

UNITED STATES DEPARTMENT OF ENERGY

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TRANSCRIPT OF THE
NATIONAL COAL COUNCIL MEETING

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Thursday, May 1, 2008

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Hilton St. Louis
1 South Broadway
St. Louis, Missouri

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ATTENDEES

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Comptoir
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I-N-D-E-X

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2 (10:00 a.m.)

3 I. INTRODUCTION

4 MR. PALMER: Let's call the
5 meeting to order. My name is Fred Palmer and
6 I am Chair of the Coal Policy Committee and
7 this is an official Coal Policy Committee
8 meeting and it is hereby called to order.

9 Today we will conduct the business
10 of the Coal Policy Committee and that is to
11 review the Draft Report requested from the
12 National Coal Council by Secretary of Energy,
13 Samuel Bodman, by letter dated April 12, 2007.
14 And our representative from DOE this morning
15 is Jay Braitsch, who is joining us by
16 telephone from Washington, D.C. Welcome, Jay.

17 Before we start, I would like to
18 state that the meeting is being held in
19 accordance with the Federal Advisory Committee
20 Act and the regulations that govern the Act.
21 Our meeting is open to the public, as well as
22 representatives of our members. I would like

1 to welcome any guests we have from the public
2 here today; but I do not believe that there
3 any. However if there are and the
4 representatives from the public or members
5 care to offer comments during the meeting they
6 are welcome to do so. At the end of our
7 discussions we will also have an opportunity
8 for any closing comments people would like to
9 make.

10 Before we begin our work on review
11 of the draft report, why do we not go around
12 the room and identify who is present and who
13 they are with, starting down here.

14 MR. OTTE: I am Roland Otte and I
15 am representing a Comptoir Balland-Brugneaux.

16 MR. BURKE: I am Frank Burke; I'm
17 a Consultant.

18 MR. BEZDEK: Roger Bezdek with
19 Management Information Services, Inc.

20 MS. GELLICI: Janet Gellici,
21 American Coal Council.

22 MS. KRUTKA: I am Holly Krutka and

1 I am with ADA-ES.

2 MR. BECK: And sitting at the far
3 end of the table, where she stepped out for a
4 minute is Janine Migden-Ostrander, who is a
5 member of the Council and represents the Ohio
6 Consumers' Energy Counsel. And I am Bob Beck,
7 staff of the National Coal Council.

8 MR. PALMER: And I am Fred Palmer
9 with Peabody Energy and Chair of the Coal
10 Policy Committee.

11 MR. BECK: And for the record, we
12 have the Secretary of the National Coal
13 Council, Larry Grimes, on by telephone, and we
14 also have Jay Braitsch the federally
15 designated official from the Department of
16 Energy, also on by phone.

17 Mister Chairman, normally the
18 Secretary fills this role, but as he is not
19 actually in the room, I would submit that we
20 do have a quorum and we can do the business of
21 the Coal Policy Committee today. Our quorum
22 numbers are available for folks if they want

1 to check that, but we have sufficient
2 representation today.

3 MR. PALMER: Thank you very much.

4 I appreciate that. We will now get into the
5 Study, and before we go to a review chapter by
6 chapter for comments on what we have, I would
7 like to make a couple of opening comments,
8 both with respect to the procedure that we
9 will follow in completing this for our
10 presentation date to the Secretary of Energy
11 on May 22, in Washington, D.C.

12 And I would also like to thank the
13 people for the hard work that has gone into
14 getting the Study into the shape that it is in
15 right now, and I want to compliment you on the
16 work that has been done. It is clear from the
17 document that is coming together nicely, that
18 a lot of very careful consideration and deep
19 thought has gone into this and I know we will
20 produce a valuable document for the Secretary.

21 At the same time, just to give you
22 an idea of how we are going to bring this to

1 closure, we will leave here today with a
2 document that we have all commented on. And
3 I am going to use the chairman's prerogative
4 and give this to Frank Clemente who has done
5 such yeoman's work for us in the past in
6 connection with the 2006 National Coal Council
7 Study that was produced to bring this into
8 shape. And at the same time the Executive
9 Summary will be redone and I would like to
10 discuss that right now and to give some
11 thoughts on where I think we need to go with
12 this and what needs to be put into it.

13 In 2006 when we did the "Coal:
14 America's Future," Study, the price of oil was
15 \$47.00 a barrel. And in 2006 when we did that
16 study the price of natural gas was \$7.00 an
17 MCF or thereabouts. We have gone two full
18 years since then and there has been a lot of
19 controversy surrounding energy policy in the
20 country. Congress has acted twice on energy
21 legislation. The most significant thing that
22 has happened has been in the position of

1 biofuels mandates. The President has opined
2 on energy. We have had a lot of developments
3 with respect to progress or lack of progress
4 in terms of coal-based electricity generation
5 in the country, all of which leads us to today
6 in an environment where we have extremely
7 expensive energy, which looks to be going
8 higher from here, extremely expensive food
9 that is linked both to the congressional
10 enactments with respect to mandates and also
11 to the increasing cost of energy. Some of
12 these factors were identified in our 2006
13 Study. We did not claim specifically at the
14 time that peak oil was here, but we gave a
15 clear warning. We did not claim at the time
16 that natural gas was going to go from \$7.00 to
17 \$11.00 an MCF, but we identified growing use
18 of natural gas for electricity generation and
19 for ethanol production, which is the largest
20 new user, and we warned of ever increasing
21 electricity prices. And the full brunt of
22 that will be felt for the first time I think

1 this summer by the American people when we get
2 into the air conditioning season.

3 And I think the introduction needs
4 to firmly set forth energy reality as it
5 exists today, based on the experience that we
6 have had in the last couple of years. And in
7 thinking about what we might call this
8 document, I am struck with the proposition
9 that we have an urgency in front of us and I
10 would like to suggest something like "The
11 Urgency of Sustainable Coal".

12 The technology path, of course, is
13 what renders coal sustainable in terms of its
14 use. And the intro to this, the Executive
15 Summary; and we have Executive Summary
16 Strawman on this Page 1 today as it exists,
17 will go through these metrics, the metrics of
18 oil, the metrics of natural gas, the metrics
19 of ever increasing electricity prices which is
20 tied to the price of natural gas, the
21 increasing demand for natural gas use for
22 electricity generation and ethanol production,

1 the lack of action with respect to advancing
2 us forward on putting in the needed base load
3 generation of both coal and in other arenas.
4 And also a review of where we stand with
5 respect to some of the positive things that
6 have happened in the context of carbon capture
7 and storage, the excellent work that DOE is
8 doing through metal and the regional
9 partnerships; but also some of the setbacks
10 that we have had in certain arenas; Future Gen
11 being an example of that.

12 So, all of this would be in the
13 context of letting Frank Clemente take a cut
14 at this in terms of setting out these metrics
15 and submitting them to the Policy Council for
16 consideration probably, -- looking at a May 22
17 date, I would think that the best that we
18 could do would be seven days in advance, -- no
19 later than seven days in advance.

20 MR. BECK: Yes, I think that is
21 fair enough from a logistics standpoint if you
22 backed up from the twenty-second, which is a

1 Thursday and took a shot at somewhere in the
2 neighborhood of the eighteenth, nineteenth,
3 twentieth, something like that. I think that
4 is something from a staff standpoint we can
5 certainly work with and get the revised
6 version out to people and those kinds of
7 things.

8 I would just like to back up and
9 let the record show that Mike Miller has
10 joined us as well from Ameren, and Mike is the
11 Vice Chairman of the overall Council, for
12 those of you who had forgotten that and we are
13 pleased to have him here.

14 But yes, I think the timing, we
15 would be fine with that Fred.

16 MR. PALMER: Okay. That would be
17 my introductory comment with respect to the
18 Strawman and I would open it for any reactions
19 or discussions on the points.

20 MR. BECK: If I could just make a
21 couple of logistical comments as to how we got
22 to where we are. As Fred mentioned in his

1 opening remarks, initially the Council wrote
2 a letter to the Secretary dated August the
3 15th of last year, 2007, suggesting that might
4 do this kind of a study. His response back
5 approving that was October the 12th. And then
6 for this particular meeting the Secretary
7 approved the meeting on April the 7th of 2008.
8 So, from the standpoint of FACA (phonetic), I
9 wanted to make sure that that was on the
10 record and we were adhering to the policies
11 there.

12 And in terms of the Executive
13 Summary Draft, the Strawman, what was done
14 here is that each of the chapter team leaders
15 basically took their chapters and excerpted
16 from them and we just dropped it in to the
17 Executive Summary. The introduction and
18 overview as Fred has mentioned in relatively
19 thin; and I think that is being polite. And
20 Frank Burke had a different description of it
21 this morning, which probably need not be
22 repeated.

1 MR. BURKE: It was off the record.

2 MR. BECK: It was off the record,
3 that is true. But it was meant to spur
4 activity and to get people's creative juices
5 flowing as it were. And I think, Fred, that
6 while it may be a little slower than normal,
7 we are at that point and folks I think are
8 going to start to engage more strenuously and
9 more actively in the next week or so.

10 So, with that, Mr. Chairman, from
11 a staff standpoint I just wanted to make all
12 those things clear for the record and we can
13 move forward.

14 MR. PALMER: Okay, terrific.
15 Thank you. Any comments on anything that has
16 been discussed to date or so far? Does this
17 sound like a reasonable way to proceed and be
18 comfortable with the theme?

19 MS. MIGDEN-OSTRANDER: Are we
20 proceeding by going through the Executive
21 Summary and then moving further back?

22 MR. PALMER: Yes. First of all,

1 the Executive Summary on its face say it is a
2 Strawman, which means is not operative. And
3 I was just describing what I thought ought to
4 go in the Executive Summary and Frank will
5 take a cut at doing a draft. But we want to
6 hit those seams in there. But it all has to
7 be in the context of sustainability, which
8 means we have to deal with carbon and we
9 understand that, and that will be an essential
10 inherent part of it. We do not talk anymore
11 about coal without talking about carbon; nor
12 did we really before. But to the extent that
13 people thought we did, we do not. So, that
14 will be an inherent part of it. But I just
15 think it is so important to take this as a
16 opportunity to let not only the Secretary know
17 our views with respect to where energy stands,
18 but the broader public in terms of this is not
19 new; these things have been discussed and
20 these trends have been in motion for a while
21 and we have not done anything and they are
22 worse. And if we continue to not do anything

1 they are going to be worse yet. It is just
2 that, that is really the theme.

3 MS. MIGDEN-OSTRANDER: Yes. No, I
4 agree with what you stated there. And I guess
5 my question was going more towards, in the
6 Executive Summary there is a number of
7 recommendations, are we going to be walking
8 through those recommendations? That is my
9 question.

10 MR. PALMER: I gotcha. And those
11 are really a summary of the chapter
12 recommendations.

13 MS. MIGDEN-OSTRANDER: Right.
14 Exactly.

15 MR. PALMER: So, yes absolutely.

16 MS. MIGDEN-OSTRANDER: Okay.
17 Thank you.

18 MR. PALMER: But I would suggest
19 we do it, -- maybe we could come back and
20 after we go through the chapters, talk about
21 it then and see what is left.

22 MR. BECK: Yes. I think that

1 might be a good approach, Fred. We have a
2 number of the chapter leaders here and people
3 that have worked on them. I think if we would
4 just very quickly go through the chapters
5 themselves and sort of give a good overview
6 and talk about how we got to where we are;
7 because I think the body of the report is
8 pretty well completed. There are some things
9 that are going to be added, I know, in Chapter
10 5, in the Underground Coal Gasification stuff.
11 We are fine tuning that with a couple of
12 experts with Janine's help and a couple of
13 other experts in the field. We are going to
14 be refining, I think, pieces of Chapters 2, 6,
15 and 7 as well. But in terms of the body of
16 the work, I do not know that there is going to
17 be anything really dramatically new that is
18 going to be added.

19 So, if we could summarize where we
20 are on a chapter by chapter kind of a basis
21 and then come back to the Executive Summary
22 discussion after that, I think that might put

1 everybody on a more equal footing to kind of
2 allow that to happen. So, that is what I
3 would suggest we do if that sounds like a
4 plan.

5 MR. PALMER: Are you all
6 comfortable with that?

7 MR. BURKE: I think that is wise
8 because the findings of the recommendations
9 have to be supported by material that is in
10 the chapter. So I think we need to look at
11 what is in each chapter there, --

12 MR. PALMER: They cannot just have
13 them be stand-alone.

14 MR. BURKE: That is right. And
15 make sure that we have covered all the bases
16 we that wanted. Because the mission we want
17 to cover is in the overview and the summary
18 and if they are not covered in the chapters,
19 then perhaps we need to do some additional
20 work there.

21 MR. PALMER: Yes. Okay. And what
22 I am talking about in terms of the discussion

1 in the Executive Summary would not be
2 recommendations, but and overview of where we
3 are and how this fits and why there is an
4 urgency to adopting a context for the
5 recommendations that are made. So, let's
6 advance in that spirit.

7 MS. GELLICI: I think it is a
8 great idea. As we go through the process on
9 the all of these studies it seems like we keep
10 going back to previous studies saying well
11 let's, -- that is exactly what we have said in
12 that study, bring it forward once again. I
13 like the urgency part of it, because we do
14 just keep reiterating what it is that we have
15 said on a lot of things. We bring some fresh
16 things to the studies that we are doing, but
17 again, it is just, --

18 MR. PALMER: Thank you. You have
19 got it.

20 MR. BECK: Mister Chairman, I
21 will, -- because I have been involved in all
22 of the telephone calls and conference calls

1 and a couple of face to face meetings and we
2 have had people participate in most of those,
3 as the staff person I have been more or less
4 the constant there. So, I think if I could
5 just lead that walk through, we will start
6 with Holly. If you could just in a general
7 way sort of summarize all of the good stuff in
8 Chapter 1 in terms of all of the efficiencies
9 and technologies and things like that, then we
10 will work our way through the chapters.

11 II. CHAPTER 1

12 By Holly Krutka, PhD

13 MS. KRUTKA: Okay. This is an
14 overview and if you want to stop me just go
15 ahead. Chapter 1 is called "Carbon Management
16 Technology Options". Basically this focuses
17 on all the technology options we have to
18 manage carbon from coal-fired power plants.

19 So, the first thing that we went
20 through, -- well, before I get started I just
21 wanted to tell you that we had quite a few
22 people helping with this job, so I do not want

1 to take all the credit. We had really good
2 help actually. Yohnos Spear (phonetic), was
3 very helpful and submitted quite a bit of
4 material and Mike Durham and John Novak. Now,
5 I am going to feel bad about forgetting about
6 everyone; Sai Ali (phonetic), and many, many
7 others. So, I think this is a really strong
8 chapter. And if there is anything you see on
9 how we can improve it I am happy to work on it
10 more.

11 So, we go through a brief
12 introduction to basically power generation,
13 just from a lay person's standpoint.
14 Basically you cannot burn coal or any fossil
15 fuel without making CO2. And we have a figure
16 with conventional a coal-fired station.

17 And then we go into a short
18 discussion of what can be done to manage
19 carbon emissions. We focused completely in
20 this on the demand side, but here we do
21 mention that there is efficiency improvements
22 to be made on the supply side. But we do not

1 deal with that in this report. And we do
2 mention the strengths of coal and especially
3 the existing capacity, the load following
4 capability. And we talk about, -- well, I
5 will just start going through it.

6 So, we basically divided this
7 chapter up into two sections. The first
8 section is for existing power plants and the
9 second section is for new power plants. And
10 the very first section under existing power
11 plants is efficiency improvement And we deal
12 with this in quite a bit of detail. We make
13 sure to emphasize that if you want to do
14 something about CO2 tomorrow, efficiency
15 improvements are the best way to do it. We
16 did mention a little bit about legislation and
17 new source review and how that affects
18 efficiency improvements or lack thereof.

19 MR. BECK: And Holly, if I can
20 just interrupt for a second, that is tied into
21 a discussion of the legal ramifications back
22 in Chapter 6 as well, and this is the basis

1 for recommendations that we have made in the
2 past as Janet mentioned before, as well as the
3 recommendations we are going to make in this
4 report for streamlining the review process.
5 If you are going to preach that energy
6 efficiency is going to be the policy of the
7 country, we think that the policy of the
8 country ought to positively support methods of
9 efficiency and those kinds of efficiencies.

10 MR. PALMER: Can I ask a
11 clarifying question here? I took the
12 efficiency to be in the context of making the
13 existing fleet more efficient, as opposed to
14 being more efficient in the way we use
15 electricity, is that right?

16 MS. KRUTKA: Right, that is right.
17 This is all supply side.

18 MR. PALMER: Right, this is all
19 supply side? Okay.

20 MR. BURKE: I think that the point
21 probably ought to be made certainly more
22 clearly in the summary, because for example

1 the second bullet says,
2 "Improvements in efficiency must
3 play an important role in both
4 near and longer-term CO2 emission
5 reductions.p

6 MS. KRUTKA: In the Executive
7 Summary?

8 MR. BURKE: Yes.

9 MS. KRUTKA: Okay.

10 MR. BURKE: In the findings and
11 recommendations.

12 MR. PALMER: On Page 9.

13 MS. KRUTKA: Okay.

14 MR. BURKE: Taken out of context,
15 I think
16 you run into the question of what I am talking
17 about, generating efficiency or a new
18 efficiency and specifically the chapter
19 supports the argument for generating
20 efficiency.

21 MS. KRUTKA: I agree completely.
22 I think in Chapter 1 we came out and said

1 that, but it did not get transferred to you;
2 that finding. So, I think we should
3 definitely make sure that we are talking about
4 the supply side efficiency. Okay. So, I am
5 on Page 23 now.

6 MR. PALMER: (23)?

7 MS. KRUTKA: Yes.

8 MR. PALMER: Can I go back?

9 MS. KRUTKA: Sure.

10 MR. PALMER: Thank you. Options
11 for new power plants?

12 MS. KRUTKA: Uh-huh (positive
13 utterance.)

14 MR. PALMER: You have
15 "The potential 45 gigawatts, new
16 coal-based electricity
17 generation.p

18 MS. KRUTKA: Uh-huh (positive
19 utterance.)

20 MR. PALMER: Is that a planned or
21 under construction or under construction or, -
22 - you know that number has bounced around a

1 lot?

2 MS. KRUTKA: That is planned. And
3 I think, --

4 MR. PALMER: And what is the time
5 frame for them? Is that a near term
6 potential?

7 MS. KRUTKA: I do not think so.
8 If you look at the IEA or MIT Report, -- I
9 would have to look it up in that reference.
10 But if you like, I could, --

11 MR. PALMER: I think it is
12 important to be specific about this as to if
13 we are making a judgment, why we are making
14 the judgment and what the database is. For
15 example there was a, -- Associated in Missouri
16 announced they were going to go put in base-
17 load natural gas in lieu of their coal plant;
18 that was four weeks ago. I assume that is not
19 captured in that. On the other hand,
20 Municipal in Iowa yesterday announced it was
21 going ahead with a coal plant. So, this is
22 definitely a moving target.

1 DR. KRUTKA: Right.

2 MR. PALMER: There is no doubt it
3 is a reduced number from when we were sitting
4 here in 2006, but it is still a significant
5 number and there is a time frame. There are
6 all these assumptions when you go out ten
7 years or beyond that may or may not be true,
8 but there are things that are going on right
9 now. So, I would talk about it in terms of
10 both the existing fleet and the likely new
11 plants, which we estimate to be pbam,p with a
12 quote to that.

