to talk about the things that matter to them.

So, we're going to hear next from Christopher.

Trial Standard Levels and Proposed Standards

MR. BOLDUC: Hi, Chris Bolduc, LBL. Just to pick up where we left off from lunch. After revising the preliminary analysis we have several downstream analyses, subgroup analyses, manufacturer impact analysis, utility impact analysis, employment and environmental assessment and the regulatory impact analysis. For the purpose of today's presentation, the Department doesn't have any comments, we're not seeking comments on any of these, but you're free to comment if you wish after, in the unstructured time.

I'll move into the trial standard levels and the selection of these trial standard levels for the liquid-immersed transformers. TSL-1, which is the proposed standard – do you have a question, Andrew, sorry.

MR. deLASKI: On the previous slide.

MR. BOLDUC: Yes.

MR. BROOKMAN: Andrew deLaski.

MR. deLASKI: I just want to reiterate something I said this morning, which is that it strikes me that one of the key issues that has not been analyzed is the impact on employment in steel

manufacturing. There's a lot of emphasis put in the NOPR on impact on steel manufacturers, yet we don't have an analysis on the impact on steel manufacturers, and particular on the employment at various TSLs. So I just want to emphasize again that that's an important issue that needs to be addressed. This is an unusual rulemaking – I was just talking to Ray, you know, you have a supplier who represents a very large portion of the value of the product, and it's very unusual to have a supplier that plays such a big role in the rulemaking, and I think in this case it could merit a much more significant impact – an analysis of impact on the steel manufacturers, including employment.

MR. BROOKMAN: Okay. Steve Rosenstock. We're going to keep moving here rapidly, though. Steve.

MR. ROSENSTOCK: Steve Rosenstock, EEI. The last slide before we had to break was about refurbishment issue, and again, I just wanted to say that again, I just want to follow Mike in terms of, yes, there's the scoping issue. DOE has never set an efficiency standard for any other commercial or residential or industrial appliance or product that

is, quote, "being refurbished or repaired or any sort of revamping." Once – again, it's a matter of, this is only on new manufactured and newly imported products, so there are people who keep repairing our products, whatever they are, could be they're probably some 50-year old refrigerators out there, because people keep on repairing them. That's their right. They have a right to do it. We've never set a standard for anyone who's doing that sort of repair type of situation. So, for doing it for this would set a new precedent, and DOE does not have the legal authority to do such a thing. You'd have to change EPCA to do something like that. Thank you.

MR. BROOKMAN: Thanks, Steve. Okay. Now we're going to proceed.

MR. BOLDUC: So for liquid-immersed transformers, there were seven TSLs were composed. The first TSL represents a standard or a level where a diversity of core materials are cost competitive and economically feasible for all design lines, and this is the proposed standard. TSL-2 is EL-1 for all design lines. TSL-3 is a maximum efficiency achievable with M3 steel, core steel. TSL-4 is the maximum NPV with seven percent discounted. TSL-5 is EL-3 across all design lines. Now with all due

respect to Andrew deLaski at ASAP, this is what we interpreted as your position at the end of negotiations, or the position that you represented as opposed to EL-2 across all efficiency levels. So there's a misrepresentation here. It is what I'm stating.

MR. deLASKI: What I said this morning is that the ESL that was closest to our position is TSL-4. TSL-4 is close to being EL-2 across the board, though not exactly.

MR. BOLDUC: Right.

MR. BROOKMAN: Okay. Go ahead.

MR. deLASKI: The Department gave notice that our position was EL-3 across the board –

MR. BOLDUC: That's right.

MR. deLASKI: -- and that was not correct.

MR. BOLDUC: That's right. TSL-5 was intended to be your position.

MR. deLASKI: Oh, was intended to be EL-3 across the board?

MR. BOLDUC: That's right.

MR. deLASKI: I see, that was the intent. Okay. I've got a few follow-up questions, but --

MR. BOLDUC: Yes, please.

MR. BROOKMAN: Steve.

MR. ROSENSTOCK: Steve Rosenstock, EEI. As I recall, I thought you, Andrew, that you're starting with a mix of four and three, EL-4 and EL-3, and during the negotiations, especially during the initial parts, it was –

MR. deLASKI: Let me just remove any ambiguity. We support EL-2 across the board. That's where we are right now. Where we were at one point or another, water over the dam. We don't need to go back and talk about it.

MR. ROSENSTOCK: Okay. No problem. Understood. Steve Rosenstock, EEI. Again, there are a lot of ELs put out here, and for people who were part of the negotiations, there were ELs, and CSLs, and now we're into TSLs because of the NOPR, because that's what you're supposed to do, so again, I think for everybody, especially for people on the webinar is that, you know, try to – when we're talking just that people should be respectful that not everybody has memorized every single EL and CSL, especially since they might have changed. And that these TSLs are, I'm hoping to say, are kind of aligned with some of the ELs and CSLs we saw during the negotiation, but this is kind of a final version of the analysis. Would that be a fair assessment?

MR. BOLDUC: Yes.

MR. ROSENSTOCK: Thank you.

MR. BROOKMAN: Yes, Ray.

MR. POLINSKI: Ray Polinski, ATI-Allegheny. And Andrew, just to be clear, you said two across the board. I thought 2.1, 2.2 or something was where you guys were at, as opposed to two across the board.

MR. deLASKI: No, I said two across the board, and then I suggested this morning – Okay, good time for me to reiterate this point – so I've got a couple questions about the TSLs and then I'll reiterate the TSLs we think the Department should have. We think the Department should analyze four additional TSLs, and one of those would be TSL-2 across the board, which is the position that we said we were willing to accept during the negotiation process, and which I reiterated again today that we would support today – excuse me, EL-2. Terminology is tricky.

MR. BROOKMAN: Thanks for the clarification. Keep going.

MR. deLASKI: So having a TSL that consisted of El-2 across the board is something that we recommend should be included in a final analysis.

