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UNITED STATES NUCLEAR REGULATORY COMMISSION'S

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

July 6, 2005

The contents of this transcript of the proceeding of the United States Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards, taken on July 6, 2005, as reported herein, is a record of the discussions recorded at the meeting held on the above date.

This transcript has not been reviewed, corrected and edited and it may contain inaccuracies.

1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

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4 ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

5 524TH MEETING

6 + + + + +

7 WEDNESDAY,

8 JULY 6, 2005

9 + + + + +

10 The meeting was convened in Room T-2B3 of Two
11 White Flint North, 11545 Rockville Pike, Rockville,
12 Maryland, at 8:30 a.m., Dr. Graham B. Wallis,
13 Chairman, presiding.

14 MEMBERS PRESENT:

15 GRAHAM B. WALLIS, Chairman

16 WILLIAM J. SHACK, Vice-Chairman

17 GEORGE E. APOSTOLAKIS, ACRS Member

18 RICHARD S. DENNING, ACRS Member

19 THOMAS S. KRESS, ACRS Member

20 MARIO V. BONACA, ACRS Member

21 DANA A. POWERS, ACRS Member

22 JOHN D. SIEBER, ACRS Member-at-Large

23

24

25

1 ACRS STAFF PRESENT:

2 SAM DURAISWAMY, ACRS Staff

3 JOHN H. FLACK, ACRS Staff

4 JOHN G. LAMB, ACRS Staff

5 JOHN T. LARKINS, Executive Director, ACRS/ACNW,

6 Designated Federal Official

7 CAYETANO SANTOS, JR., ACRS Staff

8 MICHAEL L. SCOTT, ACRS Staff

9 ASHOK C. THADANI, Deputy Executive Director,

10 ACRS/ACNW

11

12 NRC STAFF PRESENT:

13 KIRSI ALM-LYTZ, NRR

14 RAJ ANAND, NRR/DRIP/RNRP

15 CHRISTINA ANTONESCU, RES/DET/ERAB

16 PETE APPIGNANI, RES

17 STEVEN ARNDT, RES/DET/ERAB

18 HANS ASHAH, NRR/DE/EMEB

19 RAJENDER AULUCK, NRR/DRIP/RLEP/RL

20 JUAN AYALA, NRR/DRIP/RLEP

21 GOUTAM BAGEHI, NRR/DE/EMEB

22 DAN BARSS, NSIR/DPR/EDO

23 LETA BROWN, NRR/DSSA/SPSB-C

24 JOSE CALVO, NRR/DE/EEIB

25 NORBERT CARTE, RES/DET/ERAB/ICS

1 NRC STAFF PRESENT:

2 KENNETH CHANG, NRR/DRIP/RLEP

3 THOMAS CHENG, NRR/DE/EMEB

4 MATTHEW CHIRAMAL, NRR/ADPT/DE/EEIB

5 OM CHOPRA, NR/RDE/EEIB

6 KURT COZENS, NRR

7 GREG CRANSTON, NRR

8 ROBERT DENNING, NRR/DSSA/SPSB

9 YOIRA K. DIAZ, NRR/RLEP

10 LAURA DUDES, NRR/DRIP/RNRP

11 MICHAEL EVANS, RES/DET/ERAB

12 JOHN FAIR, NRR

13 ANTONIO FERNANDEZ, OGC

14 NEIL HAGGERTY, NMSS

15 BRAD HARVEY, NRR/DSSA/SPSB-C

16 RAUL HERNANDEZ, NRR/DSSA/SPLB

17 AMY HULL, NRR/DRIP/RLEP

18 DEBBIE JARVIS, RES/DET/MEB

19 PETER J. KANG, RES/DET/MEB

20 YOUNGDOO KANG, NRR/DZ/ZZZB

21 BILL KEMPER, RES/DET/ERAB/I&CS

22 STEPHEN KLEMENTOWICZ, NRR/DIPM

23 BILL KOO, NRR

24 P.T. KUO, NRR

25 CAROLYN LAURON, NRR

1 NRC STAFF PRESENT:

2 TOMMY LE, NRR/RLEP

