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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
(ACRS)

THERMAL-HYDRAULIC PHENOMENA SUBCOMMITTEE

+ + + + +

WEDNESDAY

MARCH 6, 2002

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ROCKVILLE, MARYLAND

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The Subcommittee met at the Nuclear
Regulatory Commission, Two White Flint North, Room
T2B3, 11545 Rockville Pike, at 1:00 p.m., Thomas S.
Kress, Acting Chairman, presiding.

COMMITTEE MEMBERS:

- | | |
|------------------|----------------|
| THOMAS S. KRESS | Chairman |
| MARIO BONACA | Member |
| WILLIAM J. SHACK | Member |
| JOHN D. SIEBER | Member |
| VICTOR H. RANSOM | Invited Expert |

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1 STAFF PRESENT:

2 Paul A. Boehnert

3

4 ALSO PRESENT:

5 Fran Bolger

6 Israel Nir

7 Dan Pappone

8 George Strambart

9 Singh Bajwa

10 Suzanne Black

11 Corry Holden

12 Ed Kendrick

13 Matt Mitchell

14 Stu Richards

15 Dale Thatcher

16 Brian Thomas

17 John Zwolinski

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

(1:04 p.m.)

CHAIRMAN KRESS: The meeting will come to order. This is a meeting of the ACRS Subcommittee on Thermal-Hydraulic Phenomena. I am Tom Kress, Acting Chairman of the Subcommittee.

Other ACRS members in attendance present today are Bill Shack and Jack Sieber, and Vic Ransom is attending as an invited expert, shortly to become a member.

The Subcommittee will continue its review of the GE Nuclear Energy Topical Report, NEDC-33004P, Revision 1, "Constant Pressure Power Uprate," and the NRC staff's associated safety evaluation.

The Subcommittee will gather information, analyze relevant issues and facts, and formulate proposed positions and actions as appropriate for deliberation by the full Committee.

Mr. Paul Boehmert is the cognizant ACRS staff engineer for this meeting.

The rules for participation in today's meeting have been announced as part of the notice of this meeting previously published in the *Federal Register* on February 19, 2002. Most of this meeting will be closed to the public to discuss information

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1 considered proprietary to General Electric Nuclear
2 Energy.

3 A transcript of this meeting is being
4 kept, and this transcript will be made available as
5 stated in the Federal Register notice. It is
6 requested that speakers first go to a microphone,
7 identify yourselves, and speak loud enough so
8 everybody can hear you.

9 We have received no written comments or
10 requests for time to make oral statements from members
11 of the public.

12 I have no additional Chairman's comments.
13 Do any of the members have any comments that you wish
14 to make? Seeing none, we will now proceed with the
15 meeting, and I call upon Mr. Israel Nir, I guess, of
16 General Electric Nuclear Energy to begin. The floor
17 is yours.

18 MR. NIR: My name is Israel Nir with GE,
19 and we will discuss today the GE BWR Constant Pressure
20 Power Uprate Program. We met with you back in January
21 of this year and spent four hours or more on this
22 topic, and today I am going just to go over a limited
23 portion of that presentation and a few limited topics,
24 and provide summary of what we covered in January.

25 I have a brief opening session, and then

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1 we close and go over the GE Constant Pressure Power
2 Uprate Program.

3 (Slide change)

4 MR. NIR: As I said back in January, GE
5 now has extensive analysis experience with EPU,
6 ongoing implementation experience, EPU being
7 implemented at ten BWRs, and NRC is now reviewing
8 applications for three additional BWRs.

9 We expect a high volume of applications in
10 the next several years. To respond to this
11 anticipated volume and to facilitate the NRC review,
12 we proposed a CPPU approach. It is based on our
13 experienced, focused on impacts related specifically
14 to power uprate and maintained safety margin.

15 (Slide change)

16 MR. NIR: We initially met with you back
17 in June of 2001 to describe the approach. We
18 submitted the LTR, CPPU LTR, which I'll refer to as
19 CLTR, for NRC review in March of 2001. We received
20 significant feedback from the NRC. We revised the
21 CLTR and resubmitted in July of 2001.