We also think that having a TSL that is at EL-1.5 across the board would be valuable for decision-making. That is a position that some stakeholders indicated during the negotiation process that they thought the crossover point was likely at EL-1.5, so therefore I think – let me just finish – 1.5 would be valuable to have an EL at that level – TSL at that level as well.

And then I said I also think that having pads versus poles distinguished would be valuable, so that having sub-one for each of these, that we would have a TSL that consisted of two across the board, except for a step down one level for poles. And then the same thing, EL-1.5 across the board, except step down one level for the poles, recognizing the concerns we've heard about poles. I'm suggesting, recommending to the Department that those be considered as additional TSLs in a final analysis.

MR. BROOKMAN: Ray.

MR. POLINSKI: Ray Polinski, ATI-Allegheny. And just to – semantics, whatever, but my recollection, and the record will speak for itself, when some of these people threw out those levels above that, they were like the outer –

doable, possibly, feasible, but not practical.

MR. deLASKI: Yeah, I think we're zeroing in on this question of the crossover point. We all agreed, I've agreed, that we want to be in a market where we have robust competition amongst the suppliers of core material. And you're agreeing and everyone – I think we all agree with this, and what we have disagreement on is where is that point. And that's what we haven't been able to nail down. And I know there's been different analyses that have shown that point in different places and different people have different views on where that point is. I think we still need a more thorough analysis, independent, by the Department, that helps us nail down where is this crossover point so that consumers benefit – ultimately all consumers benefit from having robust competition among the suppliers.

MR. POLINSKI: Ray Polinski, ATI-Allegheny. And again, we'll move forward – and you're saying one of your other action points, you want the crossover points to be reanalyzed. My point is that they shouldn't even do your other studies of the 1.5s or the twos, because the crossover points right now are where the – pretty much where the rule ended up. I mean, so there's no

sense in doing another study unless – you're saying it's time for more analysis, but my recollection was when we had our last conference call, you guys said – you the advocates, I won't say Andrew – the advocates kind of said, hey, this is done. We're done with analysis, you know, in the middle of December, we even talked about should we extend this a little bit, we're done with analysis, we're – it's time to move on. So I guess you're changing that position.

MR. deLASKI: No, that was for the negotiation. We're out of the negotiation, this is now rulemaking and DOE has to do new analysis. They ought to. This is a NOPR. You put out a NOPR for comment and the Department has to respond to comment. They have a legal obligation to respond to comment.

MR. BROOKMAN: I wanted to reinforce that point. We're not in a negotiation here. We want to get the best comment we can. John, you're next.

MR. deLASKI: So I really want to be clear, Ray. I don't mean to be shifting on you, this is a different stage of the process.

MR. CASKEY: John Caskey, NEMA. Just to be sure we're still talking apples and apples, when

you say across the board, are you meaning liquid-immersed, or are you saying everything –

MR. deLASKI: No, liquid-immersed. We're talking liquid-immersed.

MR. CASKEY: -- from one to 13? Okay. Just wanted to make sure.

MR. deLASKI: Thank you, John.

MR. BROOKMAN: Thanks for clarifying. Keep going.

MR. deLASKI: So I have a couple clarifying – I'll be happy to answer questions on my proposal, but that's – so there's a few things about the TSLs that continue to puzzle me, and I'll start with TSL-5. The Department contends that TSL-5 is EL-3 across all design lines, but when I looked at the actual efficiency levels, it's not. In fact, it's a mix of ELs, based on the actual efficiency levels. So I don't think we want to walk through it here right now, but it's not EL-3 across the board.

MR. BROOKMAN: Is it significantly different?

MR. deLASKI: One of the design lines is at EL-2. I'm also puzzled by TSL-3 as being the maximum achievable efficiency – maximum efficiency achievable with M3 steel. The Department presented

an analysis at the November meeting over the negotiating committee – this is the one dated November 2nd – where they showed some very famous tables that got us all very excited. People who were there will remember, that showed where M3 was viable as a design option, and these were tables on the PowerPoint what was vetted at that meeting, pages 13, 14, and 15. And in that table it showed that the design lines were achievable up through significantly higher efficiency levels than are contained in TSL-3.

So my understanding is that engineering analysis hasn't changed between now and then –

MR. BOLDUC: I can't see the presentation you have in front of you, and I don't have perfect memory –

MR. deLASKI: So I'm going to ask you to go back and take a look at that.

MR. BOLDUC: Sure. I'm just – since you have that in front of you, was that for all design lines?

MR. deLASKI: Design lines one, two – yeah, what it showed was that you could use M3 up through EL-3 for design line 1. It said you could use it up through EL-1 for design line two. So this

is correct for design line two. It showed you could use it up through EL-3 for design line three. It showed you could use it up to EL-2 for design line four –

MR. BROOKMAN: Andrew, maybe you could write down the title of PowerPoint presentation, or someone who's got it – maybe you've got it, Steve, and hand it off so –

MR. BOLDUC: Please.

MR. ROSENSTOCK: And Andrew -- Steve Rosenstock, EEI – you're talking about the November 3rd handout, Distribution transformers energy conservation program –

MR. deLASKI: This is simpler, which is that TSL-2 is EL-1 except – I'm sorry, TSL-3 is mostly EL-1. So this is saying that you can't go above EL-1 with an M3 transformer. And that is not consistent with –

MR. BROOKMAN: I want to keep this moving ahead. Steve.

MR. ROSENSTOCK: Steve Rosenstock, EEI. And I believe, Andrew, you're referring to these tables right here, right? Is this the table. Again, this was a table called Core Material selection, and it was basically, again, part of the

life-cycle cost analysis and basically it also showed that for those higher levels that they were – there might have been some, or at least one particular model using M3. That could have been just one dot in that efficiency level, and it showed zero percent, and it showed 100 percent being shown as something else because the price discrepancy was so large that they chose the lowest cost issue. So yes, I agree there might be some designs that were at those levels, but those might have been the pure outliers or, you know, I saw the scatter-plots, eight million scatter-plots. They were kind of blinking in my eyes later on that day. That's not necessarily – it might have been just one unit by one manufacturer, and so – and it was so expensive that for the life-cycle cost analysis they didn't use it because there was a much lower cost transformer to use to reduce those incremental costs.