3 ERIC J. LEE, NSIR/DNS/NSP/RSS

4 JAY LEE, NRR/DSSA/SPSB

5 SAMSON LEE, NRR/DRIP/RLEP

6 MICHAEL LI, NRR/DRIP/RLEP

7 Y.C. (RENEE) LI, NRR

8 YONG LI, NRR/DE/EMEB

9 PATRICIA LOUGHEED, NRC/RIII

10 GREG MAKAR, NRR

11 DAVID MATTHEWS, NRR/DRIP

12 DANIEL MERZKE, NRR

13 LESLIE MILLER, NRR

14 SIKHINDRA K. MITRA, NRR/DRIP/RLEP

15 CLIFF MUNSON, NRR/DE/EMEB

16 BRUCE MUSICO, NSIR/DPR/EPD

17 DAT T. NGUYEN, NRR

18 MANAN PATEL, NRR/DE/EEIB

19 PAUL PRESCOTT, NRR/DIPM/IPSB

20 JAI RAJAN, NRR/DE/EMEB

21 PAUL REBSTOCK, NRR/DE/EEIB-I&C

22 BILL ROGERS, NRR/DIPM

23 JONATHAN ROWLEY, NRR/RLEP

24 SIMON SHENG, NRR/DE/EMCB

25 BELKYS SOSA, NRR/DRIP/RNRP

1 NRC STAFF PRESENT:

2 RAMACHANDRAN SUBBARATNAM, NRR/DRIP/RLEP/RL

3 GREGORY SUBER, NRR/DRIP/RLEP

4 GEORGE TARTAL, RES/DET/ERAB

5 MIKE WATERMAN, RES/DET/ERAB

6 ADAM WILSON, RES/DET/MEB

7 KATARYN WINSBERG, OGC

8

9 ALSO PRESENT:

10 REZA AHRABIE, ENTERGY

11 TONY BANKS, DOMINION

12 PATRICIA CAMPBELL, MORGAN LEWIS

13 ALAN COX, ENTERGY

14 RICHARD CROTEZO, NRL

15 STEVEN DORT, FENOC

16 DAN FADEL, AEP

17 JOEL GEBBRE, AEP

18 RICHARD GRUMBIR, AEP - D.C. COOK

19 MIKE HEATH, PGN

20 JOE HEGNER, DOMINION

21 BOB KALINOWSKI, AEP/I&M

22 RICHARD KISNER, ORNL

23 DAVID KUNSEMILLER, FENOC

24 PAUL LEONARD, AEP - COOK

25 WILLIAM R. LETTIS, WILLIAM LETTIS & ASSOCIATES

1 ALSO PRESENT:

2 SCOTT LINDVALL, WILLIAM LETTIS & ASSOCIATES

3 CLIFFORD R. MARKS, ISL

4 ROBIN MCGUIRE, RISK ENGINEERING, INC.

5 MATTHEW MILLER, AREVA

6 MANO NAZAR, AEP - COOK

7 MARK RINCKEL, AREVA

8 ROGER RUCKER, FENOC

9 MICHAEL SCARPELLO, AEP

10 MARVIN SMITH, DOMINION

11 MIKE STROUD, ENTERGY

12 SPYROS TRAIFOROS, LINK

13 KEN WIERMAN, FEMA

14 RICHARD WOOD, ORNL

15 GARRY G. YOUNG, ENTERGY

16 GEORGE ZINKE, ENTERGY/NUSTART

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

2 8:31 A.M.

3 CHAIRMAN WALLIS: The meeting will now

4 come to order.

5 This is the first day of the 524th meeting

6 of the Advisory Committee on Reactor Safeguards.

7 During today's meeting, the Committee will consider

8 the following: Final Review of the License Renewal

9 Application for Donald C. Cook Nuclear Plant, Units 1

10 and 2; Final Safety Evaluation Report Related to

11 North Anna Early Site Permit Application; Draft Final

12 Regulatory Guide, DG-1137, "Guidelines for Lightning

13 Protection for Nuclear Power Plants"; Draft Final

14 Revision 2 to Regulatory Guide 1.152, "Criteria for

15 Use of Computers in Safety Systems of Nuclear Power

16 Plants"; and the preparation of ACRS Reports.

17 This meeting is being conducted in

18 accordance with the provisions of the Federal Advisory

19 Committee Act. Dr. John T. Larkins is the Designated

20 Federal Official for the initial portion of the

21 meeting.