22 We then received a significant number of
23 RAIs. They all were addressed, and in December of
24 2001 we sent addenda to the CLTR, which is the basis
25 now for the staff safety evaluation.

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1 We met with you in January, as I mentioned
2 already, to discuss the CPPU and CLTR approach, and
3 also you heard the presentation from Clinton on their
4 EPU, which included selected CPPU topics.

5 (Slide change)

6 MR. NIR: The GE program is a power uprate
7 program. It includes the stretch power uprate five
8 percent -- these were the initial power uprates -- the
9 EPU which was approved back in '98 with increased
10 power up to 20 percent of original licensed thermal
11 power; the thermal power optimization which is the GE
12 terminology to the small operator, up to approximately
13 one and half percent based on improved feedwater flow
14 measurement uncertainty; and finally the constant
15 pressure power uprate.

16 CHAIRMAN KRESS: Is 20 percent the limit
17 or are there plans maybe to go further later?

18 MR. NIR: We don't preclude that at this
19 point. We are asking for generic process to support
20 20 percent. We definitely see -- Some of the plants
21 are reaching their limits, and what I say about that,
22 there are some very expensive components that will
23 have to be replaced in order to move to a higher
24 power.

25 So that is definitely a consideration for

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1 the future. It will become more expensive as we move
2 to higher power levels.

3 (Slide change)

4 MR. NIR: This is a summary of GE power
5 uprate experience. Most of the experience is five
6 percent. On the left you can see all the initial five
7 percent power uprates were done with increased dome
8 pressure to avoid replacing the high pressure turbine.
9 More recently -- or opening the steam path. More
10 recently, the five percent were done with no increase
11 in maximum operating dome pressure.

12 You also see on the righthand side the
13 extended power uprate experience. The last three
14 plants, Clinton, Brunswick and Browns Ferry, are now
15 in progress. Clinton and Brunswick have selected CPPU
16 topics, as you heard with Clinton and you will hear
17 with Brunswick, which is basically the same topics.

18 Browns Ferry will be the first submittal that
19 will be fully based on constant pressure approach.

20 DR. RANSOM: How much was the pressure
21 increased in the ones in the initial?

22 MR. NIR: Those initials?

23 DR. RANSOM: Yes.

24 MR. NIR: Probably varies between 20 to
25 35.

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1 DR. RANSOM: Pounds per square inch, psi?

2 MR. NIR: I'm sorry?

3 DR. RANSOM: 20-35 psi?

4 MR. NIR: psi, yes.

5 (Slide change)

6 MR. NIR: This final slide is -- again, I
7 showed you this in January. It just shows the GE BWR
8 contributions from power uprate to the US grid. Until
9 now, we added 1700 megawatts electric, in progress
10 another 800, and you can see that we still have almost
11 50 percent on tap.

12 That concludes my comments for the open
13 session.

14 CHAIRMAN KRESS: So that's like five new
15 plants total?

16 MEMBER SHACK: Yes. You can play with the
17 size of the plants.

18 CHAIRMAN KRESS: Yes, of course.

19 MR. NIR: Yes. It is significant. So
20 again, that concludes my comments for the open
21 session, and I am ready to move to the closed session
22 and discuss the constant pressure power uprate
23 process.

24 MR. BOEHNERT: Okay, we are going to go to
25 closed session then. Anybody here that doesn't have

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1 an agreement to be here to hear GE proprietary
2 information, please leave. Other than that, we will
3 go to closed session.

4 So, transcriber, please start a closed
5 session transcript.

6 (Whereupon, the foregoing open session
7 went off the record at 1:14 p.m. and went back on the
8 record at 1:55 p.m.)

9 CHAIRMAN KRESS: I guess we are ready to
10 turn it over to you, John.

11 MR. ZWOLINSKI: Okay, Dr. Kress. Thank
12 you so very much. I had a few opening remarks that I
13 wanted to present to the Subcommittee, and then get on
14 with our staff presentation.