MR. deLASKI: That's not what the slide says.

MR. BOLDUC: Yeah, I hear you.

MR. BROOKMAN: So let's – yeah, Phil first.

MR. HOPKINSON: Phil Hopkinson, HVOLT. I

did a lot of studies of data, trying to compare transformer selling price against efficiency for M3 material. And in fact, it is theoretically possible to build transformers all the way up to what would be considered EL-4 with M3 steel. Now the problem was that we got into extremely low flux densities and extremely high copper weights, and the selling price literally tripled. So that doesn't say that just because you can build it, in theory, that it's something that you would want to do. And when you then look to see what the alternative – so if you allowed amorphous back into the picture, then you'd see that amorphous could get there easily and the selling price wouldn't go up anywhere near that much. So that whether you can theoretically build it or not has nothing to do where the breakover point is, and that breakover point is hard after EL-1.

MR. BROOKMAN: Jerry, you going to follow on? Yes, Jerry.

MR. CORKRAN: I was going to say somewhat the same thing as Phil said, also repeat what I said this morning when Andrew was proposing higher than EL-1. EL-1 is a level playing field between amorphous and silicon core steel. It's where

they're both competitive, neither one has a tremendous advantage. When you go above EL-1, the scale tips and amorphous has a tremendous advantage. So to make the family of designs that the customers want, the many different dual voltages and different things, it needs to be no higher than EL-1.

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

MR. BOLDUC: I think Andrew still has a critical set of issues.

MR. deLASKI: So then the other set of issues – the other point I want to make is again, we're not making decisions here, we're just saying what the – I'm just commenting on the TSLs, right, and I think if you're going to describe something as being the maximum achievable with M3, then that's what it ought to be.

Now my other concern is that you said that the TSL-1 is the proposed level, yet, and I mentioned this earlier today, is that when I compare TSL-1 to the NOPR levels, they're actually different. And I understand there's been some sort of scaling or smoothing of the curve, so to speak, but the level –

MR. BOLDUC: The efficiency percentages

are slightly different than those analyzed, yes.

MR. deLASKI: Slightly different, it's point – it's point four, so it's 40 percent of EL-1 for design line one, which is a 50 KVA transformer, which is a bread-and-butter product. So, it's more than slightly different. The loss reduction for EL-1 is 3.3 percent for design line one, whereas EL-1 was 8.7 percent reduction in losses. So I think it's an awkward spot for the Department to be in, to be proposing standards that are different than those analyzed. And I know you've got to smooth – you've got to stiff this curve, but it's an awkward spot. You know, we've got folks saying they can live with EL-1, but yet the level being proposed is not even half way there. And we're talking about, as people have pointed out, being very efficient, we're trying to reduce losses – we're trying to reduce those losses and those five percent matters.

MR. BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. Since this issue came up, I did notice – Andrew was talking about design line one. For design line two, the value is increased over the TSL-1 value. It was 98.91 in the table, the TSL table, but in the proposed standard it's 98.95, so in that case it

went up rather than down. Also for design line three, where the TSL-1 value is 99.48, the table value is 99.49, so it cuts both ways. I don't know what impact that has in terms of the national energy savings, but especially since design line two is the single-phase pole mount, that can be significant for a lot of situations. So it went both ways, and again, there is an issue that we don't see the 98.95, for example, in any of the tables, so again, we're not sure of the economics. I didn't see it in the NOPR, same with 99.11, same with 99.49, so I mean there's that in terms of analytical issue, but again, at the end it cut both ways. I'm not sure how it impacts all of our members. I made sure that they knew about it, but it was both ways.

MR. deLASKI: So to me it points to the need for additional analysis again. We don't have an analysis of the standards proposed. And we need that analysis, and we need the analysis of these additional TSLs to be able to make a final decision that is based on a robust, complete record.

MR. ROSENSTOCK: Steve Rosenstock, EEI. Or just put the efficiency value the same as the TSL values.

MR. deLASKI: Well, you can't do that

because poles and pads aren't separate classes.

PARTICIPANT: It's tricky.

MR. BROOKMAN: Thanks for those comments. What we're going to do is move on to the next set.

MR. BOLDUC: So the next set of slides, or next set of TSLs are for low-voltage dry-type. Again, there are six TSLs. TSL-1 is maximum efficiency achievable with M6 steel. TSL-2 is the NEMA premium levels. TSL-3, the maximum efficiency using butt-lap core mitering for single-phase and full mitering for three-phase designs. TSL-4 is max NPV with seven percent discounting. TSL-5 is maximum source energy savings with seven percent discounting, the positive NPV, excuse me. And TSL-6 is max-tech.

Now, the Department has selected – is proposing TSL-1 as the standard.

MR. BROOKMAN: Andrew.

MR. deLASKI: So as I said this morning in the opening remarks, the level that we've been supporting, and continue to support is EL-4 across the board, which happens, in this case that we actually do have a TSL which represents that, which is TSL-3. So we don't see a need for additional TSLs here. We appreciate the Department has

evaluated NEMA premium levels. My understanding is that the levels shown are not precisely the NEMA premium levels, that's my understanding, so we need to take a look at that.

And then the second point I want to make is to reiterate the point I made this morning which is that during the negotiation, it was said on the record by multiple parties, including manufacturers, that they can butt-lap up through what's now TSL-3, and the Department needs to do a more full – if butt-lapping is going to be a decision criteria, then the Department needs to do a more full analysis of how far can you go with butt-lapping manufacturing techniques. It may not be the cheapest technique, but if you still can – I think what may have happened is they had been removed because it was perhaps cheaper for some manufacturers to do mitering, but perhaps not for the small guy to miter. So it may be that some manufacturers choose to butt-lap up through TSL-3 because they don't want to make that investment or they can't, and that may take having some additional engineering options to your software, and doing an additional set of runs for optimization around those additional designs. But I think you've got to fill-

in those curves.