13 MR. BECK: Fred, we could amplify
14 that because it is a moving project in the
15 press release and cover letter which is not
16 going to be written until right before the
17 study is actually released. So, we can say in
18 the study we give a snapshot of time up to a
19 certain day or we could reference the EIA
20 Report, whichever it is and then try to bring
21 it as up to date and as current as we possibly
22 can with the press release and the cover

1 letter. That is a way of handling it.

2 MR. BURKE: One of the things that
3 confused me a little bit was when I was
4 looking through this initially after the
5 Executive Summary you start with Chapter 1 and
6 there is about a six page summary of Chapter
7 1. Then we get into the findings and
8 recommendations for Chapter 1. Then we have
9 the findings and recommendations for a couple
10 of the other chapters and then we actually get
11 to Chapter 1. So, as I was reading through
12 this the first time I was noting kind of the
13 same confederacy, there were a lot of
14 statements that were made in this initial
15 summary part that I could not find any support
16 for, but I guess they are back here. As I
17 realized later that Chapter 1 was actually
18 later in the report. There were a lot of the
19 discussions and of course points that were
20 made later in the report. So, I think there
21 is a question of organization as far as why
22 there is like a six page summary of Chapter 1

1 at the beginning of the report, rather than
2 just going directly to findings and
3 recommendations, with this summary for the
4 chapter being part of the chapter itself.

5 MR. BECK: That is correct, it is
6 an organizational issue.

7 MR. PALMER: You know what we
8 might do is revisit how we organized the 2006
9 Study, which I do think ended up being
10 clearer. I think we had recommendations by
11 chapter in the Executive Summary and then we
12 went to the chapters, as opposed to making
13 factual statements in the summary, which just
14 sort of hang there.

15 MR. BECK: That is exactly what we
16 did Fred with Americaps Energy Future Study.
17 And the idea, -- the concept, was that the
18 format would be very close, if not identical,
19 in terms of how that 2006 Study reads and is
20 laid out, because it is very easy to grasp,
21 very simple.

22 MR. PALMER: This is not a

1 criticism of anything that has been done on
2 this. This is just a, --

3 MR. BECK: No, it is just more
4 work that needs to be done on this.

5 MR. PALMER: Right. And that's
6 why if we plug Frank into this, he could do
7 that right.

8 MR. BURKE: There are two other
9 things and I will comment on them because they
10 are, I think, really significant to this. One
11 is, we have power plant costs in here in
12 various places and we are talking about IGCC
13 at \$1,800.00 a kilowatt for example; the D.C.
14 Plant at \$1,600.00 a kilowatt. Those numbers
15 are really pretty like off the meter, I think.
16 You know we have seen the \$3,500.00 a kilowatt
17 numbers for A.P. and Duke and others.

18 MS. MIGDEN-OSTRANDER: More like
19 \$4,000.00 a kilowatt. That is what they have
20 said in Ohio, is \$4,000.00.

21 MR. BURKE: I mean I know it is
22 always a struggle to come up with numbers, so

1 you try to do a comparison. And I understand
2 the context. But there is always problems, --
3 it is more of a problem nowadays, because by
4 the time you write this thing the cost has
5 gone up by another; Lord knows, 16 percent.
6 So, I think it needs to be either, -- my first
7 suggestion would probably be to at least put
8 in some discussion here about these numbers
9 that you are talking about. You know reflect
10 what the current understanding is of the
11 actual cost.

12 MR. PALMER: How would you
13 document that?

14 MR. BURKE: Regulatory rulings,
15 agency submissions that is probably the best
16 place. In North Carolina and Indiana, A.P. ps
17 the submissions they have made to the
18 regulatory agencies to get approval, --
19 certificate of, -- those numbers are out
20 there.

21 MR. PALMER: I think it is really
22 important that in the summary and as we go

1 through this, is to capture that and just say
2 hey, guess what, this stuff is going up from
3 here big time. What we did at Prairie State
4 over here in Southern Illinois was a \$3,000.00
5 number and it started with a \$1,500.00 number
6 for a supercritical PC And then when you put
7 all the guts and feathers and chickens and
8 everything in the bundle it starts getting up
9 towards four. But that includes transmission
10 and things like that. And that is a lot
11 different, -- you know that gives you a lot
12 different number than \$1,500.00.

13 MR. BECK: And that is what we
14 struggled with. We actually Frank, had
15 discussed this at that the March 27th meeting
16 of what do those number mean? Where do they
17 start and where do they end? And we pretty
18 much decided that you are right, a sixteen,
19 eighteen hundred dollar number is probably
20 obsolete and it is closer to thirty-five
21 hundred or four thousand or whatever; a much
22 bigger number. I think probably what we need

1 to do is better define what the sixteen and
2 eighteen hundred dollar numbers are. They are
3 just a plain, and that is, I think, where we
4 came out, --

5 MR. PALMER: I think Frank is
6 saying they are not just the plain anymore.

7 MR. BECK: Okay. I am comfortable
8 with that. I do not disagree with that, but
9 if we are going to do that then what we need
10 to do is be consistent with our prescription
11 of what the numbers mean.

12 MR. PALMER: I think we probably
13 could use a band and just say in the
14 literature people still talk about this, in
15 bio-links (phonetic) we get this, or you have
16 got this \$1,500.00 or \$3,000.00 KW or two
17 thousand to four.

18 MS. MIGDEN-OSTRANDER: I am sorry,
19 I did not mean to interrupt.

20 MR. PALMER: Go ahead.

21 MS. MIGDEN-OSTRANDER: In the
22 legislative debate we just had in Ohio, my

1 office put together a chart in which we showed
2 the cost of pulverized coal and the cost of
3 IGCC based upon U.S. DOE numbers with carbon
4 capture and sequestration and without carbon
5 capture sequestration, and then we had another
6 column which showed here is what the utilities
7 are saying it is going to cost. I would be
8 happy to share that chart if that would be
9 helpful.

10 MR. PALMER: I think it would be
11 really helpful, maybe even use it.

12 MS. MIGDEN-OSTRANDER: Feel free
13 to use it. Well, the chart also has a
14 comparison of coal with wind, with biomass,
15 with nuclear and energy efficiency, just to
16 show the range of cost for various
17 technologies.

18 MR. PALMER: What was the context?
19 Is it for a new plant?

20 MS. MIGDEN-OSTRANDER: This was in
21 the context of comprehensive energy
22 legislation in Ohio where we were debating

1 energy efficiency and renewable portfolio
2 standards and trying to show the spectrum and
3 also trying to develop advanced coal
4 technologies. So, showing the spectrum of
5 what was involved.

6 MR. BURKE: How did the DOE
7 numbers compare to what we've heard?

8 MS. MIGDEN-OSTRANDER: Lower. It
9 was is lower. But I think the DOE numbers
10 were also more dated, more disrecent. So, I
11 can go ahead and send that to you.

12 MR. BECK: Yeah Janine, why don't
13 you email that to me and probably to Mike and
14 Holly out of ADA.

15 MS. MIGDEN-OSTRANDER: I will need
16 emails.

17 MR. BECK: Okay, thanks. That is
18 easy enough.

19 MS. MIGDEN-OSTRANDER: Okay.

20 MR. BECK: You can send it to me
21 and I can send it to them.

22 MS. MIGDEN-OSTRANDER: Yes.

1 Alrighty.

2 MR. BURKE: The other comment I
3 had that kind of correlates, you have got
4 numbers in here for the MIT Study or the cost
5 to do the demonstration to bring these
6 technologies to fruition. And these numbers
7 are, -- in the case of the MIT numbers those
8 were \$3,005.00 and they are even low,
9 \$2,005.00, but they are nominal, they are
10 costs per dollars. I think they are low by
11 another factor too, at least, -- for the same
12 reason we just talked about. We are talking
13 about building large demonstration facilities
14 here, essentially for a power plant where we
15 are doing large demonstrations and the cost of
16 a demonstration with a commercial plant they
17 would run it by the same factors that we were
18 just talking about. But, if these are the
19 numbers they have presented, then I think that
20 at least the context should say you know these
21 numbers are nominal at \$2,005.00; talk about
22 the escalations seen in costs based on

1 commercial projects. It is likely that these
2 numbers are underestimated by similar kinds of
3 factors. And we really need to think about
4 these not in terms of constant year dollars,
5 but in actual nominal as spent dollars, which
6 as you know very well, from (inaudible) Future
7 Gen, was you know thinking about these things
8 in terms of constant year dollars, as opposed
9 to the money that would actually have to be
10 spent in terms of nominal dollars.

11 MR. PALMER: But in that context,
12 -- and the point also needs to be made that if
13 we are to have the same result on these
14 plants, for example as a Future Gen, we do not
15 like the price tag anymore we are not going to
16 do it, then we are really in trouble.

17 MR. BURKE: That is why we have
18 got to know the real price. That is really my
19 point, Fred. It is if we do not have the
20 right number in there for what this is really
21 going to cost, in terms of real cash dollars
22 in the year in which we spend it, we run the

1 risk of making the same mistake that I think
2 we made with Future Gen, which is essentially
3 low-balling the estimate. Not just because
4 costs has escalated, but because we quoted the
5 cost in constant year dollars not in real
6 estimate dollars.

7 MR. BEZDEK: The problem with
8 doing that is, -- especially when it involves
9 the future, you have to estimate according to
10 what inflation is going to be that year. That
11 is the reason why all the analysis are always
12 in constant year dollars; p05, p06 and p07;
13 and especially when you are talking three,
14 four, or five years out in the future,
15 inflation 1 percent a year; 2 percent a year;
16 3 percent a year, compounded, --

17 MR. PALMER: That is true. What
18 we have right now people will just quote what
19 is in the literature, which tends to be dated
20 and there is all sorts of anecdotal stuff
21 around as spent dollars today that are hell of
22 a lot different than the numbers that are in

1 here or anywhere else you look.

2 MR. BURKE: If power plants costs
3 are increasing just at the rate of inflation,
4 then I think well, you've probably got a good
5 argument. But they are not, they are
6 increasing much more than, --

7 MR. BEZDEK: So, do you think the
8 components are overall inflation, --

9 MR. BURKE: The thing that I think
10 is going to hurt us most, it was not just the
11 way dollars are moving; it is not just the
12 inflation, it is that these kinds of costs are
13 escalating much faster than the rate of
14 inflation.

15 MR. PALMER: And driven not by
16 things here, but by things abroad.

17 MR. BURKE: Yes, and for a variety
18 of reasons. But that is why I think these
19 numbers, like the MIT numbers; and EPRI's got
20 some similar, --

21 MR. PALMER: Okay, we'll do that.

22 DR. BURKE: -- about a billion

1 dollars a year.

2 MR. PALMER: I have another
3 question on the new power plant. You have
4 1000 gigawatts worldwide number, what is the
5 genesis of that?

6 MS. KRUTKA: What page are you on?

7 MR. PALMER: It is on five again,
8 in the Executive Summary.

9 MS. KRUTKA: Oh, you are in the
10 Executive Summary.

11 MR. PALMER: Yeah. You have "45
12 gigawatts of new U.S. and 1000 gigawatts
13 worldwide.p

14 MS. KRUTKA: I am going to have to
15 look it up. We did not have the references in
16 the front, but we do have them in Chapter 1.

17 MR. PALMER: That is a real number
18 that is in here somewhere? I mean it is from
19 like a plant or, --

20 MS. KRUTKA: If I put it in there,
21 it is referenced from something.

22 MR. PALMER: Okay. Okay. I will

1 leave that to work out with Frank. Okay.

2 MS. KRUTKA: Let me highlight it
3 and make sure that it gets checked and
4 addressed. I will say as far as the costs,
5 you may have noticed that, -- I think it is on
6 Page 45, we were worried about the costs that
7 we were discussing not meaning anything before
8 this was even printed. So, one way we
9 addressed that was by non-dimensionalizing by
10 the subcritical fleet, existing fleet. And so
11 like the cost of electricity it was normalized
12 by subcritical plant. Oh, this is for a new
13 subcritical plant. And so you can just see
14 the cost of electricity of other plants. So,
15 we did not put an exact number for the cost of
16 electricity, we just said how much it would
17 increase over a subcritical plant if you were
18 to do a supercritical or ultra-supercritical
19 or something like that. So, in some places we
20 might want to, --

21 MR. BURKE: Except in the
22 footnote, you did do it.

1 MS. KRUTKA: Well, you have to
2 tell them something, but at least, --

3 MR. BURKE: No, I understand the
4 problem.

5 MS. KRUTKA: So, we did think of
6 that. We tried to address it the best we
7 could.

8 MR. BURKE: And I think that is a
9 good way to approach it. And I realize the
10 problem is to somehow provide a basis for
11 those numbers. And the basis for those
12 numbers is somebody's estimate of cost from
13 the estimate in general. I believe it is now
14 substantially lower than what real world costs
15 are.

16 DR. KRUTKA: Right.

17 DR. BURKE: You know at least
18 some, -- a little bit of knowledge into that
19 and the graph, by quoting some of these
20 numbers here, show what people really are
21 talking about when they are building plants.

22 MS. GELLICI: How do we want to

1 deal with the projected planned new coal-
2 fired? I mean the numbers that I have seen in
3 here are from the MIT Study primarily, which
4 is a year or so old now. How do we want to
5 address that?

6 MS. KRUTKA: Is anyone aware of
7 anything more recent? MIT is so
8 comprehensive.

9 MR. BECK: There has not been
10 anything newer that has dealt with that
11 question, Janet. If there were other
12 references out there we could obviously
13 incorporate them and use them. You have got
14 to figure out how you want to do it, but what
15 I would suggest is that if we go ahead and use
16 the MIT stuff, reference the fact that it is
17 two or three years old; that there have been
18 many changes; some plants have been removed
19 from the list, but as Fred mentioned just
20 yesterday, in Iowa they have committed to move
21 forward. So the number will change. But in
22 terms of an overall kind of a scope of what we

1 are talking about, I think this at least gives
2 people an idea of what could be done.

3 MS. GELLICI: EIA does a quarterly
4 update. I do not know people's feelings on
5 how accurate that is. But in the past what we
6 have done is we have gone back to some
7 publicly available information.

8 MR. BURKE: UE keeps a, -- UE, --
9 I think they do it twice a year, --

10 MS. GELLICI: That's what I meant.

11 DR. BURKE: -- a power plant
12 database showing the status of different
13 projects in terms of announced projects,
14 permitted construction and so forth.

15 MS. GELLICI: They are doing
16 updates quarterly now.

17 MR. BURKE: They stopped doing
18 that. They used to that independently, now,
19 they are using a commercial service for it.
20 So, they are no longer reporting it by the
21 individual plant, but they are still reporting
22 the total gigawatts in each one of these

1 categories. And I think that is probably, --
2 I have looked at their data; we get similar
3 sort of data from, -- I don't know if they use
4 the same service or a different one, but we
5 have got another commercial service that we
6 use to get the same kind of information and
7 they are fairly similar. So, that will show
8 you plants that are at the point where they
9 are, -- by the time plants have been permitted
10 it is probably pretty likely to go into
11 construction or if it is in construction,
12 operation. And it shows the distribution by
13 those categories and I think there is about 25
14 gigawatts.

15 MR. BRAITSCH: Hey Frank?

16 DR. BURKE: Yeah.

17 MR. BRAITSCH: This is Jay
18 Braitsch. I just thought that I would throw
19 in that this whole issue has managed to bubble
20 itself up to the secretarial level in the past
21 few days, because there is a lot of different
22 numbers floating around and he wanted to say

1 something in a speech. And part of the
2 problem is that Nelor (phonetic) uses this
3 energy velocity database, proprietary database
4 and we think it is pretty good. These guys
5 sort of make a living on keeping track of
6 things that have been announced and how far
7 along they are. But part of the problem is I
8 think we probably have some restrictions on
9 what we can say publicly on that. But it
10 might be worth checking with those guys,
11 because the Nelor guys have put together some
12 pretty good charts to try to paint the
13 picture.

14 And part of the reason the picture
15 is so confusing is that only about a quarter
16 of the plants that are announced ever get
17 built, at least in the experience over the
18 last decade and people do not really tend to
19 understand what is going on here. They take
20 it as kind of a sigh that things are really
21 going badly for coal. They actually sort of
22 are, but I think people misinterpret it from

1 that data. So, I think you just have to be
2 kind of careful what you use in that thing.
3 I mean if you really wanted to get a rise out
4 of people you could go with the NERC
5 (phonetic) numbers on those, which are
6 probably like a factor of four higher in terms
7 of the amount of coal capacity that needs to
8 be built. So anyway, this is a very
9 controversial topic right now.

10 MS. GELLICI: And that will cite
11 for a new power plant and coal plant.

12 MS. KRUTKA: Okay.

13 MR. BURKE: I think the guy, --
14 the name of the guy that keeps track of that
15 is Eric Schultz (phonetic). Is that right,
16 Jay?

17 MR. BRAITSCH: Yes. I am not
18 sure. Ken Kearns (phonetic) runs the group
19 that that comes out of.

20 MR. BURKE: Okay.

21 MR. BRAITSCH: So, you are right,
22 there is a guy there who, --

1 MR. BURKE: Yes. I have dealt
2 with them. He has sent me stuff before. I
3 think that would be helpful to look at and see
4 what they could provide as far as plants that
5 are in permit, in construction.

6 MS. GELLICI: It would be more
7 current.

8 MR. BURKE: There are dozens of
9 plants out there that, -- you know people make
10 a big deal about the fact that plants are
11 announced and they are never built. But these
12 are 100 gigawatts faster; we could not build
13 them all. We do not have a need for them.

14 MS. KRUTKA: Okay. I think it
15 seems like a better number anyway, the plants
16 that are in permitting and construction just
17 because it is hard number. It is not just
18 kind of a 45 gigawatts. You know it is
19 estimation, but I like that idea.

20 MR. BURKE: And that is a number
21 you can get.

22 MS. KRUTKA: Okay. So, we will go

1 back to Chapter 1. So, I was around, -- let's
2 go to Page 23. We were just going through
3 technical means to improve efficiency in the
4 existing fleet. And we divided that up into
5 basically how much capital investment is
6 required and just discussed what kind of
7 efficiency improvement you can expect from
8 different types of modifications to your
9 plant. We go through steam side changes,
10 deposit treatment, coal quality, coal
11 preparation, coal upgrading and drying and
12 coal treatment.

13 And the next big section is
14 oxycombustion. I am sure everyone is familiar
15 with that. And we just basically described
16 the technical process, the other benefit such
17 as
18 NOx reduction and we also discussed the large
19 scale demonstrations that are going on right
20 now. And since the whole point of
21 oxycombustion is basically for carbon capture
22 and sequestration we included a figure and

1 this is from the MIT Report showing decrease
2 in efficiency due to implementation of carbon
3 capture and sequestration.

4 And the next section is CO2
5 management using biomass. The first area is
6 co-firing with biomass. Basically, we talk
7 about how there is no net release of CO2 or
8 there is minimal net release of CO2 when you
9 co-fire biomass. And then we talk about how
10 much of this is going on; what the issues are
11 and the problems, such as slagging and fouling
12 in the boiler; the availability of biomass;
13 competition of biomass with land needs, such
14 as food production, fly ash problems and then
15 we list the U.S. plants currently firing
16 biomass.

17 And then we discuss biochar, which
18 is one of the only carbon negative
19 technologies you can implement where you
20 actually are taking CO2 out of the atmosphere
21 when you implement this technology. And then
22 we just basically discussed the issues and

1 technical hurdles for implementing biochar as
2 an option.