15 For those of you who do not know me, I'm
16 John Zwolinski. I am the Division Director
17 responsible for the Division of Licensing Project
18 Management. Thus, all licensing activity that is
19 undertaken at NRR is processed within my division.
20 Power uprates are a form of licensing amendment and,
21 thus, licensing activities such as this are processed
22 within Projects with the support of our technical
23 divisions such as the Division of System Safety and
24 Division of Engineering and the Division of Inspection
25 Programs and their efforts.

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1 The staff is here to present the review of
2 the GE licensing topical report on constant pressure
3 power uprate for BWRs. I did want to note for the
4 record that we have a number of the management team
5 with us in support of our staff.

6 Ms. Suzanne Black, our Deputy Director,
7 Division of Systems Safety and Analysis, is with us.
8 Mr. Stu Richards, the Project Director responsible for
9 plants in Region 4; Mr. Singh Bajwa, our Project
10 Director for plants in Region 3; and a number of our
11 first line supervisors that are integral to the
12 success of NRR's mission.

13 We have Dale Thatcher who is with the
14 Equipment and Human Performance Branch. We have Brian
15 Thomas from our Systems Branch. We have Matt Mitchell
16 from our Materials and Engineering Branch. We have
17 Corny Holden from our Electrical Instrumentation and
18 Control Systems Branch, and from Reactor Systems we
19 have Ralph Caruso seated at the table and Frank
20 Stulowitz.

21 One of the reasons I mentioned that our
22 management team is here in part is to provide visible
23 support to our staff and to demonstrate overtly to the
24 Subcommittee the management commitment made to power
25 uprates and to the CPPU project in general.

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1 The CPPU topical report proposes an
2 approach for the submittal and review of extended
3 power uprate applications. It outlines what is
4 expected from licensees in their applications.

5 If a licensee follows the topical report
6 and provides the information identified in its report
7 as part of its plant specific application, the review
8 should be greatly simplified. Approval of the CPPU
9 approach would be a key change to the review of BWR
10 power uprates.

11 It presents a simplified approach compared
12 to that previously approved in topical reports known
13 as ELTR-1 and ELTR-2. Although the Clinton power
14 uprate submittal uses some aspects of the constant
15 pressure approach, it does not reference the CPPU
16 approach.

17 The staff -- does not reference to the
18 topical report. The staff expects the first submittal
19 based on the constant pressure power uprate topical
20 report to arrive in the summer of 2002.

21 On January 16, 2002, the Subcommittee
22 received a presentation from General Electric that
23 outlined the CPPU approach and presented details of
24 selected technical areas. In our presentation today,
25 the staff will address specific technical concerns

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1 which we believe to be of highest importance, and they
2 have essentially been captured in the agenda that's
3 been developed in working with the staff of the ACRS.

4 We have with us, in addition to staff here
5 to present information associated with the agenda,
6 additional staff that have worked on this particular
7 review, should question exist. So we've brought much
8 of the team over, Dr. Kress.

9 As you are aware, the CPPU deviates from
10 the previously approved approach for extended power
11 uprates for BWRs. The staff will discuss this matter
12 in some detail. I will note that the staff has
13 invested considerable resources in evaluating the
14 basis for acceptance of this proposed approach.

15 The staff has also conducted on-site
16 reviews, traveling to General Electric and to other
17 nuclear facilities. The point I am attempting to make
18 is not only is our senior management deeply committed
19 to ensuring that this program receives the highest
20 amount of visibility throughout the staff and here
21 with the ACRS, we are committed to ensuring that we
22 perform first rate reviews and ensure the health and
23 safety of our -- is preserved in the processing of
24 these amendment requests.

25 With that, I would like to now turn the

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1 presentation over to our plant project manager
2 responsible for this activity, Joe Donoghue. Joe will
3 provide an overview of the staff's efforts regarding
4 the CPPU topical, and proceed with introductions, as
5 appropriate.

6 CHAIRMAN KRESS: We certainly appreciate
7 your comments and do appreciate the fine level of
8 support you are providing to the Subcommittee and the
9 full Committee.