MR. BOLDUC: Right.

MR. BROOKMAN: Phil.

MR. HOPKINSON: Phil Hopkinson, HVOLT. What I would say is there's two issues from that. One is can you even build a transformer and with butt-lapping, I think that you probably can build something pretty close to efficiency level three, but you can't be competitive, and that's the second part of it, so that if you, in fact, impose a requirement that goes so far, it still puts the small guy out of business because while he could theoretically build a transformer that's butt-lapped, he can't actually sell that at a price where he can recover his material costs, so that he is still put out of business.

MR. BROOKMAN: Thank you. Other comments on these LVDTs and these trial standard levels?

MR. deLASKI: To follow up on Phil's point, and that's a point for analysis. That's something that we want to see analyzed as opposed to simply a conclusionary remark by the Department based on no analysis is where we are today. We've got Phil's expert opinion, based on a lot of experience, what we don't have is the Department

analysis that tells us, what is the cost penalty? Is it five percent or is it 50 percent? And can these guys compete? And we need the answer to that question.

MR. HOPKINSON: I think that data could be acquired.

MR. BROOKMAN: Thanks, Phil.

MR. BOLDUC: So for medium-voltage dry-type transformers, we have five TSLs. TSL-1 is EL-1 for all design lines. TSL-2 represents a TSL where a diversity of core materials are cost competitive and economically feasible. This was the level arrived at through the negotiation process. TSL-3, is maximum NPV with seven percent discounting. TSL-4 is maximum source energy savings with positive NPV. And TSL-5 is max-tech. Steve.

MR. ROSENSTOCK: Steve Rosenstock, EEI. I believe you received the comments from Commonwealth Edison. They're one of our member companies that they purchase significant number of these because they're the ones actually installing and maintaining them in their urban area at the commercial and industrial facilities, so I think we all agreed to it, but just take their comments into account. This is another space/size constraint issue, because

these are inside large commercial buildings sometimes. So just consider their comments, that would be very helpful, thank you.

MR. BROOKMAN: Additional comments on this? Okay.

MR. BOLDUC: So the next three slides show the efficiency levels for the different KVA ratings. For liquid-immersed, low-voltage, and medium-voltage dry-type transformers. You have the numbers in front of you. There's not much I have to say on these.

MR. BROOKMAN: I guess we have three tables here and anybody that wishes to do so can comment on any of these. Yes, Andrew.

MR. deLASKI: It would have been nice in the NOPR to have had a mapping of EL/TSLs.

MR. BOLDUC: Yes, there is one in the TSD.

MR. deLASKI: Can someone give us the page reference?

MR. BOLDUC: In the TSD, I can't give it to you right now, it's in Chapter 10. It would be in the NIA chapter.

MR. deLASKI: Okay. Thanks a lot.

MR. BOLDUC: Yep So in summary, the proposed rule, we have energy savings of 1.58 quads

over 30 years. An estimated – and this could eliminate the need for 2.4 gigawatts generating capacity, the need to build new capacity, new generation. We have a cost savings, a cumulative net present value ranging from 2.9 billion to 12.1 billion at three and seven discount rates – at 7-3 percent discount rates. And the cumulative environmental benefits of 112 metric megatons of CO2, NOX emissions reductions of 99.7 kilotons, and mercury emissions reductions of 0.8 tons.

MR. BROOKMAN: Phil.

MR. HOPKINSON: Chris, a good set of numbers. My point – my question is, the 1.58 quads, is that the incremental savings from this new NOPR or –

MR. BOLDUC: Cumulative.

MR. HOPKINSON: -- or is that including the 2010 rule.

MR. BOLDUC: Oh, no, that would be simply this rule. Not including the 2010 rule.

MR. BROOKMAN: Steve.

MR. ROSENSTOCK: Steve Rosenstock, EEI. I'm looking in the – oh, that's annualized benefit. Okay, I was looking in the NOPR and the NOPR has quite a range of total net benefits, so it seems –

okay, 2.9 to – okay – that's over the 30 – that cost savings, that's 30 years at seven and three percent. I see. Quick one for you. In terms of the environmental benefits, EPA just came out with their mercury rule, and the emissions for power plants, mercury emissions are mandated to go down 75 percent within three years, and then they're going to be pretty much capped, are you going to treat mercury like you treat other emissions that are capped upstream, in terms of benefits?

MR. BOLDUC: I'll have to look at the EPA rule.

MR. ROSENSTOCK: Yeah, it goes into effect three years before this takes effect, so that will change some of these projected estimates.

MR. BOLDUC: Likely.

MR. ROSENSTOCK: Thank you.

MR. BROOKMAN: Andrew.

MR. deLASKI: I want to – just the point I made this morning, which is that we think the estimates for the low voltage dry types are mischaracterized because the curves are mischaracterized, and this number actually reflect consumers selecting transformers more efficient than the minimum standard, which is not what we're seeing

in the market, and not what manufacturers have said they would expect. So I think the savings are being over-estimated for low-voltage dries because the curve isn't filled in, and we're selecting transformers – so it shows very little difference – not very little difference because it shows .2 quads different between level one and level three, which we think is inaccurate and not based on substantial evidence.

I also would note that the low-voltage dries, even with that inaccuracy are driving the lion's share of the savings in this docket. Just .36 of the savings total is being driven by the liquid-immersed market.

MR. BOLDUC: That's correct.

MR. BROOKMAN: Other comments looking down this summary slide?

MR. BOLDUC: So, on this slide we have the annualized benefits for the proposed rule. The primary estimate is the default scenario for all the models, and the low net benefit is run with a high equipment price and a low economic growth scenario. And likewise, the high net benefit estimate is high economic growth, low equipment price. So we have a primary estimate bracketed by the low and high, and

we have ranges for the CO2 evaluations.