3 MR. BECK: If I could interrupt
4 again, Holly. We have been in contact with
5 the American Forest and Paper Association's
6 technical staff and they have reviewed this
7 chapter on biomass co-firing with coal. For
8 the most part they are very supportive, but
9 they do have some concerns that we would
10 potentially be taking some of their actual
11 product and turning it into fuel. And so they
12 want to make sure that they are not losing a
13 lot of timberlands and things like that from
14 the standpoint of co-firing all biomass with
15 coal.

16 They have supplied us with some
17 comments on the section that you just walked
18 through. I just got those yesterday here in
19 St. Louis, and so it is in my computer but I
20 have not had a chance to download it, take a
21 look at it, and see. But they have done some
22 commenting on this section and provided a

1 couple of recommendations that I will forward
2 to you tomorrow when you get back. I do not
3 think, according to Jerry Schwartz, their
4 technical staff guy, I do not think they have
5 done a whole lot of major surgery to it. I
6 think it is just a little bit of redlining and
7 they have added a couple of things. So, I
8 think it will work out well. But that will be
9 coming and we can kind of figure out a place
10 and a way to work that into the chapter.

11 MS. KRUTKA: I am more than happy
12 to have experts helping me with that part.

13 MR. BECK: Yeah, I thought it
14 would be a good idea to ask those guys.

15 MS. KRUTKA: Okay. So, the next
16 section is post-combustion capture and we
17 basically go through what is being done.
18 There is a ton of research in this area and so
19 we just kind of did a big overview.

20 The first one are Amine Scrubbers,
21 just because that is basically the standard
22 that CO2 capture technologies are judged by.

1 And we just described the process. And I am
2 sure, as you have all heard, NEA captures; if
3 we wanted to implement that it is very
4 expensive today. Bob, I am sorry I have
5 noticed a lot of the lines are messed up in
6 here, have you seen that yet?

7 MR. BECK: Oh, they are? You're
8 talking just the format? What page is it on?

9 MS. KRUTKA: (36). Well, I am
10 noticing it as I go through. I don't know if
11 something happened to it.

12 MR. BECK: Oh, I see what you are
13 saying. It is a spacing issue.

14 MS. KRUTKA: Okay.

15 MR. BECK: Yeah, we will clean
16 that up.

17 MS. KRUTKA: I just want to make
18 sure nothing got deleted or anything like
19 that.

20 MR. BECK: We will scrub it real
21 good and make sure.

22 MS. KRUTKA: Okay.

1 MR. BECK: Not intentionally, let
2 us put it that way.

3 MS. KRUTKA: Okay. And so we just
4 discussed the issues related to NEA capture of
5 CO2 and discussed what improvements may be
6 possible to lessen the cost of that.

7 Then we move to the ammonia based
8 systems. And basically there is two big
9 groups. They are getting to the point where
10 we are doing large scale demonstrations now
11 and that is the chilled ammonia. So, we
12 discussed Alstomps process and where they are
13 and at what point their development is. And
14 then we do the multi-pollutant control with
15 power span. I think it was important to
16 mention these just because they are showing
17 very fast development of CO2 capture
18 technology and these processes look like they
19 are going to be substantially cheaper than
20 MEA. So, they are very promising and exciting
21 for those of us in that area.

22 Then we move to dry sorbents.

1 These are much less developed than the liquid
2 solvents. So, we just kind of give a general
3 overview just saying how do sorbents work for
4 CO2 capture and what are the possible
5 advantages and what are the obstacles for
6 implementation.

7 And then we just have a short
8 paragraph about membranes, which are still
9 basically in the lab scale development. And
10 just a little bit more discussion of a few
11 other general technologies.

12 And I think in the last paragraph
13 of this section, we point out that many of
14 these are still in the early stages of
15 development and that they will need proper
16 support to continue development and to
17 accelerate technology development, which is a
18 theme you will see throughout this chapter.
19 So, now those are all the options for existing
20 power plants. And then the next section is, -

21 -

22 MR. BURKE: I think the content

1 is, -- no question; no problem with that. In
2 the findings, the third finding says, -- this
3 is on Page 9.

4 "The greatest potential for
5 reducing the emissions of carbon
6 dioxide occurs in the development
7 of retrofit technology that would
8 be applied to the existing fleet
9 of coal-fired boilers generating
10 320 gigawatts of power.p

11 MS. KRUTKA: Which one? Oh,
12 number 3.

13 MR. BURKE: Third, number 3. I
14 think one of the
15 things that this chapter does that is really
16 good is to point out that there is tremendous
17 potential there for improving efficiency and
18 for potentially retro-fitting existing
19 boilers; and that is a target of opportunity.
20 I guess what I am questioning is the word
21 greatest. I guess I am not clear if that term
22 is correct. We are saying that on other hand

1 we have options for new power plants that have
2 carbon capture and storage with existing
3 plants, greatest in comparison to what?

4 MS. KRUTKA: Well, improving the
5 efficiency is not going, -- carbon capture,
6 theoretically we can get 90 percent of CO2
7 out.

8 MR. BURKE: Oh, so the greatest
9 potential to reduce carbon dioxide comes from,
10 -- for existing plants, comes from retro-
11 fitting, --

12 MS. KRUTKA: Right. I mean
13 efficiency improvements can only take you a
14 few steps. Carbon capture and sequestration
15 is where huge reductions can be made.

16 MR. BURKE: Oh, okay, okay. That
17 ought to be written then to say the greatest
18 potential for reducing carbon dioxide
19 emissions from the existing fleet of power
20 plants, --

21 DR. KRUTKA: Okay. It just needs
22 to be reworded.

1 DR. BURKE: -- occurs through the
2 development of retrofit technology. Okay,
3 that makes sense. That is fine.

4 MS. KRUTKA: Okay. So, options
5 for new power plants. The first subsection is
6 "High Efficiency PC With Related Costs and
7 Efficiencies for CCS". So, we just go through
8 these tables and all the information from
9 these tables are either from the MIT Report or
10 a paper that Yohnos Spear wrote.

11 So on Table 1.3 it lists the new
12 types of power plants, how we can increase
13 steam temperature and pressure to get better
14 efficiencies. And then the second table, I
15 think it is the very last row, I really think
16 this is interesting. It shows what the CO2
17 reduction is versus the existing capacity.
18 So, if you had just the average power plant
19 today subcritical unit, how much CO2 can you
20 reduce, but make the same amount of
21 electricity by increasing the efficiency. So,
22 you can see there is actually some fairly

1 dramatic CO2 emission reduction. So, I
2 thought that was really interesting.

3 MS. GELLICI: So, did we think
4 maybe there is significant potential for
5 reducing emissions, is that a better way to
6 phrase that then?

7 MR. BURKE: I think there are two
8 questions here. One is, if you are going to
9 reduce emissions from existing power plants
10 what is the best way to do it? And you can do
11 it through improving efficiency. But I think
12 what Holly is saying is that, -- or the report
13 is saying, is that the greatest potential to
14 reduce emissions would be if you were to
15 retrofit these plants with carbon capture
16 specific devices.

17 MS. KRUTKA: Or maybe we should
18 say that the means for the greatest reductions
19 is going to be capture and sequestration.

20 MR. BURKE: Right. The greatest
21 potential to reduce coal natural emissions is
22 probably to build new power plants that have

1 carbon capture and storage integrated into
2 them as replacement for existing capacity.
3 But that is not going to happen quickly. That
4 is going to take a long time to get to.

5 MS. KRUTKA: I think we have that
6 exact sentence in here somewhere.

7 MR. BURKE: But the way it was
8 written it sounded like you were saying the
9 greatest potential for this overall global
10 emission reduction is existing plants and that
11 is not what they were saying.

12 MS. KRUTKA: No. I will reword
13 that. It is supposed to say the greatest
14 potential for the existing fleet.

15 Okay. So, now I am on Page 44.
16 And for all these new plants there is an
17 associated efficiency reduction for the
18 implementation of carbon capture and
19 sequestration. So, these three figures from
20 the MIT Report just shows for different types
21 of plants where we are going to lose that
22 efficiency and what the final efficiency will

1 be approximately.

2 Then we have our Table 1.5, which
3 as I said we did normalize the cost of
4 electricity and it does have the cost of
5 electricity at the bottom; but the table
6 itself is I think a good way of doing that.

7 Then we just tried to emphasize
8 the plant cost versus the efficiency in the
9 next two tables and then how that curve
10 changes with the implementation of carbon
11 capture and sequestration.

12 The next section is "The
13 Gasification of Coal" and we are discussing
14 IGCC plants here. So, we give a brief
15 introduction to IGCC; the types of
16 efficiencies we can obtain by using these
17 power plants. In theory this is kind of a
18 skeleton figure to describe exactly what
19 happens in an IGCC plant and then discuss the
20 implementation of carbon capture with that.
21 And we go into costs.

22 And once again, on figures 1.15

1 and 1.16 we did non-dimensionalize the costs
2 by a PC subcritical plant. So, that was how
3 we were trying to make this figure relevant
4 for more than a day.

5 Then we go into discussion of fuel
6 cells with IGCC, and gasification of biomass
7 with coal. So, just kind of co-firing except
8 for IGCC plants.

9 Then we discussed the "Advanced
10 Turbine Program for High Efficiency and Carbon
11 Sequestration". And this is a Program from
12 the U.S. Government and just kind of the new
13 turbine types that they are doing research on.
14 So, there is hydrogen turbines, low swirl
15 combustion turbines and oxy-fueled.

16 The next section is "Carbon
17 Compression". This is not too detailed, but
18 we wanted to give some general numbers so that
19 you could put something in context with how
20 much the CO₂, once it has been removed from
21 the flue gas needs to be compressed before it
22 can be sequestered. And because this is still

1 pretty expensive we discussed the possible
2 improvement to novel methods of compression.

3 We also added a section on the
4 beneficial use of the captured CO2. So, some
5 plants will not have access to geological
6 sequestration sites and that is a real
7 problem. So, we added this section and some
8 of those plants will have other options.
9 Growth of algae for biofuels is an interesting
10 area that we discuss.

11 Then we went into a section on
12 carbon off-sets from use of coal combustion
13 byproducts. And we spent quite a bit of time
14 discussing fly ash and how much energy can be
15 saved by the use of fly ash and the CO2
16 emissions related to that, and how using fly
17 ash, -- it saves quite a bit of CO2 emissions.

18 Then we got into the RD&D funding
19 needs and started this table, Table 1.6. This
20 is from the MIT Study, I believe, -- yeah, I
21 think it is from the MIT Study. And we had
22 quite a bit of debate because a lot of people

1 did not like these numbers. So, after that,
2 we added that this is good for the research,
3 but there also needs to be, in addition to
4 this, between five and fifteen full scale
5 sequestration demonstration projects funded
6 through a public/private partnership to prove
7 that the sequestration side is possible and
8 safe. And I think at one point someone wanted
9 to throw in the cost of a billion dollars per
10 project, but I did not have anything to back
11 that up. So, it is not in there.

12 MR. BURKE: I think this is where
13 it would be worth making a couple of points
14 you made earlier. These processes tend to be
15 dated. They tend to be in constant year
16 dollars. And given the escalation and
17 construction costs recently it is likely that
18 these are significantly low. So, when you
19 make the point that by any measure these
20 estimated costs are substantial and, -- would
21 this be the appropriate place to say even
22 though they are substantial, even these

1 numbers are big, they are likely to be low for
2 these reason.

3 MS. KRUTKA: Okay.

4 MR. BURKE: I do not think trying
5 to give an actual estimate will make any
6 friends anyway.

7 MS. GELLICI: This entire section,
8 you refer to the EPRI-CURC Road Map, DOE Road
9 Map, --

10 MS. KRUTKA: Uh-huh (positive
11 utterance.)

12 MS. GELLICI: -- is that
13 incorporated in some of the newer things that
14 CURC has been working on? Because they have
15 got some near-term, -- I know that that is a
16 standard the EPRI-CURC DOE Road Map. Are you
17 familiar, --

18 MR. BURKE: Yes. This road map
19 just takes it through RD&D, it does not do
20 deployment. The Near-Term Program that they
21 have proposed is for deployment, but things
22 could be done in the shorter term. So, it

1 does include some of the stuff you talk about
2 in here; efficiency improvements for existing
3 plants. It talks about incentives for carbon
4 capture and storage, but not at 90 percent
5 carbon capture and storage, it talks about
6 incentives for 30 percent or 50 percent that
7 could be done sooner.

8 MS. GELLICI: But they also have a
9 long-term component.

10 MR. BURKE: But really CURC does
11 not so much have a long-term. They have a
12 deployment incentive program, but I do not
13 think they have a program or a concept or
14 anything that is out there that takes it to
15 full deployment. So, the road map itself is
16 a research development demonstration. The
17 Near-Term Deployment Plan is for deployment
18 either through efficiency improvements for
19 existing plants or through carbon capture and
20 storage, but not at the scale you have to get
21 to, ultimately, for the long-term.

22 MS. GELLICI: I have not drilled

1 down into that information. If you think that
2 there is anything of value there that might be
3 incorporated here?

4 MR. BURKE: Well, since this talks
5 really about the R&D funding I think the road
6 map portion would be relevant to us. I think
7 the deployment portion of it is probably not
8 relevant here because we are talking the
9 demonstration side.

10 MS. GELLICI: But it might be
11 worth a look?

12 MR. BURKE: Yes. On the next page
13 there is a ridiculous graph that shows the
14 hump in the middle, research, development and
15 demonstration. So, this first three, up to
16 the yellow bars, is what is covered in the
17 CURC's road map. The deployment part of it is
18 partly covered by the Near-Term Program, but
19 it is not complete.

20 MS. GELLICI: And the only reason
21 I raise it too Holly, is that that is getting
22 some attraction I think in D.C. and people are

1 talking about that a lot. And if our study is
2 not including that, -- I think it would
3 reinforce what other groups are saying. It
4 would lend some credibility.

5 MS. KRUTKA: We could arrange it.
6 I would be happy to do that. Okay. So, then
7 we go into R&D time-lines and we break this
8 out by technology efficiency improvements, CO2
9 capture, new plant efficiency and the
10 projected timing for all these technologies to
11 come on line from IGCC.

12 And then we have the section "Need
13 to Address Multiple Approaches", where we just
14 explain that this is not a one fit all
15 technology, or there is not a one fit all
16 solution to CO2, so we are going to need to
17 pursue several different avenues.

18 Then we have our findings and our
19 recommendations, which I do not know how the
20 numbering go messed up, but these are all in
21 the Executive Summary. So, I think we have
22 talked about them already or we will go back

1 to the Executive Summary.

2 DR. BURKE: I had a question on a
3 couple of them. We have talked about number
4 two and three. The seventh one, which is here
5 the seventeenth one?

6 MS. KRUTKA: Uh-huh (positive
7 utterance.)

8 MR. PALMER: It talks about the
9 availability of these technologies could
10 result in a savings of a trillion dollars by
11 2050. Is that number actually in the report
12 anywhere?

13 MS. KRUTKA: I do not know.

14 DR. BURKE: It did not jump out
15 and I looked through there for it.

16 MS. KRUTKA: Honestly, somebody
17 added that and it was not me. So, I will have
18 to find out where that came from. But no,
19 that is not in the actual text anywhere.

20 DR. BURKE: Okay. If it is not,
21 if there is a way to write a support for it,
22 do that.

1 MS. KRUTKA: Okay. I will email
2 the Chapter Group and see who put that there
3 and where they got it.

4 MR. BRAITSCH: You might want to
5 check the PN&L folks, who do the hundred year
6 modeling, the jasmines and FH. They have got
7 real big numbers for that kind of stuff. I
8 can give you a contact on that if you need it.

9 MS. KRUTKA: Yes, that would be
10 great. Okay.

11 MR. PALMER: Is that it?

12 MS. KRUTKA: That is it.

13 MR. PALMER: Okay. Frank, did you
14 write out your thoughts on this?

15 MR. BURKE: I think I have given
16 Holly everything.

17 MR. PALMER: And Holly, you have
18 those written down?

19 MS. KRUTKA: Yes.

20 MR. PALMER: The procedure we will
21 follow will be to Bob and then to Frank
22 Clemente.

1 DR. KRUTKA: Okay.

2 MR. PALMER: And I am sure he will
3 set up some kind of a conference call among
4 the various chapter authors, to straighten out
5 points that have been made here. Very
6 positive discussion. Who is Chapter 2? Bob
7 is not in the room.

8 MR. BECK: Just one second. We
9 are going to take a five minute break.

10 [Whereupon the meeting recessed at
11 11:15 a.m. to reconvene at 11:20 a.m.]

12 MR. PALMER: We will begin with
13 Chapter 2 and I will turn it over to Bob.

14 III. CHAPTER 2

15 By Robert Beck

16 MR. BECK: Thanks Fred. Chapter 2
17 was actually drafted by, -- or the Chapter
18 Leader, I should say, was Ray Rayfield, and he
19 had a lot of help from the coal gasification
20 folks at Eastman and Shell and other places
21 like that.

22 Basically what he did, he

1 referenced our March 2006 Study, the "Coal:
2 Americaps Energy Future Study," reporting as
3 we did in that study, that by 2025, you could
4 use coal to convert it into something like 4
5 trillion cubic feet of gas on an annual basis
6 and that that was still accurate and a very
7 laudable goal to pursue. And he basically
8 walks through all of the technologies that are
9 available.

10 The presentation is such that they
11 are commercially available. ConocoPhillips,
12 GE, SASOL, Siemens, a lot of different
13 corporations are doing this around the world.
14 And he talks a little bit about the quality of
15 the product that you get; which after some
16 discussion we decided to call substitute
17 natural gas. So, that is why you will see
18 that substitute natural gas phrase. And he
19 frankly said he has still got a lot of work to
20 do on this and he is continuing to work on it;
21 he is continuing to look at recommendations
22 that could be offered.

1 MR. PALMER: Who is this?

2 MR. BECK: Ray Rayfield.

3 MR. PALMER: And what is the time
4 line?

5 MR. BECK: Well, he knows that the
6 time line was today and he called and said he
7 should have something by the first part of
8 next week.

9 MR. PALMER: It is expanded? Is
10 it cost figures? Do you know what he is
11 coming up with?

12 MR. BECK: I do not know Fred,
13 specifically. I think that it is going to be
14 more along the lines of how much coal would we
15 need to make how much substitute natural gas,
16 because that is the piece that is really
17 missing from this particular chapter. He does
18 talk about the technologies, but you need to
19 take it the next step and say that now that
20 these technologies are there, it is kind of a
21 so what? Now, what do we do? Well, what we
22 would like to do is change coal to natural gas

1 and that is the piece that is missing. He
2 knows that and he has promised to be working
3 on that. I will give him a call tomorrow.

4 MR. PALMER: Watch the time.

5 MR. BECK: Yes, I understand that.
6 And I would suspect that he is spending a lot
7 of time with the 2006 Study to look at the
8 numbers that were involved.

9 MR. PALMER: Is Paul involved in
10 this at all?

11 MR. BECK: No. Paul is involved
12 in it, I cannot speak to the extent to which
13 he is involved in it. I do know that in the
14 initial meetings and phone calls that that
15 group had, Paul was very much involved in it
16 and I can double back with him as well.

17 That is really all that I care to
18 offer, only because I am not really qualified
19 to get into any detail. It is just not my
20 area of expertise and it is only nine pages,
21 it is very readable.

22 MS. MIGDEN-OSTRANDER: He is going

1 to provide some cost data comparing the cost
2 of coal gasification with other energy sources
3 such as liquefied natural gas and oil and
4 those kinds of things. Is that expected then?