10 MR. ZWOLINSKI: Thank you very much, Dr.
11 Kress, and we'll be here tomorrow also.

12 CHAIRMAN KRESS: And in April?

13 MR. ZWOLINSKI: I believe there is a
14 session scheduled for April, and we will support that
15 with our team.

16 CHAIRMAN KRESS: That certainly is greatly
17 appreciated.

18 MR. DONOGHUE: Thank you, John. I think
19 my mike works. As you heard, I'm Joe Donoghue. I'm
20 the GE Project Manager in NRR. I just have a few
21 brief remarks to give you an overview of the staff's
22 review that is documented in the draft safety
23 evaluation.

24 As you've heard, this part of the
25 presentation is open. It will be followed by a closed

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1 session by the technical staff, and I will just point
2 out now before I forget that on your handouts for the
3 closed session, you will see some brackets around some
4 items that were considered GE proprietary information.
5 You won't see them on the projection here, but we just
6 want to point that out to make sure everybody is clear
7 on the basis for the proprietary information.

8 Just in way of history, I wanted to
9 explain I think what you may have heard in the
10 previous presentation, that there is a revision to the
11 constant pressure power uprate topical that was
12 received in July.

13 There was a previous version that was not
14 the basis for the staff's review. It's the July
15 version. So if somewhere in somebody's cabinet they
16 have a March version, that is not what we reviewed.
17 Get rid of it.

18 In the past, as you are well aware -- the
19 Committee is well aware that the extended power
20 uprates that have been issued -- some examples I've
21 listed up there, were based on the previous ELTR-1 and
22 ELTR-2 documents, and you've heard that there are two
23 in-house now, two reviews in-house, Clinton and
24 Brunswick that I list here, that use some aspects of
25 the constant pressure approach, and the staff has been

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1 starting to deal with these things on a plant specific
2 basis, but this topical report, as you've been told,
3 has a number of changes to the previous approach.

4 I'll just put some key ones on the screen
5 here for you.

6 (Slide change)

7 MR. DONOGHUE: Basically, the first three
8 bullets address changes to what we see as the content
9 in the submitted information with the amendment
10 request. There's some details that you have heard
11 before from GE today, and you'll hear some more
12 discussion about that in the presentations to follow,
13 but those are some key areas that we see some
14 departures.

15 Then I list the last item there as an item
16 that we had to consider. The CPPU approach uses the
17 ELTR-1 and -2 approach for testing with this one
18 exception in large transient testing.

19 The staff previously approved -- reviewed
20 and approved the ELTR-1 and -2 approach testing
21 proposal, and staff has looked at this large transient
22 testing exception for CPPU and has found it
23 acceptable. However, today -- in today's presentation
24 by the staff we were not planning on discussing that
25 and wanted to point out the reason, being that we plan

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1 on discussing it tomorrow during the Clinton
2 presentation.

3 We understand that there's Committee
4 members that were keenly interested in hearing about
5 those details. So rather than being repetitive --

6 CHAIRMAN KRESS: Yes, and those members
7 will be here tomorrow, but are not particularly here
8 today.

9 MR. DONOGHUE: So as long as that is
10 acceptable, this is all I'm going to mention about
11 large transient testing, unless a question comes up.
12 We have staff available.

13 CHAIRMAN KRESS: No, I think we will wait
14 until tomorrow on that one.

15 MR. DONOGHUE: Unless there's questions,
16 I'll go on. There's some basic effects that the draft
17 safety evaluation discusses of implementing the
18 constant pressure approach.

19 As you've heard, there's changes to the
20 power to flow map. You saw a presentation from GE on
21 some heat balance parameters that changed, and these
22 things lead too some reevaluations of safety analyses
23 that are required, and you will hear about those
24 details very shortly.

25 (Slide change)

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1 MR. DONOGHUE: This slide -- You've seen
2 the list of specific exclusions. So you are wondering
3 why Donoghue is putting this one up, because it
4 doesn't have any information on it.

5 I wanted to make sure we emphasized that
6 the staff considers these exclusions that apply to the
7 CPPU approach to be very important. We want to make
8 sure that in our safety evaluation we discuss these
9 exclusions.

10 They came up in the presentation you just
11 saw. They will come up again in the next presentation
12 in some detail. We want to make it very clear that
13 these exclusions have to be adhered to, to meet the
14 spirit of this simplified approach that's contained in
15 this topical report.