MR. BROOKMAN: Steve.

MR. ROSENSTOCK: Steve Rosenstock, EEI. I know you don't have any control over it, but for the record, you're monetizing all, you know, the environmental values, but you're discounting them at different rates, so analytically I think that's extremely inconsistent, extremely inconsistent. I know that you're required to do that by the interagency memo, but when you're discounting some things at seven percent, and you're discounting other things at two and a half percent, you're getting a distorted number at the end, in my view.

MR. BOLDUC: Right. That's why we're presenting a range.

MR. ROSENSTOCK: Right, but again, there's still an issue in that when you're talking about some of these net cumulative savings, and then some of the annualized savings, it's still analytically – there's still issues, because when you're saying you're monetizing everything and you're not discounting at the same rate over the same lifetime, and it's over the same analytical period, it's distorting the result in my view. Because you're saying that something – we're going to say, well the

cost, well, you know, some things, like the cost transfer we'll discount at seven percent, but the savings we'll only discount at two and a half percent because that way that'll make the benefits look a lot better. I just think it's inconsistent. I know you're required to do that. I'm just saying this for the record that in terms of doing an analysis, when you're discounting different parts of the analysis at different rates, it's distorting the analysis.

MR. BROOKMAN: Okay. Other comments on this benefits and costs slide.

MR. BOLDUC: Thank you all very much, that concludes the main presentation for this afternoon.

MR. BROOKMAN: There is quite a lot of supplemental information, additional slides, oh, I don't know, 30 pages or so, -- oh, they're not in the package.

As we said at the outset, now is another opportunity for anybody that wishes to do so to make additional points, emphasize things that haven't been emphasized today adequately, and perhaps briefly. So who would like to go first? Please.

Discussion of Proposed Standards

MR. PETERSEN: Eric Petersen, AK Steel.

First off, just want to congratulate the entire group that was here. I know it was quite an arduous process, but as we began the outset of this path that we have been down, we commented that the value of what we were bringing to the table was the ability to be able to bring industry experts all to the table to be able to bring a correct perspective of the issues that each group represented. It's been a theme that we've talked about consistently and I'm glad to hear that we continue to say it here at the end, and we've actually divined TSLs to directly reflect it, that the intent was to identify a standard level that would provide a diversity of core materials that were cost competitive and economically feasible.

And as Mr. deLaski stated, the magic question is, what is that point level. That really has been what has been driving us. I would remind the organization that the benefit of the negotiated rulemaking was that we had the experts, the transformer manufacturers, here, which really are the only ones that can best help us understand where that crossover point is.

The recommendation that the transformer manufacturers brought to the table, defined an

efficiency level at which they see that crossover point occurring. That is the point that the DOE correctly reflected when they chose the TSL to be set as a proposed standard. Now there's been reference to three companies who are at the table in regards to a higher potential efficiency level that was mentioned. I don't recall or interpret their conversation the same way that Mr. deLaski has stated here today, that they stated – the point was there. I think it's important to define that there is the capability, technically, to be able to make a transformer at a certain level, however, that does not insure that the transformer will achieve the goal of cost-competitive and economically feasible.

We've had one of those three organizations, the one that made an opening statement today, specifically point out that since they were referenced as one of the three, that they emphasize that they were party to and supported the NEMA presentation.

So I guess I would again thank the DOE for the work that you've done. It's been exhaustive, and thank the committee in regards to defining the criteria. We've all agreed to that, which is the diversity of core materials which is cost

competitive and economically feasible, and point to the industry experts the value of what we brought within the negotiated rulemaking session, the transformer manufacturers as being really the key group that can define where that crux is, and they've done that for this efficiency level.

MR. BROOKMAN: Okay. Thank you. Yes, John.

MR. CASKEY: John Caskey, NEMA. A couple different thoughts. One is certainly I, personally, and I think NEMA, really appreciates the opportunity to participate in the negotiated rulemaking process. I think that was very educational. I mean I learned more about the transformer industry – even though I represent some of those manufacturers – and I personally learned more about the transformer industry that I didn't know before, and I learned about the steel industry, and I learned about some of the perspectives of some of the advocates and other groups that were in the room. So I think, to me, it was a very constructive thing, and I think that was very valuable.

I think the other aspect that was very valuable was the idea that the various consultants to DOE heard first hand how the data was being used

and how the manufacturers, the steel producers, or other people interpreted the data, and where there were weaknesses and where there were flat out, what I would call, mistakes, and that they were able to correct some of those deficiencies in the course of doing the analysis. So I think that, in itself, helps give DOE a better chance of providing some rulemaking that is fairly rigorous in all the analysis that has been done.

Speaking on behalf of NEMA, we came to the table dealing with a negotiated rulemaking session – sessions, and really had three things in mind. One is that we supported higher efficiency standards as long as they could be proven that they were cost effective; two is that we really were concerned about the transformer industry in the U.S. as well as steel industry in the U.S. and we wanted to find some solutions where there was a balance, and we've talked about it a lot today, where there was a balance where the transformer manufacturers would have the flexibility to use different types of core steels, different types of designs, and different manufacturing techniques to be able to meet the efficiency standards. And the third thing was really dealing with the small manufacturers,

particularly those dealing with the low voltage dry-type transformers, and certainly we represent them as well as the big guys, and certainly don't want to get into a position where we're actually knocking them out of business and losing jobs for the U.S.

So, from those three sort of core principles that we started with, and looking at all of the Navigant and LBL research, I feel that the – NEMA feels that the current NOPR really represents a good fit between all of those characteristics. So we certainly support the proposed rulemaking as it now stands with those proposed energy efficiency levels, and thank you for the opportunity to participate with all this.

MR. BROOKMAN: Thank you. Yes, Richard.