5 MR. PALMER: Is he doing that? I
6 doubt it.

7 MR. BECK: I doubt it.

8 MS. MIGDEN-OSTRANDER: Because
9 that would be, I think, very useful to take a
10 look at it from an economic standpoint and say
11 okay what is the cost of this as compared to
12 other technology.

13 MR. PALMER: I would agree with
14 that. I think he is the position to have the
15 best cost numbers, but I doubt that they will
16 go into that. You can ask him.

17 MR. BECK: Yes, I agree, Janine
18 with your point. And Fred, obviously, I doubt
19 that he is going to get into that. And if he
20 does, it is probably not going to be in any
21 really great detail. But we certainly can
22 check.

1 MR. PALMER: Yes. Did Ohio look
2 at the economics of coal to substitute natural
3 gas at all?

4 MS. MIGDEN-OSTRANDER: No.

5 MR. PALMER: Did you look at life
6 cycle CO2 emissions from LNG versus, --

7 MS. MIGDEN-OSTRANDER: No. I mean
8 the reason I put together what I did, was part
9 of a Comprehensive Regulatory Energy Bill in
10 terms of regulation versus de-reg and whether
11 we were going to do energy efficiency
12 standards and renewal portfolio standards.
13 And then there was an advanced energy piece
14 that was not very well defined. And this
15 report will help define what is considered
16 advanced energy for use in Ohio.

17 MR. PALMER: The cost aspects of
18 SNG are like CTL. If you look in the CTL
19 discussion in that broader chapter next, the
20 construction cost increase from 2005 has
21 basically doubled. CERA (phonetic), is that
22 their graph?

1 DR. BURKE: Yeah.

2 MR. PALMER: And that is

3 everything. So, when people were looking at

4 these CGG plants, coal to gas, I think we may

5 have used a \$6.00 number in the 2006 Study.

6 Now I promise you that is not \$6.00 anymore.

7 And when you put carbon capture and

8 sequestration in it, it gets right up to where

9 the cash costs are, which are more than \$10.00

10 today.

11 The fear though, -- I mean the

12 risk to the society is stepping back from who

13 is doing what, in what state? That LNG is the

14 incremental source of natural gas supply,

15 because the U.S. production is flat. And if

16 that gets priced on oil; and it has been that

17 way, it would be more than \$15.00 today or 50

18 percent higher than it is on a permanent

19 basis. Depending on what happens to oil, you

20 can get a twenty to \$25.00 increase for MCF.

21 So, in that context LNG is

22 obviously a bad idea. And then from a carbon

1 standpoint; Carnegie-Mellon did their study on
2 the full life cycle of carbon footprint LNG,
3 is a lot higher than the carbon footprint of
4 SNG with carbon capture and sequestration,
5 because that basically gives you a natural gas
6 instead of a natural gas footprint. But LNG
7 you have got all the divination, methane
8 leakage and then the gasification process and,
9 -- or the faction process and then the re-
10 gasification process and then the transfer
11 process.

12 So, I think those specifics need
13 to be in here somehow. I am not sure who is
14 going to go do that. I think though we can
15 get Frank Clemente to put some of this stuff
16 in here. I think the cost, -- I do not know
17 how you would get there? Grey Point
18 (phonetic) claims on their web page \$5.00 gas.

19 MR. BURKE: It is easy when you
20 have not built one.

21 MR. PALMER: Well, it is a process
22 that is not as complicated as the Conoco degas

1 process and it is inherently more economical
2 because there is less going on. But they have
3 not proven it either.

4 MR. BURKE: Yeah, I am always
5 skeptical of those kinds of plans.

6 MR. PALMER: But they raised 150
7 million dollars. So there are some people,
8 including Kleiner Perkins and Al Gore is a
9 partner in that.

10 MR. BURKE: There you go.

11 MR. PALMER: And Jim Carrey.

12 MR. BURKE: It has got to be true.

13 MR. PALMER: Anyway. But I think
14 the specifics of these things, -- the more
15 specific we would be, the better. But how and
16 whether we are able to do that or not? I
17 would push him harder for specifics.

18 MS. MIGDEN-OSTRANDER: Yes,
19 especially in light of what you just said in
20 terms of pointing out that this could be a
21 much lower cost option than LNG and everybody
22 seems more focused on LNG. That sort of makes

1 the economic case for sort of switching gears
2 a little bit.

3 MR. PALMER: I think in the
4 preface in the Executive Summary we ought to
5 put that LNG stuff right up front saying, here
6 is our path. If we do not use coal we are
7 going to use this stuff, and if we use this
8 stuff and it gets priced off oil, here it is.
9 And by the way the carbon footprint is worse
10 than coal to SNG with carbon capture. We just
11 put that right up front.

12 MS. MIGDEN-OSTRANDER: Well, the
13 other thing that I sometimes discuss in terms
14 of why we need to look at other solutions, is
15 the fact that when you rely on LNG you are
16 also competing with Europe, you are competing
17 with India, and you are competing with China,
18 and you are getting your sources of gas from
19 countries that the United States may not have
20 the best of relationships with. And that also
21 goes to the whole idea of energy independence
22 and security.

1 MR. PALMER: That is very
2 impressive and the reason it is, is because I
3 gave that speech today myself.

4 MS. MIGDEN-OSTRANDER: I promise
5 you I was not there.

6 MR. PALMER: I am just kidding.

7 MS. MIGDEN-OSTRANDER: Like
8 minded, we are like minded on it, yes.

9 MR. PALMER: Could we ask you what
10 you concluded in your cost review for these
11 various alternatives?

12 MS. MIGDEN-OSTRANDER: Well, what
13 I concluded was that energy efficiency; demand
14 side management, was the least cost option,
15 costing \$400.00 a kilowatt, as compared with
16 all other technology. And that is including
17 allowing the utility to recover their program
18 cost and incentive payment and lost revenues
19 associated with incenting them to not sell
20 their product. And so we used that in getting
21 a 22 percent by 2025 Energy Efficiency
22 Standard passed in Ohio.

1 MR. PALMER: How do you define
2 efficiency? What is the baseline to compare
3 that to? Is it appliance? It is an appliance
4 specific method?

5 MS. MIGDEN-OSTRANDER: No.
6 Basically, what we are saying is that if you
7 take a look at the utility company's entire
8 load for the past three years and you do an
9 average and determine a baseline. And then
10 every year they have to reduce that baseline
11 by a certain amount. It starts off at .3
12 percent and so forth. And what you do is you
13 have the utilities implement Energy Efficiency
14 Programs for customers. For example, one
15 program could be a rebate program where a
16 utility will give a customer a rebate for
17 buying an Energy Star refrigerator or Energy
18 Star air conditioning or it could be a light
19 bulb change out program. It could be an
20 entire HVAC system for an industrial customer
21 or motor change out. But you come up with
22 programs that pass what is referred to as a

1 total resource cost test, meaning that the
2 benefits of the program exceed the cost and
3 then you follow up with monitoring and
4 evaluation periodically to measure those
5 savings.

6 MR. PALMER: What happens if the
7 utility load grows?

8 MS. MIGDEN-OSTRANDER: I am sorry?

9 MR. PALMER: What happens if the
10 utility load grows? If the demand in their
11 system grows for the utility?

12 MS. MIGDEN-OSTRANDER: Well, if
13 the growth in demand is due to new businesses
14 locating in the service territory, you try to
15 account for new growth, because you do not, at
16 the same time want to inhibit economic
17 development. So, you have to factor that into
18 your entire equations of what that baseline
19 is.

20 MR. PALMER: That would apply to
21 expansions as well?

22 MS. MIGDEN-OSTRANDER: Yes, yes.

1 Obviously, like in a State like Ohio, which is
2 in great need for economic development, you do
3 not want to have the energy efficiency impede
4 that.

5 MR. PALMER: Okay. So, efficiency
6 was the first, then what were the others?

7 MS. MIGDEN-OSTRANDER: Well, I can
8 pull up the chart right now. Then I think
9 came wind and biomass, followed by, I think
10 natural gas. But let me pull that up and I
11 can give you exactly. If you give me two
12 seconds here, I can pull this up for you.
13 Here is my nice little
14 colored, -- for whoever can see it. Here is
15 my energy efficiency at 400, wind at 1,480,
16 biomass as 1,510, central station solar at
17 3,149, natural gas combined cycle at 1,172,
18 nuclear is projected at 7,810, and that is
19 based upon Florida facilities, and then IGCC
20 with carbon capture sequestration based on DOD
21 numbers is 2,496, and the latest projection
22 using AEP and Duke is 4000, and then

1 pulverized coal supercritical with carbon
2 capture is 2,635.

3 MR. BURKE: Does capacity
4 approximate use for wind?

5 MS. MIGDEN-OSTRANDER: I can tell
6 you in a moment by going to the other chart,
7 but we take into account the fact that wind
8 does have a low capacity factor.

9 MR. PALMER: But the numbers you
10 gave us are installed capacity costs?

11 MS. MIGDEN-OSTRANDER: Yes.

12 MR. PALMER: Not all in operating
13 costs?

14 MS. MIGDEN-OSTRANDER: Right,
15 right. And the thing is, you do not have the
16 kinds of operating costs and fuel costs
17 associated with the, -- obviously the energy
18 efficiency or the wind. Okay. Your question
19 with regard to wind, let me look here. This
20 is based on the Annual Report of U.S. Wind
21 Installation Cost and Performance Trends 2006.
22 DOE figures are capacity weighted averages and

1 include a federal production tax credit of .2
2 cents per KWH.

3 MR. PALMER: Okay, yes 2 cents,
4 okay. On the natural gas, did you have carbon
5 capture and sequestration as part of it?

6 MS. MIGDEN-OSTRANDER: On the
7 natural gas combined cycle?

8 MR. PALMER: Yes.

9 MS. MIGDEN-OSTRANDER: I do not
10 believe so.

11 MR. PALMER: On the pulverized
12 coal IGCC, do you do that based on turning it
13 into a natural gas emission footprint from a
14 combined cycled unit or is it more aggressive
15 than that?

16 MS. MIGDEN-OSTRANDER: I am sorry.
17 Let me answer your question with regard to the
18 natural gas combined cycle, because I am
19 looking at the note here. It says, the
20 natural gas combined cycle as with the IGCC
21 has an average of three IGCC designs, cost and
22 performance baseline for fossil fuels. So, I

1 think there is some accounting for that. I
2 would have to get back to you on that. What
3 was your next question?

4 MR. PALMER: I guess what I am
5 talking about is it really apples to apples?
6 Obviously natural gas has carbon?

7 MS. MIGDEN-OSTRANDER: Yes, but
8 our calculations show numbers with, -- the
9 more detailed chart shows, -- which I have
10 just emailed to Holly and Bob, and I would be
11 happy to email to you, shows with and without
12 carbon capture sequestration.

13 MR. PALMER: For natural gas? For
14 all of them?

15 MS. MIGDEN-OSTRANDER: Yes, for
16 all of them, with and without. We have a
17 price without carbon capture, it is \$554.00.
18 With carbon capture it is \$1,172.00

19 MR. PALMER: Okay. So, that is
20 the high end?

21 MS. MIGDEN-OSTRANDER: Yes.

22 MR. PALMER: All right. I gotcha.

1 Thanks, that is really helpful. It is not
2 actually a digression when you are talking
3 about coal to natural gas. So, in that space
4 you are just producing the fuel. So, if we
5 are going to require the natural gas units, --
6 basically, you take the natural gas units to
7 where the pulverized coal units used to be at
8 \$1,200.00 a megawatt, with carbon capture and
9 sequestration.

10 MS. MIGDEN-OSTRANDER: Yes. So,
11 the numbers that are on that chart that I read
12 off to you before, was with the carbon
13 capture.

14 MR. PALMER: I have always thought
15 and do think, that the sweet spot in all of
16 this at the end of the day; particularly given
17 all the combined cycle units sitting out there
18 that are not used today and given where the
19 public is on carbon, is coal is a substitute
20 natural gas with carbon capture and
21 sequestration. Because everything is already
22 there, you do not have to go recreate the

1 wheel it terms of nutrients and things like
2 that. But you have got a lot of capacity that
3 is not being used, it is just sitting there.
4 That answered my question. So, are we done
5 with Chapter 2?

6 MR. BECK: Yes, we are.

7 MR. PALMER: We are on to, --

8 MR. BECK: We are on to three.

9 IV. CHAPTER 3

10 By Roger H. Bezdek, PhD

11 MR. BEZDEK: How do you want to do
12 this? Do you want me to run through it
13 quickly or go page by page?

14 MR. BECK: Quickly would be better
15 than page by page.

16 MR. PALMER: Actually my major
17 concern in this area is cost. And we have got
18 numbers in there that we know are not right;
19 the MIT stuff.

20 MR. BEZDEK: And the DOE stuff.

21 MR. PALMER: And the DOE stuff.

22 So, I am just not sure that is useful. I

1 would ask you to revisit the whole cost
2 question and to use, -- you have done your own
3 calculations, and use the anecdotal things
4 that you have heard, and then to give a number
5 based on those calculations. For the group
6 and for the record, I think the numbers that
7 Roger has produced were between \$100,000.00
8 and \$125,000.00 per barrel installed capacity
9 of CTL. And anecdotally we have heard numbers
10 as high as \$200,000.00 a barrel of installed
11 capacity; that is U.S. China is different,
12 the whole rest of the world is different
13 because of capital costs, which are a fraction
14 of that.

15 MR. BEZDEK: Okay then, do you
16 want me to read the discussion of the MIT
17 Study from 2006 or the MEA Study from 2007?

18 MR. PALMER: Well, you might
19 discuss them in saying here is where it was,
20 but we know it is not there now and here is
21 the impact of the cost; by the ramp in CAPEX
22 numbers. So, it comes back to the Future Gen

1 kind of, as an example. If you sit in a
2 corner and quiver and say this stuff is too
3 expensive, we are not going to do anything.
4 Then energy will truly get, -- it is already
5 expensive, it will be scarce, because people
6 will not make the investment.

7 On the other hand, if you put
8 these things out there and you go okay, at
9 \$150,000.00 a barrel and we are a 30,000
10 barrel a day plant and you take the 2006 ERL
11 (phonetic) that we put out there, -- what was
12 it, a million barrels a day? I think 2.6
13 million barrels a day.

14 MR. BEZDEK: 2025.

15 MR. PALMER: By 2025, and you say
16 this is the CAPEX; here is all the cost with
17 carbon capture and sequestration and we meet
18 the needs of aviation anyway; you know for
19 transportation, different deal, but you have
20 got heavy duty trucks, railroads, coal mining,
21 aviation, we have very high priority national
22 necessities that we need CTL for, if it is a

1 peak oil world. And then you go to other
2 modes of transportation through corn based
3 ethanol, cellulosic, plug-in hybrids, that
4 whole gambit of things. And so that is how I
5 think on this. But I do not think it takes
6 that much work. I think the Chapter itself,
7 is excellent. But I think these cost numbers
8 could be realistic.

9 MR. OTTE: I would like to comment
10 on the whole Chapter myself and start
11 basically by looking at Page 103. And I would
12 like to underline the statement that says,

13 "It is likely that CTL plants
14 built in the U.S. for the
15 foreseeable future will utilize
16 indirect liquefaction.p

17 I really would like to question that comment
18 and see that the other technologies indirect
19 liquefaction would have equal exposure in this
20 chapter.

21 MS. GELLICI: Where are you? I am
22 sorry.

1 MR. PALMER: He is on Page 103 at
2 the top. There is a discussion about the
3 likely path for CTL in the U.S. is indirect
4 and that is a challenge to that conclusion.
5 And indirect is Fischer-Tropsch and then
6 direct is, --

7 MR. OTTE: H-Co (phonetic).

8 MR. PALMER: And I think that's, -
9 - do you have a response to that?

10 MR. BEZDEK: Well, everyone else
11 that we have talked to on this chapter has
12 agreed with that statement.

13 MR. PALMER: That is not a
14 response. Everyone else agreeing is not a
15 response. Do you have a response on the
16 substance?

17 MR. BEZDEK: On the substance, I
18 believe that that statement is correct, that
19 the future lies in indirect.

20 MR. PALMER: And is that because
21 of the economics or the product?

22 MR. BEZDEK: Economics and

1 environmental considerations.

2 MR. PALMER: And what are those
3 specifically?

4 MR. BEZDEK: Direct liquefaction
5 is much more environmentally intrusive. And
6 do you use, -- do the same people actually
7 investing money in direct liquefaction plants
8 in the near future, in the U.S?

9 MR. OTTE: Yes. We have been
10 working on a system.

11 MR. PALMER: Here, Roger on this
12 point. A conclusory statement by itself, if
13 challenged, there has to be specifics as to
14 why you reached this conclusion. And if there
15 is actual real world ongoing direct
16 liquefaction development then that by its
17 definition needs to be known, and what people
18 see in that versus indirect.

19 MR. BEZDEK: Could you send me
20 information on what is going on with direct
21 liquefaction?

22 MR. OTTE: Sure.

1 DR. BEZDEK: Because as far as we
2 could determine there is no action going on in
3 that area. If there is, I would like to know.

4 MR. OTTE: Yes, I would be happy
5 to.

6 MR. PALMER: But we are obviously
7 agnostic in terms of, -- and should be and
8 will be agnostic in terms of what is being
9 done. I think a discussion of the
10 considerations in each sphere is in order.

11 MR. OTTE: It is just that we
12 started in January using the technology.

13 MR. BEZDEK: It generally is in
14 China.

15 MR. OTTE: Right. I understand
16 that. But, as I said, we are two weeks away
17 from completing the physical study.

18 MR. PALMER: In the U.S.

19 DR. BEZDEK: Yeah, I would
20 appreciate any information you can send me
21 that is non-proprietary. Does the Council
22 want me to include another couple of

1 paragraphs into more depth on the direct
2 liquefaction process, that we covered only
3 very briefly and cut off in this chapter?

4 MR. BECK: Yeah, that probably
5 would be a good thing. Especially if Roland
6 can supply some information; maybe you can, --
7 just a lift queen and place kind of thing
8 (sic). And it is like Fred said, you know we
9 are not in the business of trying to
10 differentiate big winners and losers and which
11 one is best or whatever. But, by the same
12 token, if one is a thousand dollars at some
13 price and another one is at three thousand
14 dollars, I think that is the kind of
15 information we want in there. And then people
16 can draw their own conclusions as to which way
17 they want to go. But if we do have something;
18 if you can provide that Roland, that would be
19 helpful. And if you have already got it
20 mapped out where it ought to go that should be
21 kind of easy to get that.

22 MR. OTTE: I would be happy to.

1 MR. PALMER: Would you have them
2 to elaborate on that; the separate section on,
3 -- did you have a Fischer-Prob's (phonetic)
4 discussion?

5 DR. BEZDEK: Yeah, we can pick up
6 a section on, --

7 MR. PALMER: Where we have, -- not
8 make conclusory statements and have a separate
9 section on indirect, that would be great.

10 MS. GELLICI: I think it would be
11 fair to say that, --

12 DR. BEZDEK: Because there is
13 already a section in there directly and
14 indirect liquefaction, I'll just expand that,
15 just an additional couple of paragraphs on
16 direct liquefaction.

17 MR. PALMER: We need to stay away
18 from the conclusory stuff.

19 MS. GELLICI: I think it probably
20 would be fair to say that most of the activity
21 to date has been around the indirect
22 liquefaction, without then avoiding that

1 declaratory statement.