22 We have received no written comments or

23 requests for time to make oral statements from members

24 of the public regarding today's sessions.

25 A transcript of portions of the meeting is

1 being kept and it is requested that the speakers use
2 one of the microphones, identify themselves and speak
3 with sufficient clarity and volume so that they can be
4 readily heard.
5 I have a couple of items of current
6 interest. I'd like to introduce Mr. Cook Lai who is
7 a graduate student studying Electrical Engineering at
8 the University of Maryland. He has joined the ACRS
9 staff as a summer intern. He will be assisting the
10 Committee in its review of the Digital I&C Research
11 Plan. Please welcome Mr. Lai.
12 (Applause.)
13 In the items of interest which are being
14 handed out, you'll notice a couple of speeches from
15 Commissioners and there is an SRM dated June 30th. In
16 the first paragraph, I noticed the sentence, "the
17 Staff should continue to emphasize the importance of
18 effective implementation of a good, corrective action
19 program." This was one of the points that we made in
20 our last meeting.
21 I now would like to begin with this
22 meeting, the agenda. The first item on the agenda is
23 the Final Review of the License Renewal Application
24 for Donald C. Cook Nuclear Plant.
25 I will invite my esteemed colleague, Dr.

1 Bonaca to get us going.

2 MEMBER BONACA: Good morning. We're here

3 to review the license renewal application for D.C.

4 Cook Nuclear Power Plant and the associated final SER

5 prepared by the NRC Staff.

6 Our plant license renewal subcommittee met

7 on February 9, 2005 to review this application and the

8 interim SER. At the time, there were a couple of open

9 items and also some confirmatory items still to be

10 addressed by the licensee. All those items have been

11 closed now and I think we are ready to hear from the

12 licensee and the Staff, the final conclusion of the

13 safety evaluation.

14 So I'll turn to Dr. Kuo.

15 DR. KUO: Thank you, Dr. Bonaca. I'm

16 happy to be back here. Today, the Staff is ready to

17 make a presentation to the Committee Members on the

18 D.C. Cook safety evaluation -- final safety

19 evaluation. As you are aware, when we prepared the

20 draft evaluation, we had two open items and two

21 confirmatory items. And that since then, actually

22 before the ACRS subcommittee meeting, those issues

23 were resolved.

24 For the record, I'm P.T. Kuo, the Program

25 Director for the license renewal and the environmental

1 impacts program. And to my right is Dr. Samson Lee
2 who is the section chief for the project management
3 section. And to my far is the project manager,
4 Jonathan Rowley. And Jonathan is going to lead
5 today's presentation for the Staff. And we also have
6 all the tech staff that was involved in this review,
7 sitting in the audience. Also, we have our regional
8 representative, Patricia Wilson, in the audience, in
9 case that you have any questions about performance.
10 Perhaps Pat will be able to answer that.
11 Unless you have any further questions, I'd
12 like to again now first turn over the presentation to
13 the Applicant. Take it over, if there's no questions.
14 Thank you.
15 MR. GRUMBIR: Good morning, I'm Richard
16 Grumbir. I'm the project manager for the D.C. Cook
17 license renewal effort. I brought along a number of
18 support staff with me. Bob Kalinowski is our
19 technical lead. We have a number of people from
20 Framatome and Entergy that were also supporting us in
21 the application, as well. We have a few people that
22 are a little bit late coming in and that will be Joel
23 Gebbre, the engineering program manager; Michael
24 Scarpello, our regulatory affairs supervisor; Paul
25 Leonard is a design engineering supervisor; Dan Fadel,