MR. PARKER: Yes, Richard Parker. I just wanted to say this is probably my last hurrah for this process, but I wanted to say what a pleasure it's been working with everybody here at the table. It was a difficult process. It was sort of a perfect storm of challenges, I think that this group faced, very, very complex issues, multiple stakeholders with very different perspectives, and combined with that some possibly radical tipping points which created a lot of anxiety as you

approached them, and then on top of it all, of course, a very compressed time schedule which made it difficult to get the analysis right and then to refine the analysis in time to be ready for the next meeting and so forth.

I thought the analysts did a fantastic job, dealing with the hand they were dealt, but it was very hard to do things in that time frame. And one lesson, I guess, the main lesson that I took away from this process is that might have been less work and less time for everybody had we been able to space the work out that we were doing over a longer time period, do more of it off-line, and less in plenary and get the analysis right before we come together and negotiate.

But we are where we and I think the process did produce a lot of very useful information as well as a consensus on some small areas, and I think that's in no small measure thanks to the great work of people around this table and in the audience. So I just want to wish everybody the best as you go forward and I have no position on how the rule should come out, but I hope that we can get - you can get - the analysis and the rule to an outcome that is respected as legitimate and

hopefully supported. But thanks again for the chance to work with you.

MR. BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. Again, I just want to thank DOE for having the negotiation sessions and for Mr. Parker for his patience, and he's still smiling after leading that session. I'm really surprised about that. Really appreciated all his hard work involved in negotiations.

I also wanted to say again, I think that - I appreciate the nature of what DOE did for the negotiation, bringing in all the stakeholders, and I also want to remind people, I'm a numbers guy and I just remember that because of the last rule that DOE finalized in 2007 that went into effect in 2010, every time a utility, commercial customers, buying a new transformer, they're going to be more efficient. That's done. That's locked in. Every time they replace an old transformer with a new transformer, there's going to be more efficiency on our system.

So I think we've already made a big stride. As you'll recall, certain parties with the advocates said, well, again, going back to the old rule, well Level two in 2009, Level four in 2013,

and many of the levels that went into effect in 2010 are already well past Level four, that's a fact. That's already in there. That's done. So we've made a lot of progress already and we're willing – I think all parties were willing to make some more progress here within that, those certain valid points, and I believe that, you know, I think all the parties are going to make comments, we're going to make sure that the industries are competitive. We want – we like choice as consumers, we like choice, and we also like domestic manufacturing. They're our customers too.

So again, I appreciate all the work that everybody's done. We look forward to making comments on April 10th, and we look forward to a final rule being published by October 1st. Thank you.

MR. BROOKMAN: Robert.

MR. BERMAN: Robert Berman, Berman Economics. If we can take a break from thank you's for a moment, I have a technical question, trying to run some numbers. Would you explain, Chris, the role of tables Roman numerals I.5 and Federal Register on page 7285 of the Federal Register versus Roman V.1 on 7342 of the Federal Register.

MR. BOLDUC: Can you read the titles –

MR. BROOKMAN: 7285 and?

MR. BERMAN: 7285 says, "Proposed electrical efficiencies for all liquid-immersed distribution equipment classes, compliance starting January 21, 2106." And Table V.1 is efficiency values of the trial standard levels for liquid-immersed transformers by design line.

MR. BROOKMAN: What's the second page, Robert?

MR. BERMAN: I'm sorry, 7342.

MR. BROOKMAN: Okay. Thank you.

MR. BERMAN: I note for example, this is where we had the discrepancy in one of the places where we have a discrepancy in efficiency numbers. The 50 KVA, which is design line one, in the first table mentioned is 99.11 and the second table mentioned is 99.16. Is the second table the one where the efficiency analysis was done at? In other words, is that saying we did the analysis at EL-1 and are proposing a 40 percent of standard EL-1, say for design line one? Is that what that's saying?

MR. ROSENSTOCK: It's because of the scaling. Steve Rosenstock, EEI. Because of the smoothing, Mr. Berman, because of the smoothing. We

discussed that earlier.

MR. BOLDUC: The smoothing changed the efficiencies between the analysis and putting the final editions together.

MR. BERMAN: So we're using the analysis at efficiency losses at 99.16 to do the savings for 99.11? Is that correct?

MR. BOLDUC: That sounds correct.

MR. BERMAN: Okay. Thank you.

MR. RIVEST: This is Mike Rivest. Remember what we're looking at here are representative units. Three representative units for one product class, and so what I heard Steve say earlier on balance, some are going up, some are going down, so really, you know, when you take into account, in a typical analysis we have one representative for product class. Here we've disaggregated that into three representative units, so the economics aggregated for the three rep units, are representative for that product class.

MR. BERMAN: That's why I asked the question.

MR. RIVEST: Okay. I just wanted to make sure that people were not making conclusions from what you were saying.

MR. BROOKMAN: Robert, do you want to respond?

MR. BERMAN: Robert Berman, Berman Economics. I'm just trying to clarify that what analysis was used on what design lines, and did we use the losses that we established at 99.16 to attribute to the savings at 99.11. And I think you said yes to that, and that was my question, and that's fine.

MR. BROOKMAN: Before – just as we returned from lunch, Andrew deLaski said he had an issue that took us back to something said this morning. Did you want to raise that now, Andrew.

MR. deLASKI: Yeah, and so – actually there's two different – two – I suggested a number of new analyses today that I think the Department needs to conduct, and I'm not going to reiterate those now. I think I've been clear enough earlier and we'll certainly reiterate them in our written comments. But I think doing those further analyses will help the Department get to a final rule that better – enables it in a better way to weigh the seven factors.

Two things came up. One is that I'm a little struck that we didn't hear anything today,

nothing presented by the Department on the impacts on small manufacturers. We don't have a slide on it, and we haven't had any discussion – I mean, we've had very little discussion other than sort of cursory remarks, and given the weight the Department is giving to impacts on small manufacturers in its decision making process, I think it's incumbent on the Department to do additional work to better document, better understand, what are the scale of those impacts, and what are the – what are the impacts on small manufacturers. So I know there's been some work done. It needs more. Phil and I were talking about this earlier, it needs more if it's going to be the basis for decision-making.