2 MR. PALMER: But the reality is
3 there has been nothing, -- there's no steel
4 for indirect.

5 MS. GELLICI: Yeah, nowhere. So
6 let's keep it open.

7 MR. PALMER: So cost, and then
8 more agnostic treatment; different methods.
9 And to the extent we can get cost estimates,
10 that would be wonderful.

11 MS. GELLICI: The other thing I
12 thought was perhaps, absent from this report
13 or this section, was what's going on from the
14 consumer perspective. I know FedEx has been
15 very involved and supportive of coal to
16 liquids. We have had some conversations with
17 them. And we talk a lot about commercial
18 aviation. We talk a lot about DOD.

19 DR. BEZDEK: That's discussed in
20 here.

21 MS. GELLICI: So is the
22 industrial, --

1 MR. PALMER: Well the reality is
2 right now, the biggest difficulty of all of
3 this is (inaudible). And we have been
4 involved with that for three years, with this
5 CAAFT (phonetic) that they call it; Commercial
6 Air, Alternative Fuels Technology, -- whatever
7 the acronym stands for. And while the
8 airlines and the big users are equally
9 exposed, nobody has stepped forward and said
10 this is the path we want to go. That has not
11 happened. The Air Force is pushing it.
12 Senator Domenici actually introduced a Bill
13 today, calling for a CTL mandate of 7 billion
14 gallons, -- almost 400,000 barrels a day you
15 know which is not ethanol level, but it is a
16 mandate. And that is really a first from, --
17 a new order in terms of that kind of concept.

18 The problem has been, and is, on
19 these projects with the CAPEX numbers and the
20 uncertainty surrounding the price of oil and
21 also natural gas in the SNG. And also the
22 costs profiles that tend to follow crude and

1 natural gas prices. So, it's never, -- it's
2 the way Shell Oil has (inaudible) talking
3 about that in the '80s.

4 MS. GELLICI: I think it
5 strengthens our position, -- I mean the
6 commercial aviation sector thing to me was
7 just, -- really reinforced the need for this.
8 And that is what I am struggling to find
9 something, -- because you hear a lot of
10 feedback from folks; well, without the DOD
11 component or without another federal
12 government support, this thing does not make
13 economic sense. And to me, to be able to make
14 the argument that there is other sectors of
15 the economy that are heavily dependent on
16 these transportation fuels from the industrial
17 perspective, not just the commercial aviation,
18 but you know the FedEx(s) and the BS(s) of the
19 world who are also, I think, stepping up and
20 standing up on this a little bit. Are we
21 missing an opportunity to reinforce our
22 position here on that, by not including

1 something to that effect?

2 MR. PALMER: You mean in terms of
3 highlighting their interest or, --

4 MS. GELLICI: Yeah, interest.

5 MR. PALMER: I would not be
6 adverse to it if there was something concrete.

7 MS. GELLICI: Yeah. And I don't
8 know if there is. And I would be happy to do
9 some rooting around on it.

10 DR. BEZDEK: Fred Smith is
11 interested in energy efficiency and hybrid
12 structural carry outs and speaking on
13 replacement fuels I am not sure Deverick
14 (phonetic) made a sworn statement in terms of,
15 -- in favor of CTL. He is generically in
16 favor of anything that would reduce the price
17 of liquid fuels for his ground vehicles and
18 airplanes.

19 MS. GELLICI: What I would be
20 happy to do is just root around a little bit
21 and see if there is something else that we can
22 add that would support that.

1 MR. PALMER: That would be really
2 helpful.

3 MS. GELLICI: And then my other
4 major point on Section 2 is we seem to use
5 greenhouse gases and CO2 interchangeably and
6 I think we need to go through and decide if,
7 in fact, those references to greenhouse gas
8 emissions are the same in fact as CO2
9 emissions. And it is something that I think
10 we need to be cautious about, because those
11 are two different things.

12 MS. MIGDEN-OSTRANDER: Something
13 similar to that is that in reading through the
14 document, especially in the Executive Summary
15 where we use acronyms, we do not always
16 identify what that acronym is the first time
17 it shows up. And so that is something that
18 needs to be cleaned or done. Because you read
19 through something and then it is like
20 sometimes they are not at all identified or
21 they are identified on a subsequent page. And
22 so it would be helpful to make sure we do that

1 the first time it is mentioned.

2 MR. BECK: Yeah. And that's an
3 editorial issue that we can clean up.

4 We go around on CO2 versus
5 greenhouse gases all the time and we just need
6 to make sure that we are clear when we are
7 referring to the, -- you know be accurate. If
8 it's CO2, it's CO2; if it's all greenhouse
9 gases, then it's all greenhouse gases. And I
10 think again, that is an editorial issue that
11 we can work on.

12 MS. GELLICI: Maybe not. I mean
13 maybe some of the references are there. You
14 know if we are pulling references to other
15 things it might in fact be a greenhouse gas.
16 So I would just kind of caution the editor.
17 And I think it is incumbent on the section
18 chairs to go back and make sure that when they
19 use greenhouse gases they in fact want to use
20 GHG instead of CO2.

21 DR. BEZDEK: Well in some cases
22 the two can be mentioned.

1 MS. GELLICI: Let's make sure that
2 when we are doing that, -- I was just kind of
3 confused about that at a couple of places. I
4 just was not sure.

5 MR. BECK: No problem.

6 MR. PALMER: Did you do the
7 closing, --

8 MR. BECK: No, Frank Burke did
9 that.

10 MS. GELLICI: Are we going back to
11 the recommendations then?

12 MR. BECK: We are going to go back
13 to the recommendations at the end of the, --
14 unless Mr. Chairman, if you want to get into
15 them now, that's fine.

16 MR. PALMER: Well, we are not
17 quite through.

18 MS. GELLICI: I didn't know if you
19 were doing it section by section or, --

20 MR. PALMER: No, we were going
21 chapter by chapter and then coming back to the
22 recommendations.

1 MS. MIGDEN-OSTRANDER: So a
2 comment with regard to recommendations on this
3 section I should hold until we go back?

4 MR. PALMER: You can say it now
5 or, -- I won't do anything to you if you want
6 to say it now.

7 MS. MIGDEN-OSTRANDER: All right.
8 Well then I will just go ahead and put this on
9 the table.

10 On page 139 there is a
11 recommendation to exempt initial CTL
12 facilities from new source review and national
13 ambient air quality standard to offset
14 requirements. I think by putting that in
15 there, --

16 MR. PALMER: I agree. That's out.

17 MS. MIGDEN-OSTRANDER: Thank you.
18 And I had my arguments all lined up and you
19 shut me up. That works.

20 MR. BECK: Well, we have gone on
21 record Janine, over and over again, saying
22 that we would like to have things streamlined,

1 but not done away with or not, -- I agree.

2 MS. MIGDEN-OSTRANDER: Yeah, I
3 think you know, you have to go into
4 legislation and you're opening up a can of
5 worms.

6 MR. PALMER: Nobody is going to
7 argue for that. These things are going to
8 have to get fully bedded and go through the
9 regulatory process and there is just no
10 question about that.

11 There actually I think, was a
12 National Coal Council Study that argued for
13 that and talked about picking up, -- I think
14 Steve Leer (phonetic) was Chair of this,
15 wasn't he
16 Bob, --

17 MR. BECK: Yeah.

18 MR. PALMER: -- in the early, --
19 what, about five years ago now?

20 MR. BECK: 2001. It was a May
21 2001 Study I think.

22 MR. PALMER: And identified low

1 hanging fruit of 40,000 megawatts of capacity
2 I think if that were done. But that would not
3 have worked.

4 MR. GRIMES: Bob, are you talking
5 about the third bullet on page 139?

6 MR. BECK: Yes indeed, Larry.
7 That would be the third bullet on page 139.

8 MR. GRIMES: That's just out?

9 DR. BURKE: That has been deleted,
10 yes. I have a general question. And
11 particularly, in finding the recommendation
12 that is starting on page 133, 134, 135, up to
13 the R & D part on 136. Most of these deal
14 with very specific legislative issues. And
15 the recommendations really are not to DOE,
16 they are really policy changes that would have
17 to be made at a congressional level. Is that
18 something that the National Coal Council, --

19 MR. PALMER: We have always done
20 that.

21 DR. BURKE: Well we haven't always
22 done it. There was an issue on this in the

1 past and I know that we had a problem, --

2 MR. PALMER: Well we did it in the
3 2006 Study.

4 DR. BURKE: Specific policy
5 recommendations when we are making
6 recommendations to the Secretary of Energy and
7 they are outside of his, --

8 MR. BECK: Right. I understand
9 what you're saying. What we have done in the
10 past is, -- and I'll
11 just, -- since I am looking at page 139, I am
12 going to stay on page 139. There is a
13 recommendation that starts out, "The Federal
14 Government should develop". What we have done
15 in the past is, if we truly mean the Federal
16 Government we will say "The Secretary of
17 Energy, working in conjunction with his fellow
18 cabinet members, should develop," kind of
19 thing. So we make the recommendation directly
20 to the Secretary, but we make it in a way that
21 we know perhaps DOE is not the lead Agency on
22 it; that they have to work with EPA. Or if it

1 does require legislation then we say "The
2 Secretary, with the understanding that this
3 would take legislative change," or something
4 to that effect. But we caveat it that way,
5 because you're right Frank, you know our job
6 is to make recommendations to the Secretary.
7 He is our one and only customer, so to speak.
8 Although, we are talking in terms of a much
9 broader audience I think for a lot of this
10 kind of stuff.

11 DR. BURKE: I guess my suggestion
12 was going to be to segregate these into two
13 categories. Ones that are specific
14 recommendations to the Secretary. Because
15 some of them, like the R & D Recommendations
16 are specific recommendations to the Secretary.
17 And then have a second set that says you know
18 in addition to these clear recommendations
19 there are some policies that would certainly
20 help to be addressed and then list those as
21 policy issues, but segregate them somehow from
22 the considered recommendations.

1 MR. PALMER: What we will do is
2 take, -- we addressed, -- I mean we came up
3 with a method for dealing with that in the
4 2006 Study and we will follow that. Because
5 we do understand that the Secretary of Energy
6 does not have the ability to give you tax
7 credits. So, we understand that. But at the
8 same time we asked for 100 percent expensing
9 for depreciation, for tax credits, for the
10 whole deal. And it was done in the context
11 of, -- I can't remember.

12 MR. BECK: You're right. You're
13 right, Frank. There is a correct way to do
14 that and stay within our Charter. Because we
15 cannot just blanket say, -- I mean it gets
16 back even to the NSR discussion; we cannot
17 recommend that the Secretary do anything on
18 NSR, because he does not have any authority to
19 do anything on NSR. It has got to be done by
20 EPA if it is a regulatory issue and by the
21 Congress if it is a legislative issue.

22 So, what we recommended to the

1 Secretary in that 2001 Report that we were
2 just talking about is that the Secretary, in
3 conjunction with the Administrator of the EPA
4 and other elected officials, streamline, --
5 and then we went on from there. But there is
6 a way to do it and we have a format for doing
7 it. But thank you for bringing it to our
8 attention, to make sure that we do scrub it
9 and make sure that that is done correctly.

10 MR. GRIMES: Bob, I believe we
11 have effectively used the word support in the
12 past; the Secretary should support this or
13 support that?

14 MR. BECK: Yes, exactly. We have
15 got three or four different ways of saying it
16 Larry, because we get tired of saying the same
17 thing over and over again; it sounds
18 redundant. So I mean we do not want to sound
19 like we are singing a litany here, we want to
20 make sure that at least it is a report that
21 people can stand to read. So yeah, we've done
22 that.

1 And you know we will spend a great
2 deal of time over the next two weeks I'm sure,
3 going back through all of this stuff and
4 scrubbing it to make sure that with Frank
5 Clemente's help we do get this all correct in
6 terms of greenhouse gases versus CO2, versus
7 what we can ask the Secretary to do, versus
8 what we need to ask the Secretary to support
9 or work with his colleagues about.

10 MR. PALMER: Okay, where are we?

11 MR. BECK: We should be at page
12 142, looking for Frank Burke to talk about
13 Chapter 4.

14 MR. PALMER: Good job, Frank.

15 V. CHAPTER 4

16 By Frank Burke, PhD

17 DR. BURKE: Okay. I don't know
18 that we need to go through the text obviously,
19 but let me just give you the thread of it.

20 The PHEV is plug-in hybrid
21 electric vehicles or a way to get coal into
22 the transportation market. I think it is

1 really interesting to look at the analyses
2 that they have done on the McCain Bill
3 (phonetic) and the Warren Bill (phonetic).
4 The transportation sector does very little,
5 because the price never gets high enough that
6 people stop driving cars. And so there is
7 very strong resistance to change. But there
8 has been some adoption of hybrid vehicles;
9 there seems to be some, -- at least public
10 acceptance of that. And so one way as an
11 alternative to coal to liquids, to get
12 electricity, -- or get coal into the
13 transportation market, is through
14 electrification of the fleet. So, we talked
15 about it here and there are a couple of
16 advantages. And there was a good report that
17 was done by EPRI last year, which I relied on
18 fairly heavily here. And John Novack of EPRI
19 helped me work on this. Where they go through
20 and they look at life-cycle emissions for
21 conventional cars, hybrid cars, plug-in hybrid
22 vehicles. And even without carbon capture and

1 storage, using a state-of-the-art coal-fired
2 facility the carbon emissions from a plug-in
3 hybrid vehicle are less than for a
4 conventional vehicle and comparable to a
5 hybrid.

6 With carbon capture and storage
7 the emissions are substantially less than for
8 either hybrid; certainly less for conventional
9 vehicles. The other thing obviously is that
10 by using electricity from coal to make, -- as
11 a transportation fuel, we displace petroleum
12 and again relying on EPRI's analysis, the
13 potential for that is pretty substantial. So,
14 in concept, this is a really good idea. The
15 problem is that these vehicles are not
16 commercially available at this time and to
17 have a major impact, -- oh, I guess one other
18 point I will make too is because these
19 vehicles operate; a substantial part of their
20 duty cycle on electricity alone, there is no
21 emissions for SOx, NOx, VOC(s), anything else.
22 So in addition to the CO2 benefit it has

1 benefit in terms of precursors to the ozone in
2 particular. And again, the analyses all are
3 pretty consistent showing that.

4 The problem is that there aren't
5 any of these around right now. GM has
6 announced that they are going to begin to
7 market these in perhaps, 2010. And Toyota and
8 some of the others have indicated that they
9 are interested in this too. The big problem
10 is cost. EPRI says that at maturity it is
11 going to cost two to three thousand bucks more
12 than an HEV, which in turn costs maybe two to
13 three thousand more than a conventional
14 vehicle. And this is offset by lower fuel
15 costs. Electricity as it turns out is a lot
16 cheaper than gasoline to drive cars; even at
17 the current prices. But that payback period
18 is fairly substantial, it could be as long as
19 ten years. And people have generally been
20 reluctant to invest in the higher price up
21 front for fuel cost savings over time.

22 So the difficulty then is to see

1 how the price of these can be brought down to
2 the point where either consumers are different
3 or provide an incentive so that they are
4 willing to buy a plug-in hybrid vehicle as
5 opposed to buying a conventional vehicle or a
6 conventional hybrid.

7 The other issue here is
8 electricity demand. And as we discuss in
9 here, actually the electricity demand is
10 fairly modest. EPRI estimated that it would
11 only require about an 8 percent increase in
12 electricity demand in 2050 to replace 60
13 percent of the light/medium duty fleet with
14 hybrid vehicles. Which just goes to show that
15 really, the size of our electricity is pretty
16 large. So it is very modest, the increase,
17 over time, to be able to accommodate this.
18 And in fact, for the foreseeable future in the
19 next couple of decades even with substantial
20 penetration of PHEV(s) there is enough spare
21 capacity to be able to accommodate them
22 without really any major command on new build.

1 Particularly if people would recharge at night
2 when demand is relatively low. There has been
3 a debate about that. There is some feeling
4 that people would want to charge it during the
5 day like when they drove it to work. And that
6 is discussed, we go into a little bit more
7 detail than that.

8 But finally it comes down to the
9 question of cost. Would people be willing to
10 buy these more expensive vehicles? And there
11 are two ways to approach it. One is to bring
12 down the cost through research and
13 development; a principal cost element in
14 battery technology. There is a lot going on
15 right there, -- on this right now, but that is
16 probably the principal difference between a
17 hybrid and a plug-in hybrid is the battery
18 technology. If we can bring the cost of that
19 down it has a big impact.

20 And then the second issue is
21 whether or not there could be an incentive,
22 financial incentive. There is a financial

1 incentive now for conventional hybrids, but
2 Congress limited that to a very small number
3 of vehicles; 60,000 vehicles per manufacturer,
4 just to put the total cost of this in line.
5 So we looked at that; looked at that existing
6 incentive and then did an analysis. And I got
7 suggestions and help from a guy at CMU on this
8 to say what it would cost for an incentive for
9 a certain number of vehicles; 10 million
10 vehicles, to bring the cost to compare with a
11 hybrid electric vehicle and what that would
12 cost over time. And the total price tag is
13 very expensive, but that was sufficient to
14 then result in the reduction of a substantial
15 number of hybrid vehicles along the line for
16 this forecast, the actual cost of the
17 incentive is really pretty low. It turns out
18 to be a few dollars, three to five dollars
19 (inaudible) under the assumption that by
20 incentivizing the introduction of this fairly
21 large number of vehicles the technology takes
22 off (inaudible) time.

1 So, the winner here is a
2 combination of a incentive to adopt a large
3 number of electric vehicles, along with the
4 commercialization of carbon capture and
5 storage. And it turns out that the timing for
6 those two things is fairly consistent. We are
7 probably looking at large scale adoption of
8 carbon capture and storage, particularly from
9 new facilities in the 2020, 2030 time frame.
10 And to get electric vehicles introduced into
11 the fleet in large numbers, just the time it
12 takes to turn that over, is a similar sort of
13 time frame. So, the recommendations here are
14 really threefold.

15 (1) Continue the research and
16 development on coal based electricity
17 generating, including CCS, so that we have
18 technology available in the future to be able
19 to apply this incremental electricity
20 generation that we need from low carbon
21 emitting coal based sources.

22 (2) The second is continue to

1 research, -- and there is a program and we
2 discuss it in here, on improved battery
3 performance. And that obviously is a high
4 priority and commands I think, the attention
5 of the Secretary to ensure that that program
6 moves along effectively.

7 (3) And then the third, -- and here is
8 the recommendation that we made along the
9 lines that we talked about earlier, the
10 Secretary working with other agencies and
11 Congress to evaluate the timing, the structure
12 and incentives for deployment, so that we can
13 move carbon capture and storage coal based
14 technologies along in coordination with hybrid
15 electric vehicles.

16 MS. GELLICI: That's whimpy.
17 Sorry Frank. One of the questions I had
18 there, -- I mean the thing that struck me
19 about, --

20 DR. BURKE: When you say whimpy,
21 you mean that in the kindest possible sense,
22 right?

1 MS. GELLICI: I do. I do. With
2 all due respect. One of the things that
3 struck me as I was reading; and I did not know
4 anything about PHEV(s) before I read this, so
5 this is definitely from a neophyte
6 perspective, was the timing issue, bringing on
7 the new fleet and the availability of low
8 cost, you know hopefully coal based generation
9 to do that. And one of the things that
10 concerns me is not getting some of the
11 generation in place now and when these
12 moratoriums on coal and some of the cut backs
13 on coal generation; and some of that
14 understandable, but is there an issue there
15 that we might run into some availability? I
16 did not feel that really strongly. Maybe it's
17 because there is not a significant amount of
18 additional generation there?