16 CHAIRMAN KRESS: Suppose a plant came in
17 and referenced the CPPU process and the topical report
18 and says but we don't -- this one exclusion here, you
19 know, the list that we were given -- there's one of
20 them here we don't conform to, and the reason is --
21 they give you a reason.

22 Is that going to be acceptable, as long as
23 they can justify not --

24 MR. DONOGHUE: I'll take a stab at it.
25 Then I think there's somebody else here at the table

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1 that would maybe chime in.

2 I think the short answer is ELTR-1 and -2
3 are there. They are approved and available for the
4 licensees to use. If they want to have a power uprate
5 with other encumbrances -- maybe I shouldn't use that
6 word, but other changes that they are considering
7 besides increase in power, they can use that approach.

8 By allowing the CPPU approach to be
9 available, it's a simplified approach. That's the
10 impetus behind it. We are seeing that as a way to
11 make our review also somewhat simplified, but if a
12 licensee decides they want to do other things, I think
13 our short answer is use ELTR1 and 2. I don't think we
14 are going to be favorably inclined to consider a range
15 of options in between.

16 CHAIRMAN KRESS: CPPU, we heard, was a
17 subset of ELTR1 and 2. So if they say, well, we're --
18 the only difference between the CPPU that we are
19 addressing is this one item that -- So we are going to
20 still reference the CPPU documents, but we're going to
21 justify this one change.

22 MR. CARUSO: Dr. Kress, this is Ralph
23 Caruso. I'm going to give the next presentation, and
24 I thought I would jump in here.

25 The reason we approved topical reports is

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1 to make staff reviews efficient and effective, so that
2 we don't have to review the same thing over and over
3 again. If anyone who references a topical report
4 decides to take an exception to it, they bear the
5 burden of justifying that.

6 CHAIRMAN KRESS: As long as they justify
7 the exception.

8 MR. CARUSO: In the process of justifying
9 it, they also take the risk that the staff may reopen
10 the review and, as a result, they may not gain the
11 efficiency and effectiveness that they had hoped to
12 achieve by referencing the report in the first place.

13 CHAIRMAN KRESS: I think that's the answer
14 I was looking for.

15 MR. CARUSO: This is a general practice
16 that we have with regard to all topical, and it would
17 apply here. So licensee can take a chance, and maybe
18 they will get lucky.

19 CHAIRMAN KRESS: We understand. I think
20 that was the answer I was looking for.

21 MR. DONOGHUE: Thanks, Ralph.

22 CHAIRMAN KRESS: Okay.

23 MR. DONOGHUE: The staff's review of the
24 topical report that was submitted focused on, as you
25 may expect, the differences from what was previously

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1 accepted in ELTR1 and 2. Wanted to point out that the
2 staff in its review considered lessons learned from
3 other power uprate efforts, and the SE, the draft
4 safety evaluation, mentions the Maine Yankee lessons
5 learned, in particular.

6 I wanted to add here that the review spent
7 some time examining one of the key differences here in
8 the CPPU approach, and the staff acknowledges that
9 there is going to be some analyses that we would
10 normally expect to see in an ELTR1 and 2 based
11 submittal that will not be available for our review in
12 this submittal.

13 CHAIRMAN KRESS: We understand that, and
14 that is one of the points of debate among the
15 Committee members. Will that come up again either
16 tomorrow or in April, that particular aspect?

17 MR. DONOGHUE: I was going to add that
18 this point will be discussed in more detail in the
19 following presentations, because it gets into some of
20 the proprietary aspects of the information. But we
21 just wanted to emphasize it here, because it was an
22 important aspect of the review and took some effort to
23 come to some resolution on that.

24 (Slide change)

25 MR. DONOGHUE: My final slide just

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1 outlines what we expect to be the roadmap we would use
2 for conducting the submittals for CPPU for specific
3 plants. I think you heard a mention about a power
4 uprate safety evaluation report shell that GE
5 maintains.