MR. BROOKMAN: I think Mike would like to follow on.

MR. HYLAND: I just want to expand this. This is Mike Hyland at APPA. I'd like to expand that to small businesses in general. Of the 2000 munis, 1950 are small businesses. The co-ops, I'm not sure the number, but it's pretty impressive. It's 500 or so. So you're talking over 2000 small businesses which are the end consumers, which will be paying the freight of this with every dollar being passed on. So are we hitting the magic number

of 100 million? Has that been evaluated yet, based on the cost increase? Has there been a small business analysis of how they're affected? You increase the cost of the transformer by $100,000. Is that two jobs? Has that impact been analyzed? So if you're going to look at small businesses, please don't look at just manufacturing, because it's the end consumer that has to pay.

MR. BROOKMAN: Okay. Andrew, keep going.

MR. deLASKI: The other thing is that in the TSD, in the engineering analysis, the Department raises the possibility that it may do a reoptimization based on new pricing. It strikes us that that is likely to be a useful exercise to have optimization conducted based on the actual prices used in the analysis. We had discussion on prices during the engineering discussion. We talked about the need to fill in the gaps in the analysis so that - filling in those gaps is going to require doing optimization on new designs. And as the Department looks to fill those in, I think it needs to corroborate whether re-optimization will help it get to decisions based on results that reflect the material choices that are being made based on those prices. Might not have to do everything all over

again, but you maybe could do some of it over again, based on the prices that you decide to use in the final rule analysis.

So again, this is raised as a possibility in the TSD engineering analysis chapter. We think you're raising the right question and we would encourage you to certainly do some additional reoptimization and perhaps do it soup-to-nuts, depending on whether that looks like it's going to be valuable to you.

MR. BROOKMAN: Andrew, does this conclude the other issue you wanted to raise?

MR. deLASKI: That's it.

MR. BROOKMAN: Okay. Thank you. Yes, Charlie Stephens.

MR. STEPHENS: Charlie Stephens, Northwest Energy Efficiency Alliance. I just wanted to speak from a slightly different utility perspective, given that I work for 130-some of them, ranging all the way from the smallest, I imagine, of the rural ones, to some of the larger investor-owned utilities. There's some confusion here it seems to me between consumer or customer or whatever, and the way it works where I am from is that the utilities have costs and they have benefits that derive from their

investments, and the net of those is what flows through to the real consumers, which is the people who pay the bills and which is our rate payers.

And so we're focused, I have to say, much more on that level. You know, transformers don't just cost more, they deliver benefits. They deliver efficiency savings, and those flow through the rates as well. It isn't just cost that flows through to the rates. So we're looking at, on balance, what are the benefits versus the cost, and I think a lot of people around the table are trying to do that. But some of us, if we really focus on that, what it does to our economy, and where the jobs really come from, and we're very focused on that where I live right now. There are benefits that aren't even counted in this rulemaking right now. I'm not going to go into them, but I think that's a different – I seem to have a different customer or consumer perspective here than some of the other utility representatives sitting around the table, and I don't entirely understand that, but I just wanted to put the Northwest perspective on the record. Thank you.

MR. BROOKMAN: We've heard a lot already today about different views of who the customer is,

I hope we don't need to rehash all of that. Steve.

MR. ROSENSTOCK: Federal Register notice 7286, footnote. "For the purposes of this document, the consumers of distribution transformers are referred to as customers. Customers refer to electric utilities, in the case of liquid-immersed transformers, and to utilities and building owners in the case of dry-type transformers." I'll just go on the dry-type side. Some of those owners could be retailers like WalMart and Sears and Home Depots, we consider them the customers of dry-type transformers. DOE has never done an analysis of "gee", how will it affect the retail prices if the transformer is more efficient? It would just be an impossible analysis to do, because the end use customer going into that store is not the customer of the product. The entity that is buying the product, operating it, and maintaining it is the customer. Thank you.

MR. BROOKMAN: Thank you. Yes, Mike.

MR. HYLAND: Yes, I just wanted to tap into what he said. My CEO is from the Northwest, and he – they're one of the largest utilities and he's in sync with what we're saying here. So we do have an overlap in membership. It ties into what

Steve had said. We've already come up so far from 2007, and you start looking at what are you going to do with the next dollar. As Rick Anderson said, who's not here, but I know he's on the phone from Fayetteville, is what's your biggest bang for your buck at this point. And we're arguing over 99.82, 99.84, when you can look at any municipality, or any utility in this room, the end consumer, based on what this says, would have a better time helping Andrew's goals by putting a dollar elsewhere at this point. What are they getting per watt? How much is it costing them to save a watt at this point, versus putting that dollar to something else in these communities?

MR. BROOKMAN: Okay. Thank you. I think we're at the point where we're hearing traditional and perhaps final comments. Any other issues that people wish to raise? Because I think we're starting to double back on ourselves here. Closing remarks. Yes, Bob.

MR. SAINT: I agree that we have been doing closing remarks for some time, and so –

MR. BROOKMAN: Thank you.

MR. SAINT: -- and I –

MR. BROOKMAN: This is the only thing

which I'm allowed to achieve a consensus.

MR. SAINT: -- and I too would like to congratulate everybody in the room for the diligence and hard work that we've all done, and DOE, and the consultants, and the negotiation team, and we've all come to, I think, a better understanding of each other's issues through this process than we all realized.

There are some points that – and we do think that DOE came to the right conclusion when they did their analysis, and congratulate them for their levels that they've chosen in this NOPR, and encourage them to hold fast with those recommendations. Most everybody in the room has agreed with them. There are a few exceptions, but the vast majority of the people in the room, and I believe the vast majority of the comments that you will receive agrees with your analysis and the diligence that you've gone through to come up with these efficiency levels and we hope that you will hold fast with these.