19 DR. BURKE: Those two studies that
20 I cite in there, one was by EPRI and the other
21 was by, -- maybe there was three studies. I
22 can't remember exactly. One was Pacific

1 Northwest Lab and they looked at the amount of
2 incremental generated capacity that would be
3 necessary for a certain number of vehicles.
4 And it turns out that in the EPRI Study to
5 replace 60 percent of the light/medium
6 vehicles in 2050, which is larger number
7 vehicles than now, would require an 8 percent
8 increase in the generating capacity relative
9 to what was projected in 2050. And in the
10 near term the amount of excess capacity that
11 is available now, is sufficient to be able to
12 accommodate a fairly large fleet.

13 So they looked at that in a very
14 detailed manner, comparing what the demand
15 would be over time versus the potential
16 introduction of vehicles over time and they
17 modeled that to see what impact it would have
18 on incremental generating capacity.

19 MS. MIGDEN-OSTRANDER: If I could
20 add something to that, which is that if, --

21 DR. BURKE: But the conclusion was
22 that it really did not pose much of a problem

1 in the near term, but there would be a need
2 for some additional capacity in the long term.

3 MS. MIGDEN-OSTRANDER: I'm sorry,
4 I thought you were done. The other issue is
5 that utilities today; and the electric
6 institute is pushing towards this whole
7 concept of the smart grid and going more
8 towards smart metering and time of use rates.
9 And so if we send the proper price signals
10 there would be a larger number of customers
11 who will probably be using this technology,
12 plugging in their car at night. And at that
13 point you have capacity that is available to
14 off-peak capacity. And so that is also going
15 to help a lot; you know it is going to help
16 the electric industry as well to sort of
17 levelize their loads.

18 So when you are looking at
19 incremental increases to the extent that
20 people are plugging them in during the day,
21 then you have to be concerned about, -- you
22 have to be more concerned about incremental

1 sources of generation than if they are doing
2 it at night. And of course, there will be
3 some that will be doing it at various times of
4 day, but also if we start sending customers
5 the right price signals in terms of what it is
6 going to cost them to do it in the middle of
7 the afternoon, as opposed to overnight, that
8 is going to influence behavior for a lot of
9 people.

10 MR. BECK: Yeah Frank, isn't this
11 pretty much, -- I mean I don't know that there
12 is anything much that is really new in this
13 particular discussion.

14 MR. PALMER: It's new to us.

15 MR. BECK: I'm sorry?

16 MR. PALMER: It is absolutely new
17 to the National Coal Council, --

18 MR. BECK: Well no, no, no, I
19 understand that. I am talking about, -- yeah,
20 that I agree. I am just talking about in the
21 general discussion of electric vehicles hasn't
22 the problem always been the cost of the

1 vehicle of itself, the distance that the
2 vehicle can go, because the electricity
3 industry, going back, -- way back in my old
4 days at EEI, we were saying the same thing
5 that Janine just said. We could charge them
6 at night; you don't have to build new power
7 plants; yeah, you've got to make more
8 electricity, but you don't have to build more
9 power plants to fuel them. And I think it
10 seems to me like what we're saying here is
11 that we will stand ready to do this, to
12 provide the electricity needed; that coal can
13 play a major role in doing that, it's not, --
14 and this gets to Janet's whimpy statement,
15 it's not really our call. I mean we are not
16 the ones that ought to be promoting or trying
17 to sell electric vehicles. That is, in fact,
18 GM, Toyota, et cetera.

19 MR. PALMER: Well stop. Stop.
20 Stop. Stop. The electric vehicle component
21 of this is every bit as important as the coal
22 to liquid component. What we are talking

1 about is a broader use of coal to meet
2 national needs and one is transportation.
3 This discussion of plug-in hybrids goes only
4 to if you create, -- if you do X, Y, Z, you
5 are going to need this much new generation.
6 It does not try to sell them, but it points
7 out societal benefits from using coal in lieu
8 of using oil for transportation through the
9 vehicle, a plug-in hybrid. It is no different
10 than the CTL discussion or any other
11 discussion.

12 DR. BURKE: Just a point. Really,
13 the difference here is that this is the way of
14 dealing with the CO2 issue on the
15 transportation side that if electricity comes
16 from coal-fired power plants that have carbon
17 capture and, -- it deals with three issues.
18 It deals with an energy security issue,
19 because the electricity is coming from plants
20 that have carbon capture, -- they come from
21 coal. It deals with the environmental issue
22 in two ways, because carbon capture and

1 storage is dealing with carbon emissions from
2 the transportation sector, which is very hard
3 to get. That was the point I was making
4 earlier. These analyses show that you don't
5 do much on the transportation side because you
6 cannot put anything on the tailpipe of the
7 car. And even efficiency improvements helps,
8 but it is a very slow position. And it deals
9 with the economic issue because electricity is
10 a hell of a lot cheaper as a transportation
11 fuel power source than gasoline. Even gas at
12 \$3.00 and now it is up to \$3.60 or whatever,
13 so. It is about a third less expensive to
14 drive your car on electricity, -- about a
15 third of the cost to drive your car on
16 electricity as it with gasoline.

17 So really, the only problem with
18 it is, as you said, there are transportation
19 applications where this just does not work;
20 you cannot run an airplane on electricity.
21 Not far.

22 MS. GELLICI: Up; you can go up.

1 DR. BURKE: And they would still
2 lose your bags. You know, they would, trust
3 me. And you cannot do ships and you cannot do
4 long haul trucks and diesel. There are things
5 that are suitable for electrification and this
6 is a way to get at that. I think that's what,
7 --

8 MR. PALMER: Turn to page 148; and
9 I think this is an important point. And there
10 is a chart in there on the carbon footprint of
11 plug-in hybrids, based on four scenarios. And
12 the top one is a new coal plant without any
13 carbon capture or sequestration. And then you
14 see there is a substantial reduction of carbon
15 emissions below a conventional vehicle powered
16 by gasoline. And it goes to this whole, -- it
17 underscores the point of beneficial
18 electrification, which that electricity, in
19 and of itself, is a good thing, because it is
20 more efficient at the point of use. And it
21 applies, by the way, not just to autos, it
22 applies to a lot of other things. And this is

1 an example where more power plants are a good
2 thing from a carbon standpoint, even without
3 carbon capture and sequestration. If you were
4 devoting that electricity for transportation
5 to meet carbon concerns, you get a lower
6 carbon footprint.

7 So that is totally germane to what
8 is going on today. And then, of course, if
9 you use carbon capture and storage, you get
10 basically a third or 40 percent of the total
11 carbon emissions. And there is nothing wrong
12 with a new power plant as such. What we are
13 talking about is what comes out of it from an
14 emissions standpoint and the cost of the
15 electricity. And in this state to make a
16 major penetration of electricity in the
17 transportation sector would be nothing but
18 good for the United States. There is nothing
19 to be concerned about in that context.

20 MS. MIGDEN-OSTRANDER: May I make
21 another suggestion with regard to something
22 that I think might help with the argument.

1 Now, I don't know to what extent this can be
2 done, but if you're looking at the cost of
3 comparing a plug-in hybrid with a conventional
4 car, you say okay, it is about ten, eleven
5 thousand more, based upon your charts. But if
6 we looked at projections of what is going to
7 be the price of gasoline over the next ten
8 years when these cars would be in operation,
9 versus you know what is going to be the cost
10 of electricity to charge that car over that
11 same period of time; looking at a projection
12 of where the prices are going, and then factor
13 that into the overall costs, so that you are
14 adding in sort of the fuel cost component in
15 the comparison.

16 DR. BURKE: That is what is on
17 page 154 and 155.

18 MS. MIGDEN-OSTRANDER: Okay. I
19 did not fully get that. Maybe I missed
20 something.

21 DR. BURKE: That's the break-even
22 price analysis. So it looks at it, --

1 MS. MIGDEN-OSTRANDER: Oh, I see.

2 Yeah, I see what you're saying.

3 DR. BURKE: And there were two
4 cases here. There's the base case where we've
5 got conventional vehicle, the hybrid, -- the
6 plug-in hybrid, with the low capital costs and
7 a plug-in hybrid, -- there's a dispute about
8 what it costs to build a hybrid and I am not
9 surprised. EPRI's got a number that is kind
10 of a low number; Pacific Northwest Lab had a
11 number that everything is just way too high.
12 But I thought that for the purposes of this
13 study you know rather than pick between them,
14 just show both of them.

15 But the curves show the number of
16 years it takes at the current fuel and
17 gasoline/electricity prices for the cumulative
18 cost of each one of those vehicles to break-
19 even. So, for example, -- you get the idea.
20 The purple line is conventional vehicle at
21 current fuel prices. If you have the low
22 price PHEV, you know the one that costs two

1 thousand to three thousand more than a hybrid
2 electric vehicle, they cross over about six
3 years out. Which means that the break-even
4 time for the fuel cost to pay back the cost of
5 capital is about six years.

6 If you look at the graph on the
7 right hand side; this assumes that gasoline
8 prices are \$5.00 a gallon, it also assumes
9 electricity prices went up in proportion.
10 So, I think electricity prices I think were
11 like .9 cents kilowatt hour in the base case
12 and they were .14 cents or something like
13 that, in this case. So they all went by the
14 same ratio. And that brings the break-even
15 period back to about three and a half years,
16 if you have the lower price PHEV.

17 So, this says two things; one is
18 obviously, higher fuel prices actually make
19 this a better story, even if the electricity
20 price goes up at the same rate of gasoline
21 prices, which we have not seen and probably do
22 not expect. And that is purely and

1 assumption. But the other thing it says is
2 that if you look at that red line, that's the
3 higher priced PHEV, there is a real incentive
4 to get the cost of the vehicle down. But that
5 is what this is intended to show is that there
6 is a break-even. And is it really relatively
7 a short period of time, if you can bring the
8 cost of the vehicle down. That's a key point.
9 And that is why one of the whimpy
10 recommendations is that the Secretary ought to
11 continue to work on bringing, -- research and
12 development to bring that, --

13 MR. PALMER: And I think we ought
14 to, -- in the summary, make a big point of
15 this.

16 MS. MIGDEN-OSTRANDER: Yeah, I
17 think that needs to be highlighted more.

18 MR. PALMER: And GM is for sure,
19 pursuing this both, car/auto, in a major way
20 and they are going to roll it out currently
21 this fall and bring it to market within two
22 years.

1 DR. BURKE: Well they had a car
2 out last year, but they did not have a battery
3 in it, as I understand.

4 MR. PALMER: Yeah, they have got a
5 working prototype.

6 DR. BURKE: They've got a working
7 prototype. They are working; they've been
8 around for awhile. Again, the problem is
9 energy density, you know getting a battery, --

10 MR. PALMER: You know it is
11 another example of in a peak-oil world
12 everything, everywhere, all the time. You
13 need alternatives and this is an important
14 one.

15 DR. BEZDEK: Let me ask a question
16 here. I've heard it called the metric for
17 hybrid vehicles on something like this, the
18 battery pack will last about fifty or sixty
19 thousand miles, at which time that has to be
20 replaced at a cost of five or six thousand
21 dollars. Therefore, negating virtually all of
22 the money you've saved on gas the previous

1 five years. Is that your understanding as
2 well?

3 DR. BURKE: No. These analyses
4 are based on the assumption that the battery
5 technology develops to the point where you can
6 get 100,000 miles over the life of the car out
7 of the battery. I did not get into it here,
8 because there is a lot of that kind of stuff.
9 And I don't think the intention of this is a
10 treatise on plug-in hybrids. But the
11 assumptions are that this vehicle will run for
12 100,000 miles with the battery. That is one
13 of the concerns you know the de-cycling that
14 it goes through and whether or not you can
15 actually develop a battery; whether the
16 battery, -- actually what it would cost to
17 develop a battery that does that. But that is
18 part of the disparity between this INEL
19 number, -- or PNL, which is substantially
20 higher than EPRI's number.

21 MR. PALMER: But you said that is
22 a documented number?

1 DR. BURKE: Yes, it is heavily
2 referenced.

3 MS. GELLICI: So, I guess my point
4 was I got real excited about the chapter; one,
5 because I did not know anything about it and
6 secondly, it just seemed like a real win on a
7 lot of points which you make. Then when I got
8 to the findings and recommendation section
9 there was something that, -- I just kind of
10 lost air on. And maybe there isn't anything
11 there that we really want to step up on. It
12 is a very new thing for the Council; kind of
13 the first time that we have addressed it.

14 DR. BURKE: It seemed to me Janet,
15 that for the National Coal Council, -- it kind
16 of goes back to what people were saying, the
17 real key element here for us is, -- I mean the
18 issue here is really to have this vehicle
19 developed commercially, which is not a
20 National Coal Council thing. But you know
21 that is where, -- and the primary issue there
22 is battery technology. And so there is a

1 recommendation to the Secretary, because there
2 is a program and they are working on that. So
3 that was the reason for that recommendation.

4 I think for the National Coal
5 Council the key thing is to ensure that we can
6 continue to provide coal-based electricity in
7 the future to be able to meet this. Replacing
8 plants to be incremental to, --

9 MR. PALMER: It is the use of coal
10 in transportation and it is conceptually no
11 different than coal to liquid.

12 DR. BURKE: Right.

13 MR. PALMER: So, we are quite free
14 to go ahead and make recommendations with
15 respect to driving the bus, -- in terms of
16 trying to get this stuff, --

17 DR. BURKE: Well, I think from a
18 coal perspective the issue is no different
19 than it is for any other coal used in the
20 future; to have carbon capture and storage
21 technology commercially available so we can
22 build these coal plants to provide electricity

1 for any use. And in this case, the
2 electricity demand is going to be increased
3 because of presence of the hybrid electric
4 vehicle. So, that is what it came down to.

5 MS. GELLICI: Yeah, and I
6 understand that.

7 DR. BURKE: And then the
8 incentives idea was well, you know it makes
9 some sense. There is an appetite out there
10 for incentives, and give an analysis of what
11 an incentive program would look like and what
12 it might cost. And as a recommendation for
13 the Secretary it wasn't, --

14 MR. PALMER: Well, we will look at
15 that recommendation to the Secretary, -- the
16 aspect of that.

17 DR. BURKE: I mean if somebody's
18 got a, -- I would be happy to have somebody
19 else write it.

20 MR. BECK: Your idea Janet, was
21 just to beef this up to the extent we can?

22 MS. GELLICI: We can talk about it

1 a little bit more on the, -- but I was kind of
2 just, -- and it may be, -- you know I
3 understand why you made the recommendation.
4 They are great recommendations, it's just can
5 we be stronger
6 on, -- like this is something that we really,
7 really need to pursue.

8 MR. PALMER: Okay. Is this a good
9 time to break for lunch?

10 MS. MIGDEN-OSTRANDER: I just have
11 one quick comment. On Recommendation Number
12 2, is that something within the Secretary's
13 jurisdiction or is that really something more
14 within the Department of Transportation?

15 MR. BECK: It's in DOE.

16 MS. MIGDEN-OSTRANDER: It's in
17 DOE?

18 MR. BECK: Yeah. That's the Idaho
19 Renewable Energy Lab, they have a program.

20 MS. MIGDEN-OSTRANDER: Okay.
21 Great. Great. I just wanted to make sure we
22 were not slipping on, --

1 MR. BECK: Oakridge, they have a
2 program.

3 MS. MIGDEN-OSTRANDER: Okay,
4 thanks. This is exciting.

5 MR. PALMER: Okay. We will break
6 for lunch and just eat right here and when
7 everyone is done we'll open up.

8 [Whereupon, at 12:00 p.m. the meeting
9 was recessed, to reconvene this same day at
10 12:30 p.m.]

11 MR. PALMER: Bob did the next
12 chapter.

13 VI. CHAPTER 5

14 By Robert A. Beck

15 MR. BECK: Chapter 5 is
16 Underground Coal Gasification. And to say
17 that it got off to a slow start is probably an
18 understatement. And Jay Braitsch was kind
19 enough to send me a 120 page document that was
20 put together by three people, Elizabeth
21 Burton, Julio Freidmann and Robbie, -- I am
22 going to slaughter this poor guy's name; U-P-

1 A-D-H-Y-E. Anyway, they are at Lawrence
2 Livermore National Lab and they have done; and
3 have been working on, best practices in
4 underground coal gasification for quite some
5 time.

6 I finally took that 119 pages and
7 tried to summarize it, shrink it down
8 basically through a cut and past operation.
9 Got it out to Janine. Janine looked at it and
10 actually shared my summary with Julio
11 Friedmann, who said that they have an updated
12 version and he would be happy to provide some
13 comments and update it. So, that is exactly
14 what he has done. Unfortunately, that is not
15 the version that you are looking at, because
16 he just sent that to me again, yesterday. And
17 on top of that, I think Janine is going to add
18 some more comments to it as well. But, I
19 think we are at a point now where we do, in
20 fact, have the experts engaged and we will get
21 the comments that Mr. Friedmann has sent and
22 get them incorporated into this. We will get

1 the proper reference to that study and give
2 them the proper credit, because actually it is
3 their work. Which is not unusual, it is what
4 we do. You know we take other people's work
5 and put it into our stuff and reference it.
6 So that is kind of a brief summary of the who
7 on this.

8 The factual part of it; as you
9 recall, our agreement was to give an overview
10 of the technology, since it's being studied
11 and to some degree, implemented in various
12 stages and places for about the thirty years.
13 And there is quite a bit of history. There is
14 a lot of work being done in the United States,
15 but more predominantly I think, overseas,
16 especially in China and India and Australia,
17 the former Soviet Union, all of those
18 countries are active in various phases of it.
19 So, that is basically what we talked about.

20 Obviously, the attractiveness of
21 the technology is that it traps all of your
22 emissions underground while you are gasifying

1 the coal insitu. As I've said often, it
2 always amazes me that you start a fire in a
3 coal mine on purpose, when usually that is the
4 last thing you want to have happen. But this
5 is a little different situation. It would, in
6 fact, make available otherwise un-minable coal
7 scenes and coal supplies and expand
8 dramatically, the coal resource base, if in
9 fact we can implement these technologies here
10 in the United States, as well as worldwide.

11 That is sort of where we are at.
12 The recommendation, -- it is hard to make
13 recommendations to the Secretary about
14 research and development on this stuff,
15 because it has got a long track record and a
16 long history. But that is, in fact, what
17 Julio Friedmann is going to put together, some
18 recommendations that we can deliver.

19 Obviously, the carbon management aspect of it
20 is attractive, in that again, it can trap all
21 of that already in the ground and it stays
22 there and you just bring up the fuel that you

1 produce.

2 So, that is kind of a thumbnail
3 overview. Janine, if you would care to
4 amplify, add to or whatever.

5 MS. MIGDEN-OSTRANDER: A couple of
6 quick things. One of the factors about the
7 up-to-date is going to focus, -- there is
8 going to be an addition about what is going on
9 in the United States. Wyoming has, -- in
10 Wyoming Gas Tech has announced plans to build
11 and begin a UCG pilot. So that is something
12 new, where we've got something actually
13 happening in the United States. So that is
14 also referenced in this study.

15 And then the biggest change, in
16 addition to just updating the various sections
17 is to talk about is to increase the
18 recommendations, asking for more funding for
19 research and development of these technologies
20 and outlining what is necessary to do that.
21 Engaging in more field demonstration projects.
22 Developing standards for citing and operation

1 of new CG projects.