6 This shell, though it is discussed as part
7 of this discussion -- it's not -- It was not submitted
8 with the CPPU topical report. It is maintained by GE.
9 However, for plant specific submittal we will be
10 seeing the power uprate safety analysis report.

11 In that report, staff is going to be
12 looking for certain things. I list some of those key
13 items up here, which we started to discuss a little
14 bit today. We had to make sure we know what methods
15 are being used for the analyses, justification for
16 their applicability at the new conditions, and --

17 CHAIRMAN KRESS: You will ask for the
18 justification in this report?

19 MR. DONOGHUE: And you heard just a little
20 bit of discussion. There were some questions about
21 conforming applicability of these generic evaluations
22 that are discussed in the topical report.

23 Another important point to bring up before
24 I turn it over to the more detailed presentations is
25 that the submittal, especially this power uprate

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1 safety analyses report, can be used as the basis for
2 the NRC to conduct audits of selected safety analyses.

3 You heard about the audits before. We
4 will discuss them some more today, and I think it's
5 going to be an important aspect of our approach on
6 these submittals.

7 Unless there's any questions, thank you
8 for your attention. I'll turn it over to -- Yes?

9 CHAIRMAN KRESS: For BWRs following this
10 approach, this pretty much serves the purpose of a
11 standard review plan for those?

12 MR. DONOGHUE: I would not venture to call
13 it a standard review plan. This is -- I think, as
14 Ralph expressed earlier, this is a method that is
15 being proposed to us to make the review -- the
16 submittal first, more simplified and, therefore, the
17 review, hopefully, more simplified.

18 It's not necessarily something that the
19 staff -- If we saw a submittal that said to check the
20 box for CPPU, we did it; would not necessarily get in
21 and take a look at it. This is an approach that we
22 find, if followed, if all the things are done that are
23 in the topical and we will discuss in our safety
24 evaluation are done, we can then accept for review.

25 MR. CARUSO: Also realize, Dr. Kress, that

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1 this topical does not address technical issues that
2 have to be demonstrated to be acceptable. Those are
3 addressed in the other technical topical reports, for
4 example, for ECCS methodologies, for transient
5 methodologies, for design stress calculations.

6 Those are what the SRP generally contains.
7 The SRP generally contains technical issues. This is
8 a process document. So those standards that are
9 described in the SRP and that are accepted in the
10 various approved methodologies still apply. Nothing
11 changes with regard to them. This is a process
12 document.

13 CHAIRMAN KRESS: The Standard Review Plan
14 you're talking about there is just the original
15 licensing standard review plan.

16 MR. CARUSO: Standard Review Plan which we
17 use right now to do ongoing license amendment reviews,
18 the applicable regulatory guides, and all of the body
19 of regulatory guidance that currently exists for
20 operating plants right now.

21 MR. ZWOLINSKI: And if I may, Dr. Kress,
22 and to the rest of the Committee, remind that we do
23 have an IOU back. We are evaluating the pros and cons
24 of a Standard Review Plan for this area.

25 CHAIRMAN KRESS: That was really one

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1 reason I've brought the question up.

2 MR. ZWOLINSKI: Okay. And I think Joe and
3 Ralph pretty much answered how far this actually goes,
4 but this is really not going to supplant do we want a
5 Standard Review Plan for the entire area, as we
6 understand it. That's another matter.

7 MR. CARUSO: I will make the observation
8 that I believe that the purpose of the Standard Review
9 Plan was to ensure consistency in staff reviews, and
10 the use of this document does that, to a certain
11 extent. The fact that the staff went through the
12 process of reviewing it, and a large number of staff
13 members participated in that, also helps to ensure a
14 certain amount of consistency.

15 MR. BOEHNERT: We will go into closed
16 session now. Transcriber, go back to closed session.
17 If there is anyone here that should not be here,
18 please leave.

19 (Whereupon, the open session went off the
20 record at 2:15 p.m.)

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This is to certify that the attached proceedings
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in the matter of:

Name of Proceeding: ACRS Thermal Hydraulic

Phenomena Subcommittee

Docket Number: (Not Applicable)

Location: Rockville, Maryland

were held as herein appears, and that this is the
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Laurie Rossbach
Official Reporter
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