The issues that we see that are important are maintaining a robust, competitive, competition among suppliers, and we've been talking about steel manufacturers versus amorphous-core manufacturers

for a while, and we do think that we need to have that robust competition. In addition, we feel strongly that we need to – the small transformer manufacturers themselves need to remain competitive, and we have a concern that if one – if amorphous-core transformers become the only transformers that are competitive to be made, then those small manufacturers will go out of business, and those small businesses will not be able to exist.

We have a couple of members that are transformer manufacturers and we really feel that we should support our members, small transformer manufacturers.

Of course, the other part of the analysis is the life-cycle cost and the total owning cost of these transformers, and there's where we see some issues with that. There's been a lot of analysis, a lot of input given on the costs. We feel like there's still inconsistencies in the costs that are used in the analysis, for example, the material costs seem to be fairly low versus the power costs are high, and that very much skews the results of the analysis, so we really question the credibility and the viability of that analysis.

So we're – since we have trouble looking

at these life-cycle cost issues and the total owning cost analysis, we go back to the competition, and that seems a little more clear, at least to some, that dividing point, and that's where the DOE has come on. So even though there seems to be more emphasis on this robust competition among suppliers, core suppliers, and that seems to be a lot of the issue, that is because we still have problems with credibility of the life-cycle cost analysis, so we keep going back to the robust competition.

And we can't, lastly, we really can't ignore the issue of the refurbished transformers and the fact that if the original cost of transformers get too high – and nobody knows what too high is – but at some point the market for these transformers is going to become a dominant market, and no one wants that, no one in this room wants that. And that kind of defeats the purpose of this whole rulemaking if we price these efficient transformers out of the market and people find an alternative to these transformers that are regulated, it really defeats the purpose of the whole thing. And if we want to include those transformers or not, I think that's an issue that will take a long time, and it's a tough legal decision that apparently DOE has

looked at several times and decided fairly clearly that they can't regulate the refurbished transformers.

So, again, thank everybody for all our diligence, and we'll be submitting the comments and encouraging our members to submit comments as well, and hope for the best. Thank you very much.

MR. BROOKMAN: Thank you. Additional closing remarks. Phil.

MR. HOPKINSON: Phil Hopkinson, HVOLT, Inc. One thing that I might add is that several years ago I went to an IEEE ad hoc meeting and came out chairman of a group that was addressed at looking at issues associated with DOE energy efficiency activities for distribution transformers. We have a meeting coming up and I think that it is March 13th, in Nashville, for IEEE, and a good many of the people who have been right here, as well as a lot more – I typically have about 100 people that come into the meeting and they are manufacturers, most of which didn't get a chance to sit in here, but will be there, and users, many of which again, didn't get a chance to come here, but they'll be there. And they really look forward to these sessions to be able to find out what's going on in

the first place, and are likely to have comments back that can be useful. I'll do my best to capture those and certainly send them in, and I think there will be others that will do that from these meetings.

I'm very complimentary of the process that went on to get to this point, and of course Richard Parker, I think, has done a wonderful job with the negotiations. I'm impressed with the quads of energy that actually were saved, because way back in 1991 I went to the first task force, Congressional task force, where energy efficiency activities were kicked off, and we struggled to find even the first quad of energy savings back with the group as we started out, so we made a tremendous progress in the rulemakings that went in in 2007 and 2010, but clearly we've got another big jump with what the proposals are here.

Again, I think that from all of the experience that I've had in this industry, that it is a tremendous balance between the efficiency savings that we all would like to see happen, and the impact on the market place and on the players in the market place, and the materials and so on. I really believe that – and that's why I wrote such a

complimentary letter well deserved – that this is a very, very excellent rule. I would certainly propose that you stick at that rule. Thank you.

MR. BROOKMAN: Final remarks. Additional final remarks? Yes, Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. Just another thing on the process, I also want to thank DOE for having – doing more of these with webinars. We have members from all over the country, and I know that they appreciate being able to listen in and see the slides, because it helps them with some of their comments as well. You know, budgets can be very tight, and this really allows more participation, more stakeholder input, I believe, so again, thank you for making that a regular part of this process.

MR. BROOKMAN: Thank you. Anything else. Okay, then, from my part, one of our traditions is to distribute evaluation forms. The Department very much wants to hear what you think about these proceedings and how it can be improved. And speaking for myself, I'd just like to thank you all. This has been a very, very productive meeting. People spoke plainly and directly to the issues at hand. I'd also compliment the

negotiators. I always think of negotiation as a good thing, and so there was a lot of effort, a very compressed time period. I'd also, as a consultant that works all over the federal sector, I'd like to acknowledge DOE's leadership. It's not easy for them to do things differently, and they deserve a lot of credit for giving this a chance and so, I will turn it back then to Jim Raba for closing remarks and my thanks to all of you, safe travels.

MR. RABA: Well thank you, Doug, for being our facilitator for today. It's been a very productive and challenging meeting with the fire drill in between, but still you got it done, and we appreciate that, and thank you who participated throughout this process. Very thoughtful participation, and remember at this NOPR stage we've just gone through, or going through now, it's a Notice of Proposed Rulemaking, not a Notice of Perfect Rulemaking. You have offered many good comments, very helpful comments. We're not perfect, but we all believe, I think, this has been the best part of the NPR: "negotiated proposed rulemaking," and you worked in good faith throughout. It's been most worthy. Now we look

towards a final rule, maybe an NPR - nearly perfect rulemaking, and thank you very much.

(Whereupon, at 3:30 p.m., the meeting in the above captioned matter was adjourned.)

REPORTER'S CERTIFICATE

This is to certify that the attached proceedings before:

U.S. DEPARTMENT OF ENERGY

In the Matter of:

PUBLIC MEETING ON ENERGY CONSERVATION STANDARDS PROPOSED RULEMAKING FOR DISTRIBUTION TRANSFORMERS

Were held as herein appears and that this is the original transcript thereof for the file of the Department, Commission, Board, Administrative Law Judge or the Agency.

Further, I am neither counsel for or related to any party to the above proceedings.

Debra Derr
Official Reporter

Dated: February 28, 2012