2 And the final thing is a comment
3 that insitu gasification has a potential to
4 dramatically reduce the cost of syngas
5 production and thereby, carbon capture and
6 sequestration. And trying to follow through
7 on that and look at how we can bring down the
8 overall costs of gas, -- coal gas, through
9 this technology.

10 And a final recommendation would
11 be develop materials for out-reach and
12 education since there is very little
13 familiarity in the United States about this
14 technology. We need to do some work on
15 letting people know about it and educating
16 them about it.

17 MR. BECK: And on the timing, I
18 think that we will have the input from
19 Friedmann by Tuesday or so of next week. So,
20 fairly quickly.

21 MS. MIGDEN-OSTRANDER: Probably by
22 tomorrow.

1 MR. BECK: Okay. So, it will be
2 coming very quickly, so it will be easy enough
3 to factor into the next draft.

4 MR. PALMER: Here is a comment, --
5 it's so interesting though, just to see how
6 quickly the world changes and moves. On page
7 167, you see a reference to China. "China
8 uses over 1.9 billion tons of coal each year
9 and emits over 3.5 billion tons of CO2."
10 That's of 2004. This year they will produce
11 over 3 billion tons of coal in China. So, in
12 four years they have added the U.S. production
13 base to China. In four years. You have to
14 stop and think about that.

15 DR. BURKE: Yeah. There is an
16 article in USA Today saying in 2006 it's now
17 generally agreed that China passed the U.S.

18 MR. PALMER: In 2006.

19 MS. MIGDEN-OSTRANDER: Do you have
20 specific information Fred that you can give me
21 and we can update that section to include
22 that?

1 MR. PALMER: Yes. Actually, I
2 think probably the World Coal Institute web
3 page would have that.

4 MS. MIGDEN-OSTRANDER: Okay.

5 MR. PALMER: And I will look at it
6 too.

7 DR. BURKE: One thing I would
8 suggest adding to the recommendations; and
9 maybe it is in there somewhere, but I did not
10 catch it. Do a fairly, -- well, a more
11 detailed engineering and economic analysis of
12 the technical requirements and costs. Because
13 what I have seen so far is pretty rudimentary,
14 I guess I would say.

15 MR. PALMER: It's cursory.

16 DR. BURKE: And I have seen some
17 numbers that suggest that it is substantially
18 less expensive, -- and maybe it is, I am not
19 arguing that. And given what we know about
20 the cost for surface plants now going up so
21 high that maybe it's even more of a, -- but I
22 think that is something that probably demands

1 a little more attention.

2 MS. MIGDEN-OSTRANDER: So,
3 engineering on, --

4 DR. BURKE: Engineering and
5 economic analysis of underground coal
6 gasification.

7 MS. MIGDEN-OSTRANDER: I don't
8 know if that can be done for this report, but
9 I'll, --

10 DR. BURKE: No, put it as a
11 recommendation to be done.

12 MS. MIGDEN-OSTRANDER: Oh, as a
13 recommendation?

14 MR. BECK: There is a
15 recommendation in here on increasing modeling
16 capability for siting.

17 DR. BURKE: That's probably more
18 technical, --

19 MR. BECK: But I don't think there
20 is a specific recommendation Frank, on what
21 you are talking about. But I think there is
22 enough in the body that we could make that

1 recommendation.

2 MS. MIGDEN-OSTRANDER: Can I read,
3 -- do they have the updated recommendation, --
4 they don't have it. Can I read to you one
5 recommendation and tell me if that captures
6 your thoughts? If you don't mind.

7 DR. BURKE: Okay.

8 MS. MIGDEN-OSTRANDER: "Renewed
9 Research Program.

10 The U.S. disbanded its research
11 program in 1989, since then no
12 government agency has sponsored
13 scientific research in to UCG
14 processes or products. The number
15 of outstanding technical issues,
16 including cost and economics,
17 process engineering, subsurface
18 process monitoring and control
19 risks and hazards and synergies
20 with carbon management remain
21 unexplored. Improved simulations
22 are also needed for gasification

1 formation of a cavity, the flow
2 and transfer of contaminants and
3 subsidence, in order to better
4 define the boundary conditions for
5 practice and to decrease the
6 learning curve. A substantial
7 research program; less than 5
8 million per year for five years,
9 for a total of 25 million is
10 recommended. That includes
11 participation of research
12 institutes, universities and
13 companies."

14 DR. BURKE: That is really the
15 research. I think what I am asking is a
16 recommendation specifically to look at the
17 engineering and economic analysis.

18 MS. MIGDEN-OSTRANDER: Okay.
19 Because they do mention costs and economics,
20 process engineering.

21 MR. BRAITSCH: Bob, this is Jay
22 Braitsch. I am not sure, -- I have not looked

1 at that chapter yet, but one thing that would
2 probably be interesting to DOE is if you do do
3 this and you do have the combustion products
4 trapped, do these un-minable themes generally
5 come with a seal or is the CO2 likely to come
6 bubbling to the surface sooner or later?

7 MR. BECK: That is a good question
8 Jay. I don't know. I mean Frank, I think
9 that is what you are talking about; that's
10 engineering and, --

11 DR. BURKE: Well yeah. What I
12 have seen on this is sort of a cursory kind of
13 analysis of the economics, -- design and
14 economics for an underground coal gasification
15 facility. And what I am suggesting is a
16 recommendation for more detail of the
17 engineering and economic analysis.

18 MS. MIGDEN-OSTRANDER: Okay.

19 DR. BURKE: I don't know if it is
20 covered in here or not, but the other thing
21 that would be interesting would be, -- there
22 is a discussion in there on the research side

1 about trying to do a better job of
2 characterizing sites as potential candidates
3 for this. I think some quantification of the
4 total amount of coal that would be available,
5 particularly if you could differentiate from
6 the coal that would be otherwise un-minable,
7 what that would do to increase out
8 economically recoverable resources would be
9 really interesting.

10 MR. PALMER: Yes, it would.

11 DR. BURKE: That's why the unions
12 are interested in it, particularly the
13 Chinese, because they've got a lot of coal
14 that can be released if you get to the seams
15 and they cannot mine it. So, you know this is
16 an attractive way for them to get at it. We
17 have got a lot of coal resources that
18 currently appears to be un-minable and that
19 would be a really interesting number.

20 MR. PALMER: Well I see the
21 reference in here to China, what does it say,
22 over 100 trillion tons of coal? So, I would

1 think the U.S. resource base would be similar
2 to that.

3 MR. BECK: In the first paragraph
4 there's a reference to a 300 to 400 percent
5 increase in recoverable coal reserves in the
6 U.S. could be possible. So, at least they've
7 taken a stab at it.

8 DR. BEZDEK: What page are you on?

9 MR. BECK: Page 160, right in the
10 first page of the chapter under the
11 highlighted part. If you look at Summary and
12 Overview the second to last sentence in that
13 paragraph; "A 300 to 400 percent increase in
14 recoverable coal reserves in the U.S. is
15 possible".

16 DR. BURKE: That number on page
17 167 says 114 trillion; that should say
18 billion.

19 MS. MIGDEN-OSTRANDER: On page 16,
20 --

21 DR. BURKE: Page 167.

22 MS. MIGDEN-OSTRANDER: Where are

1 you at?

2 DR. BURKE: The first sentence in
3 the second paragraph. "China has huge
4 reserves of coal of every rank, estimated at
5 114," -- it should be billion.

6 MS. MIGDEN-OSTRANDER: Okay.

7 DR. BURKE: U.S. coal resource is
8 4 trillion tons. The resource is all the
9 coal, every bit of carbon. Our demonstrated
10 reserve base is 250 billion tons. And that is
11 the estimated coverable reserve if mined out
12 at the current price. The 114 number for
13 China is in billions. It is probably wrong,
14 but then that is the number that they put out.

15 DR. BEZDEK: Bob's point is well
16 taken. A three to four hundred percent
17 increase in coal reserves, that is a
18 significant number.

19 MR. BECK: Yeah. Especially if
20 you can trap everything down there while
21 you're at it.

22 DR. BEZDEK: Where is that number

1 Bob? What page?

2 MR. BECK: It is on page 160. The
3 first paragraph of the Summary and Overview.
4 The second to the last sentence.

5 MS. MIGDEN-OSTRANDER: Are you
6 saying it is significant because you think it
7 is significant or are you saying you think the
8 number is wrong?

9 MR. PALMER: No, he thinks it's
10 significant.

11 DR. BEZDEK: I think it's very
12 significant.

13 DR. BURKE: It might be wrong, but
14 it's significant.

15 DR. BEZDEK: Well divide by (2)
16 it's still significant. What's interesting,
17 there have been a couple of studies over the
18 past year saying that the world's coal
19 reserves are way over estimated. This tends
20 to refute that.

21 DR. BURKE: Yeah. That's the
22 resource versus reserve argument.

1 MR. PALMER: You know when you
2 talk to these guys that know Asia (inaudible)
3 and they talk about China, they say there is
4 coal out there that nobody has any idea.

5 DR. BURKE: I did this National
6 Coal Council Study, -- Research Council Study
7 rather and we looked at world coal reserves
8 and this number that you've got for China is
9 probably right, it's 114 billion tons. They
10 are mining 3 billion tons a year; they are
11 trying to go to (4). And says then we've got
12 enough coal for another twenty or thirty
13 years. That is not true. They have a lot
14 more coal than that, in my opinion. But
15 that's my opinion.

16 MR. PALMER: It just has not been
17 identified.

18 DR. BURKE: It's just that they
19 have it put it into their estimated reserve
20 number. But it is almost certain to be
21 substantially higher than that number. The
22 U.S. Coal Resource is 4 trillion tons, but we

1 only count 265 billion of that as a
2 recoverable reserve. So, about 8 percent of
3 our resource we actually count as recoverable
4 reserve. Those numbers were generated in 1972
5 when coal was selling for about \$10.00 a ton.

6 MR. PALMER: What's the aggregate
7 number of total resources?

8 DR. BURKE: The total resource is
9 4 trillion tons, but that does not count
10 Alaska either. So Alaska could add another
11 couple of trillion right there.

12 DR. BEZDEK: We submit that on
13 page 93.

14 DR. BURKE: Yeah, that's the one.
15 That is the U.S., -- that dates back to 1972
16 and it hasn't really been updated since then.

17 MR. BECK: Anyway, we think we've
18 got Chapter 5 up and running and in good
19 shape. And in very short order a revised
20 draft of this, --

21 MS. MIGDEN-OSTRANDER: Maybe it
22 will be Monday.

1 MR. BECK: Well, very short order
2 like I said, Monday or Tuesday of next week.
3 And it should be a pretty easy cut and paste
4 operation to get it in there.

5 MS. MIGDEN-OSTRANDER: I'll circle
6 back with Julio regarding those comments and
7 send you an updated.

8 MR. BECK: Okay, that would be
9 great.

10 VII. CHAPTER 6

11 MR. BECK: Chapter 6 is way beyond
12 my intelligence level, since I flunked out of
13 law school after a year and a half.

14 MR. PALMER: It reads fine. It's
15 understandable.

16 MR. BECK: And I don't know what
17 else we could add to it. These guys are truly
18 on top of this thing. We may need to work
19 with them directly to get some really
20 specific, refined recommendations, I think.
21 But obviously, in the legal aspect there are
22 a lot of things that come into play; there's

1 a lot of other environmental laws that are
2 going to be a part of this if the Congress
3 does not move legislation. If they do, we
4 will have to see how they treat all these
5 other, if you will, competing environmental
6 statutes.

7 There are obviously, liability
8 issues and I think that this particular
9 chapter begins that debate rather thoroughly
10 and probably raises more questions than it is
11 going to answer. But clearly I think it is a
12 critical part of the whole carbon management.

13 MR. PALMER: Would you ask them to
14 revisit this and take the economics out.
15 We've got that in other parts. They are just
16 giving you a regurgitation of what's in the
17 literature.

18 MR. BECK: Are you on a page?

19 MR. PALMER: Yeah, (176).

20 Wherever they are giving lawyerly like
21 opinions on the economics, I don't think that
22 is appropriate. Now, the geologic criteria as

1 to when you can do it and when you cannot,
2 that's fine. I think that probably would be
3 my major, -- my only one, really. I do think
4 it's a good job.

5 And ask them to be more specific
6 when they talk about liability risks. What
7 risks are people worried about? That is the
8 loosest discussion in this whole field is the
9 fear of liability risks associated with CO2.
10 What does that mean, specifically? What?
11 Why? How? When and where? As the reporters
12 say. But, tell them thank you and it is a
13 great job.

14 MR. BECK: Will do. Considering
15 what they normally charge and we got it for
16 free, I think that's a pretty good job.

17 MR. PALMER: Well they have a lot
18 of clients that have a big interest in this,
19 so I am not sure they weren't paid for it.

20 MR. BECK: They are getting paid
21 for it. There's no question about it, they
22 are getting paid for it.

1 DR. BURKE: That's why we got no
2 lunch.

3 MR. BECK: That's right. Blame it
4 on Huntley Williams (phonetic), it wasn't the
5 National Coal Council.

6 VIII. CHAPTER 7

7 MR. BECK: Chapter 7 is another
8 section of the report that was done by Ray
9 Field.

10 MR. PALMER: That's the Eastman
11 (phonetic)?

12 MR. BECK: That's correct. And
13 frankly, I just got this a couple of days ago,
14 so I have not even had a chance to really go
15 through it in any detail. Ray has indicated
16 to me that he has already reworked this, so we
17 should be able to get a second version of this
18 very quickly, again, Monday or Tuesday of next
19 week.

20 MR. PALMER: What do you think
21 about, -- where would you put this? Would you
22 just have it sitting at Chapter 7? I mean

1 what is this, -- if we style this, -- if the
2 name of this thing is something like "The
3 Urgency of Sustainable Coal," then that kind
4 of, -- this kind of discussion really ought to
5 go in the Executive Summary; up front.

6 MR. BECK: There is nothing
7 magical to the numbering system for chapters.
8 We have not done it on a priority basis. I
9 think we did think through where we had
10 Chapter 1 for example, because that's kind of
11 where traditionally you have got to get all
12 that stuff up front. After that, I think we
13 can order or number the chapters, working with
14 Frank, through the editorial process. I don't
15 know that we have a strong feeling on what
16 ought to go where. But, I do agree with you
17 that the guts of this particular chapter need
18 to be prominently displayed and discussed in
19 the Executive Summary. Because as I recall,
20 this is one of the main, --

21 MR. PALMER: I guess what I am not
22 saying, I am not sure I would have a separate

1 chapter.

2 MR. BECK: Oh, I see. Okay, I see
3 what you're saying.

4 MR. PALMER: Because it is back to
5 the comment that was made earlier; I cannot
6 remember who made it, but it is a context.

7 MR. BECK: I see what you're
8 saying.

9 MR. PALMER: And then what flows
10 from the context is okay, here's how you do
11 sustainable coal. It's what internally we
12 call why coal/how coal. So the why coal ought
13 to be in one place and the economics is part
14 of why coal. Now Frank can take this and use
15 it so that this work is not loss, but to have
16 it as a separate stand-alone chapter, I guess
17 that would probably cause ideas, --

18 MR. BECK: Well, I don't know
19 whose, -- I mean in talking about it, it was
20 discussed in a number of different meetings
21 and phone calls. Let me ask a question Fred.
22 Generally everything we have in the Executive

1 Summary; and I think this is why we have the
2 stand-alone chapter, everything we have in the
3 Executive Summary has a more detailed
4 discussion of it in the body of the report to
5 which we can refer back.

6 MR. PALMER: But, let me
7 interrupt. Because the context is not in the
8 report itself. The context is the framework
9 for why do we feel the urgency of sustainable
10 coal? That's the Executive Summary. Do you
11 see what I'm saying? As opposed to a separate
12 chapter study.

13 MR. BECK: Okay.

14 MR. PALMER: It's to say here's
15 where we were in 2006 when we did the other
16 study, -- when we did the America's Future
17 Study. Here's what has happened in between.
18 Here is where we are and it could go higher,
19 and you lose this, this and this. It's clear
20 beyond doubt that we need to do, -- that we
21 need to use more coal in a broader context
22 with carbon capture and sequestration. Here's

1 how we will do it.

2 So, this Chapter 7 is like an
3 addendum almost.

4 DR. BURKE: Can you take Chapter 7
5 and make it, -- I don't know what you want to
6 call it in the context of an overview or
7 something like that, make it, -- after the
8 Findings and Recommendations, make it the
9 first chapter. And then have the Executive
10 Summary Findings go off from this, some
11 findings and recommendations to make that the
12 first entry in the Findings and
13 Recommendations Section.

14 DR. BEZDEK: I think that's a good
15 suggestion.

16 MR. BECK: Sure.

17 DR. BURKE: I think what Fred said
18 is right. You know this does not even belong
19 at the last, -- it belongs at the beginning.
20 It explains what electricity from coal is all
21 about and what coal is all about. But if you
22 make this the Executive Summary then it takes

1 you forever to get into the Findings and
2 Recommendations. So I think reordering and
3 putting this as the first chapter, calling it
4 overview and context or something and then
5 draw some findings from this and make those
6 the first of the sets of chapter findings and
7 findings and recommendations.

8 MR. BECK: That is simple to do.
9 That is very easy to do. The reason that the
10 chapters are put in the order that they are
11 put in, really is no substantive basis. It is
12 just in looking at the letter that was sent to
13 the Secretary back in August of last year when
14 we proposed doing the study, we had a list of
15 things that the study would cover and they
16 were listed in no specific order. We just
17 then took that list and said well, number one
18 is Chapter 1; number two is Chapter 2. And
19 that is really how we did it. So, there is no
20 real rhyme or reason for the actual numbering
21 of the chapters based on priority or based on
22 assuage or any of that kind of thing. So, to

1 take this and move it to the front of the body
2 to make it Chapter 1 is, --

3 MR. PALMER: But, I am challenging
4 the notion that this should be in there at all
5 in the context that it is in. Because this is
6 more of an academic; here is what coal has
7 done; here is what it can do, as opposed to we
8 have a train wreck, you need to pay attention.
9 Here is why and here is how you can do it.
10 And so that, as opposed to this economic
11 argument; which has gone nowhere.

12 I mean we have made these kinds of
13 arguments in every study that we have done
14 from the beginning of time. And you know we
15 are way beyond that. We are way beyond this
16 kind of advocacy or advice, I guess I could
17 say, in the context of where we are from an
18 energy standpoint. When George W. Bush became
19 President of the United States oil was \$20.00
20 a barrel and natural gas was two and a half
21 dollars an MCF. So, we've got a five times
22 out of the one and five times on the other,

1 and if anything, we are moving away from the
2 paths that we thought we were on three or four
3 years ago. And these prices are just ramping.
4 This is an opportunity to just say to people
5 pay attention. And I don't think this kind of
6 academic economic discussion does that.

7 Now, having said that, I will
8 defer to you and Frank, when you sit down and
9 try to, --

10 MR. BECK: Well I will see what we
11 get from Ray first.

12 MR. PALMER: -- scramble the egg
13 and then put this back. And see what you get
14 from Ray, -- and it is good work. I am not
15 denying that, but I do not think it has the
16 urgency, --

17 MR. BECK: You're just saying that
18 it is behind the curb a little bit?

19 MR. PALMER: Yeah, it's too
20 vanilla.

21 MR. BECK: Plain vanilla. Okay,
22 let me see what I get from Ray. I will call

1 him tomorrow when I get back and see exactly
2 where he is at; what he has got going on and
3 obviously talk with Frank as well and we can
4 see what we can do in terms of making this
5 more hard hitting, more specific and then
6 moving it to the front part of the report, in
7 some way, shape or form. We will see how we
8 can do that.

9 MR. GRIMES: Hey Bob, it seems to
10 me that there is one way to make it a little
11 more hard hitting is just to parch out from it
12 the various good arguments. If I understood
13 Fred, what Fred was really getting at I
14 thought was that this is the kind of thing
15 that is an argument as opposed to the other
16 sort of analysis going on. And I think what
17 Fred is calling for is to come in with a
18 strong argument to back up his urgency
19 suggestion. And you need to take a few points
20 and bang them in there real hard. So maybe
21 they need to be more specific, but a little
22 less lengthy, near the front of that document

1 somewhere as the opening argument.

2 DR. BEZDEK: Focusing on the
3 economic consequences, rather than the
4 academic discourse.

5 MR. GRIMES: Yeah, everything that
6 comes behind it will back it up. But you know
7 if you are writing a brief you want to get
8 your best shot up in the first two paragraphs.

9 MR. PALMER: It must have been the
10 lawyer in me.

11 MR. GRIMES: Am I understanding
12 you right Fred? Is that what your point is?

13 MR. PALMER: Yes.

14 MR. GRIMES: Kindred souls.

15 MR. PALMER: There you go. Okay,
16 that takes us through the document in its
17 entirety and let's go to the recommendations.

18 IX. RECOMMENDATIONS

19 MR. PALMER: Where are those?

20 DR. BURKE: We have kind of gone
21 through them already.

22 MR. BECK: Yeah. Actually we, --

1 MR. PALMER: Let me ask it this
2 way; does anybody have anything further with
3 respect to the recommendations? Obviously,
4 the recommendations are going to get reworked,
5 because the whole thing is being reworked, but
6 does anybody have any additional comments on
7 it.

8 MR. BECK: Yeah, I think that is a
9 better way to put it, Fred. We did, in fact,
10 walk through almost all the recommendations on
11 a chapter by chapter basis. Now would be a
12 good generic time to talk generally about what
13 are the things you might want to see added or
14 put stronger or whatever. And I know a couple
15 of folks have been kind of waiting to make
16 their statements.

17 MS. MIGDEN-OSTRANDER: I had one
18 thought, which was that on page 9, it states,
19 "The National Coal Council makes
20 the following recommendations".
21 And then after that we start specific
22 recommendations. And I was wondering whether

1 it made sense to say on page 9 that,

2 "The National Coal Council makes
3 the following general
4 recommendations".

5 And then when you start with Chapter 2 say,
6 "specific recommendations include". And then
7 to capture the specific recommendations from
8 each chapter.

9 DR. KRUTKA: The recommendations
10 on Chapter 9, -- or on page 9, are from
11 Chapter 1, so that they are specific to that
12 chapter.

13 MS. MIGDEN-OSTRANDER: Oh, okay.

14 MR. BECK: Yeah. I understand
15 what you are saying Janine, but they are, --

16 MS. MIGDEN-OSTRANDER: Yeah. I
17 guess because it does not state that this is
18 Chapter 1.

19 MR. BECK: It does, way back on
20 page 2. The summary for Chapter 1 is rather
21 lengthy, because the chapter is rather
22 lengthy.

1 DR. BURKE: The findings and
2 recommendations I assume, are going to be
3 pulled out and put into a separate section on
4 findings and recommendations by chapter?

5 MR. BECK: Right.

6 MS. MIGDEN-OSTRANDER: Yeah. I
7 guess that is where I got confused here.
8 Because you have a whole summary of Chapter 1
9 and then you have Findings and
10 Recommendations. And then you move on to
11 Chapter 2, Findings and Recommendations
12 without necessarily a summary.

13 DR. KRUTKA: We can just write
14 Chapter 1 Findings and Recommendations.

15 MS. MIGDEN-OSTRANDER: Yeah, I
16 would just put Chapter 1 right above it.

17 MR. BECK: But, what we have done;
18 if you go back to the 2006 Report as the
19 format, we go chapter by chapter with
20 findings, and then we go to recommendations
21 that are not attributed to any chapter, they
22 are just recommendations. That is the format

1 we used in '06, we used a similar format in
2 the study from June of 2007. It is not
3 necessary to link each recommendation with the
4 chapter that it came from, I guess is what we
5 are saying. And because we do not prioritize
6 recommendations; or we never have in the past,
7 we have always tried to make them more broad
8 in terms of being study-wide, rather than from
9 a specific chapter.

10 MS. MIGDEN-OSTRANDER: I don't
11 know, for me and the way I, -- just the way I
12 think and work things through, it helps for me
13 to see that it is tied to a chapter so if I
14 want more detail I can go back and no where to
15 find more detail and where all of that is
16 coming from. So I kind of like that, --

17 DR. BURKE: In this case, it might
18 be better to link, -- the reason being that if
19 you look at it the chapters are really quite
20 a bit different. I mean this is a collection
21 of several different stories, as opposed to
22 different parts of the same story. So the

1 recommendations are all fairly specific to the
2 findings for that chapter.

3 MS. GELLICI: And I would agree
4 with that, except that I think to get back to
5 Fred's suggested title, "The Urgency of
6 Sustainable Coal," I know it is maybe a
7 departure from what we have done in the past,
8 but there is a lot of recommendations in here
9 and the way things get done you know Bob, they
10 read the first five pages, three pages, two
11 pages.

12 MR. BECK: Right.

13 MS. GELLICI: And if we really
14 want to make some points I think we are going
15 to have to do some prioritization of some of
16 these recommendations and pull some out that
17 we think are most urgent.

18 MR. PALMER: Let's get this thing
19 reorganized and get them in one place, I agree
20 with that and then call them.

21 MS. GELLICI: Because I think they
22 are going to get lost.

1 MR. PALMER: And just get nuts and
2 bolts recommendations, you know use the wrench
3 this way and put the wheel on that way, as
4 opposed to the higher level recommendations in
5 terms of federal incentives and driving the
6 bus on carbon capture and sequestration and
7 research and development and a regulatory
8 regime. Those are really the high level kind
9 of things that I think we should focus on.

10 Because I agree with Janet's
11 observation that you've got four or five pages
12 of detailed recommendations that nobody will
13 read anyway.

14 MS. GELLICI: And I know working
15 in Chapter 3 we've gone through even the CTL
16 stuff that are very, very extensive and a
17 great list of recommendations and the Roger's
18 gone back through and actually prioritized
19 some of those. And you know I still get to
20 that section and I go; is this really a
21 priority? Is this something that we really
22 need to include in this section? And you know

1 we can walk through some of my thoughts on
2 those. But, I am starting to really get lost
3 in just the volume of recommendations and
4 stuff here, so. Have we run into this before,
5 Bob?

6 MR. BECK: We actually have not
7 run into it. Well, let me rephrase that. In
8 my ten years we have never run into it. In
9 previous studies before that; the thirteen
10 years before that, you know I cannot speak to
11 that.

12 But this study is a little bit
13 different in that I think Frank's point is
14 well taken, each chapter is kind of almost its
15 own study sort of in and of itself, because it
16 deals with, -- it all deals with coal, but it
17 deals with it in kind of a different way. But
18 I still think if we stay with the template of
19 the last two studies and we force ourselves to
20 really just put the findings from the chapters
21 in there and then we can put the
22 recommendations on a chapter by chapter basis

1 too. I think you are right Fred, we are going
2 to have to pick the silver bullets that we
3 want to put up front, because otherwise even
4 though it is an Executive Summary you are not
5 going to get people past the second or third
6 or fourth page. And if it is twenty pages,
7 which is about what it is, nobody is going to
8 get back to ten, eleven, twelve, thirteen.
9 And if that is where your recommendations are
10 you have sort of lost your opportunity to
11 really say what you want to say.

12 So, I think we can take all of
13 this stuff and try to rework it. Since Frank
14 was involved in this specifically as well, I
15 think we can take another crack at it and let
16 you guys see what comes back.

17 MR. PALMER: Okay.

18 MR. BECK: We have the time to do
19 it. I know time is short, but we do have the
20 time to do it.

21 MR. PALMER: Okay. The process
22 from where will be Bob and Frank, and of

1 course, Paul and Eastman too, -- so the
2 comments, -- you will set up a working group
3 and Frank will have the working document and
4 make the changes and then as these changes are
5 made they will be circulated.

6 MR. BECK: Yes.

7 MS. MIGDEN-OSTRANDER: May I make
8 a suggestion? What might be helpful is for
9 the folks working on each chapter to sort of
10 highlight what they think are the most
11 important recommendations in their chapter to
12 help cull it down even further.

13 MR. PALMER: Good suggestion.

14 MR. BECK: I agree 100 percent
15 folks. I mean they are the people that have
16 been doing it. So, we will make that request
17 I guess. Now, let me just kind of ask around
18 the table, because we have got some of the
19 leaders; Holly, you got a whole bunch of
20 suggestions and whatnot given to you, you are
21 going to go back with Mike and maybe reconvene
22 the Chapter 1 people or whatever and you are

1 going to basically redo Chapter 1 based on
2 today.

3 DR. KRUTKA: Yes.

4 MR. BECK: I am going to call Ray
5 and Paul on Chapters 2 and 7, and also on
6 Chapter 7 obviously, work with Frank and see
7 if we need it or where we put it.

8 Roger is going to do pretty much
9 the same thing on three, right? You are going
10 to take the changes and get some language from
11 Roland and get that taken care of.

12 Frank, I don't know that we did
13 much damage to Chapter 4, but, --

14 DR. BURKE: I am going to make my
15 recommendations look more macho.

16 MS. GELLICI: And I do want to
17 ask, I mean do we want to be stronger than
18 where we currently are with that? So, I am
19 happy to, --

20 MR. BECK: Well, I think we want
21 to be as strong as we possibly can be. There
22 is no sense in saying well gee Mr. Secretary,

1 we sort of, kind of, --

2 MR. PALMER: Well I think the
3 biggest thing on plug-in hybrid is tax
4 credits.

5 DR. BURKE: Yeah, I think
6 incentives, -- like I said a combination of
7 the vehicles and the generating technology go
8 hand in hand. You know logically, trying to
9 move those along simultaneously.

10 MR. PALMER: I mean we will have
11 all the incentives for carbon capture and
12 sequestration in other parts, so.

13 DR. BURKE: We hope.

14 MR. PALMER: Sure. But plug-in
15 hybrids I think by itself it needs to be
16 curved on all levels.

17 DR. BURKE: Okay. I will go back
18 and look at that.

19 MR. BECK: And Chapter 4, Janine
20 and myself are already working with Julio
21 Friedmann and we are going to get that
22 revamped rather quickly as well.

1 I think six we are pretty
2 comfortable with. There are a couple of
3 questions; I will go back to Fred Ames
4 (phonetic), and David Van Houck Stratten
5 (phonetic), and ask them to clear up your
6 question on economics and those at risk,
7 something or other, -- liability risks.

8 MR. PALMER: It is not clear up,
9 it's be specific. What are you talking about?
10 What risks are we afraid of?

11 DR. BURKE: Are they going to
12 actually have some recommendations? Right now
13 they don't.

14 MR. BECK: They do have
15 recommendations. Frankly, they are not in
16 there by design. They are getting paid by
17 other people and they have some
18 attorney/client privilege that they have to be
19 careful of. They know we need
20 recommendations; they want to give us them,
21 because if it does in fact help them and in
22 the long-term probably their clients, to see

1 those offered to the Secretary. And we will
2 go back and ask them okay guys, now is the
3 time to provide that.

4 And we will shoot for a week to
5 ten days to having that revised draft and get
6 that out to everybody and continue the
7 process.

8 MS. MIGDEN-OSTRANDER: The
9 question was asked way back if we had any
10 comments on any of the recommendations. I did
11 want to, -- before everybody winds up; on page
12 16 with regard to personnel; and this going
13 coal to liquids, I think part of the issues, -
14 - and I am finding that in the regulatory
15 world too, is that maybe one of the things we
16 ought to recommend is that we somehow
17 advertise to young people in high schools and
18 to their parents, that this may be a good
19 career path for you; getting involved with
20 engineering and science with respect to energy
21 issues; coal to liquids or any other aspect.
22 Because I keep hearing over and over in

1 conference after conference, about how as the
2 baby-boomers retire then there is not enough
3 other people coming up that understand this
4 and can step into these fields and do this
5 work. And I think that in addition to trying
6 to put together programs in schools, we have
7 got to let people start thinking about it and
8 knowing about it.

9 MR. PALMER: Bob, I would put it
10 in terms of enhance academic program support
11 in chemistry and advance public awareness of
12 the need to rebuild the workforce for coal
13 technology. Something like that.

14 DR. BEZDEK: And it is a
15 recommendation that is not specific to CTL.

16 MR. BECK: It is truly across the
17 board. Dick Masurey (phonetic), has been
18 singing this song for a long time. He sees
19 West Virginia University engineering students
20 and whatnot, just falling off, you know down
21 to almost nothing. So, it is a very good
22 point. And you are right, it probably should

1 be a generic recommendation, not just a CTL,
2 but across the board.

3 MS. MIGDEN-OSTRANDER: And I am
4 even thinking something as you know like you
5 see the Army advertising on TV about join the
6 Army, here are the career opportunities, from
7 time to time, doing some TV ads on the shows
8 that teenage kids watch. That say have you
9 ever considered, -- you know energy is our
10 future; have you ever considered a career in
11 this area? Contact such and such and maybe
12 there is a web site they can contact for more
13 information.

14 MS. GELLICI: On page 12, on the
15 research and development recommendation, I
16 think I have addressed this before, but I am
17 not quite sure I am making my point well
18 enough. When we are asking for more, --
19 should increase and expand focused fundamental
20 R&D programs for CTL, one of the arguments
21 that we make as an industry is that this is a
22 proven, mature technology. And I get

1 concerned when I see that we want more
2 research. And I think there are some specific
3 recommendations in terms of advanced R&D, but
4 I get a little nervous when I see more generic
5 statements that the recommendation there, --

6 MR. PALMER: I think that is a
7 valid point.

8 MS. GELLICI: -- should increase
9 and expand focused fundamental R&D. So, I am
10 just wondering, --

11 MR. PALMER: Roger, how do you
12 respond to that? How do you think that is
13 valid? What do we need on CTL R&D?

14 DR. BEZDEK: Well, it is a
15 delicate point. I think there is a general
16 agreement that we want to recommend additional
17 R&D in certain areas of CTL, but we do not
18 want to go over board and make it look like, -
19 -

20 MR. PALMER: Well, what is the
21 need? What specific R&D is needed for CTL?

22 DR. BEZDEK: Well, there is a

1 whole list of them here. The question is
2 should we take out this generic recommendation
3 or tone it down, --

4 MR. PALMER: Yeah, I think the
5 point was there is not a list of them; that it
6 is generic.

7 MS. GELLICI: There is some that
8 once we get into the chapter Fred, that it
9 goes into. And there are some great points
10 about some of the advanced R&D that is needed
11 on this. But again, I get a little, -- I
12 think we need, --

13 DR. BEZDEK: Well, there are
14 specific R&D recommendations at the bottom of
15 page 12 and 13 and at the bottom of 14, plus
16 more in the chapter. But again, the question,
17 -- and Janet and I have discussed this before,
18 maybe we should delete or reword this, this
19 first recommendation.

20 MR. PALMER: Okay, I gotcha.

21 MS. GELLICI: And then my final
22 point, --

1 MR. PALMER: You should just
2 restrict it to biomass coal-fired.

3 MS. GELLICI: Which I think is the
4 most important in the scheme of things.

5 MR. PALMER: I do too.

6 MS. GELLICI: You know if we have
7 to prioritize, just because that is such a
8 popular word.

9 MR. PALMER: You got that? So I
10 guess what she is saying is the generic should
11 just get hooked.

12 MS. GELLICI: I just do not want
13 to leave the impression that we still need to
14 do more work on the basic technology on the
15 CTL, because we just need to build them.

16 MR. PALMER: And if there is
17 something specific that is not covered, then
18 it should be added in.

19 MS. GELLICI: And the specifics
20 are really for some of the advanced things
21 that it would be great to have, but you know
22 we can start building some of these things.

1 DR. BEZDEK: Instead of focused
2 fundamental; advanced R&D programs? Would
3 that solve the problem?

4 MS. GELLICI: Yeah. And I think
5 we can go back and, --

6 MR. PALMER: Why do you need a
7 generic program? There is no context for a
8 generic recommendation. People won't read
9 that stuff.

10 MS. GELLICI: Why don't we go back
11 Roger, and look at the, --

12 MR. PALMER: If you do have
13 something specific you want done, then we will
14 say it. But, in terms of just saying gee, we
15 want money, --

16 DR. BEZDEK: All right, we will
17 just delete this recommendation. We have got
18 plenty of it and that's fine.

19 MS. GELLICI: I am concerned about
20 going to the well too many times, because that
21 comes through on this report as well. We need
22 this. We need this.

1 DR. BEZDEK: Well, that is
2 something that concerned me. It seems all the
3 recommendations, we need more, more, more.
4 More R&D, more tax credits, more of this and
5 more of that.

6 MR. PALMER: Well, it's true.

7 DR. BEZDEK: Well, there a hand
8 and it's out.

9 MR. PALMER: No, it's not that,
10 the spirit is a partnership with the Federal
11 Government and industry working together to
12 create an energy manufacturing industry to
13 meet our energy needs. It is not a handout.

14 MS. GELLICI: And I think that is
15 one of those urgent recommendations that pulls
16 in from all of the chapters.

17 DR. BEZDEK: And if in indeed, if
18 the focus here or the theme is urgency, then
19 urgency means that the Government has to do a
20 lot of things, -- a lot of generous things
21 real quickly.

22 MR. PALMER: Yes.

1 MS. GELLICI: And then a final
2 point Roger, on page, -- it looks like 11. On
3 the first, -- under the financial bullet; "CTL
4 capital costs are high and are escalating".
5 Again, my concern there is that costs are
6 escalating for all infrastructure development
7 projects and this makes it seem as if the
8 costs are only escalating for CTL. My
9 recommended change there would be CTL capital
10 costs are high and consistent with other
11 energy project developments worldwide, --

12 DR. BEZDEK: You are on page 11?
13 Where, --

14 MR. PALMER: Ten actually.

15 MS. GELLICI: Ten. I'm sorry.

16 MR. PALMER: Right under the bold.

17 MS. GELLICI: CTL capital costs
18 are high and consistent with other energy
19 project developments worldwide that are
20 escalating.

21 DR. BEZDEK: That point is made in
22 the chapter, but it does not come out in the

1 recommendation.

2 MS. GELLICI: Right. Thank you.

3 MR. PALMER: Thank you. Anything
4 additional from anyone else?

5 [No Verbal Response]

6 MR. PALMER: The meeting has been
7 duly authorized and publicized and is open to
8 the public. The public can submit comments to
9 the Department of Energy or if any individual
10 wishes to speak they may do so at this
11 meeting. Those of the public who wish to
12 speak may do so for a maximum of ten minutes.
13 Does any member of the public wish to speak?

14 [No Verbal Response]

15 MR. PALMER: Hearing none, we have
16 no further business before the Committee and
17 we stand adjourned.

18 MR. BECK: Thank you, Mister
19 Chairman.

20 MR. PALMER: Thank you all.

21 [Wherein at 1:40 p.m. the meeting
22 was adjourned.]

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