1 our vice president of engineering is also coming; and
2 Mr. Mano Nazar, our chief nuclear officer is here.
3 I thank you for this opportunity to share some
4 infirmation about Cook.
5 What I'll run through here real quickly in
6 the interest of time and I know you all aren't shy to
7 ask questions as we go, so please feel free to do
8 that.
9 I just want to run through just a quick
10 description of the plant, our asset management, the
11 ice condenser containment system, there was some
12 question or some interest in that; system walkdown; a
13 quick discussion on TLAA and we'll talk about
14 implementation and commitments.
15 The information here is pretty self-
16 explanatory. We're on the Lake Michigan, where we use
17 Lake Michigan as our ultimate heat sink. We do have
18 an 18-month fuel cycle. We are somewhat unique in
19 that we have an ice condenser containment and our
20 original period of operation started in 1974 for Unit
21 1 and 1977 for Unit 2.
22 This slide here, this was just to bring up
23 some examples of where Cook or Indiana Michigan Power
24 Company is clearly committed to operating the
25 facility. We have a number of long-range projects

1 that are either in work or have been completed
2 recently.
3 I did put the Traveling Water Screens, I
4 changed that to red to represent -- we did receive an
5 industry award through NEI for that project.
6 MEMBER BONACA: Could you comment to the
7 Committee on those two additional diesel generators
8 that you have added?
9 MR. GRUMBIR: We are in the process of
10 adding two supplemental diesels. That's an in-
11 progress item. That's to provide backup power source
12 for -- it will help us with our PRA numbers, as well
13 as supporting an 14-day allowable outage time on the
14 main diesels.
15 MEMBER BONACA: So I understand that
16 they're not safety-related.
17 MR. GRUMBIR: That's correct. They are
18 not safety-related.
19 MEMBER BONACA: But the size is such that
20 they can support a full division of -- what's the size
21 of this?
22 MR. GRUMBIR: I don't know the specific
23 size. I think they are not as large as the main
24 safety-related diesels, if that's what you're
25 thinking.

1 MEMBER BONACA: Okay.

2 MR. GRUMBIR: They're significantly

3 smaller. There's a smaller set of loads that we're

4 planning to apply to them.

5 CHAIRMAN WALLIS: These sump strainers

6 that you're putting in, they are not traveling screens

7 or anything, they're just static, aren't they?

8 MR. GRUMBIR: That's correct.

9 CHAIRMAN WALLIS: And how much bigger are

10 they than the original ones?

11 MR. GRUMBIR: I'd have to defer that to

12 Paul.

13 MR. LEONARD: I'm Paul Leonard. I'm the

14 structural design supervisor and also the technical

15 lead for our sump strainer project. Right now, we're

16 projecting approximately a 2,000 to 2,200 square foot

17 sump strainer area for our containment from our

18 current 85 square feet.

19 CHAIRMAN WALLIS: So that is a significant

20 change by any measure?

21 MR. LEONARD: Yes, that is a significant

22 change, sir.

23 CHAIRMAN WALLIS: Okay.

24 VICE CHAIRMAN SHACK: These supplemental

25 diesels, is this for hydrogen controlled severe

1 accidents, is that one of the loads that you're
2 planning to put on them?
3 MR. GRUMBIR: That's one of the loads that
4 we're planning to put on, yes.
5 MEMBER BONACA: So both are igniters?
6 MR. GRUMBIR: Yes. The other piece --
7 clearly, I didn't put any financials on here, but this
8 is a significant financial commitment in the
9 neighborhood of $65 million, I believe, this year, and
10 more than that even next year when we have the heads
11 going in.
12 Ice condenser. I think the best thing is
13 to skip ahead to the pictures. This is just a large
14 pictorial representation and then on this one you can
15 see some of the more intricate details. Most of the
16 items that you see in here are in scope. The various
17 deck doors, in scope of license renewal: the various
18 deck doors, the frames, the turning vanes down on the
19 bottom, the lower support structure, number of the
20 structural elements are in the scope.
21 The picture is an older picture. It's a
22 little misleading in that the bridge crane cannot be
23 manipulated into the ice condenser any more.
24 (Laughter.)
25 This was part of the original design and

1 there's an end wall door that has now been closed and
2 sealed, preventing it from going in and we've also
3 disabled any power in the area, so in the event that
4 it -- it just removes some unnecessary wiring there.
5 From a surveillance perspective, we do
6 have surveillance that require us to measure the ice
7 weight, boron concentration and the pH levels of the
8 ice to verify that the flow passages are clear from
9 any ice build up. The top deck doors which are not
10 visible on this picture, are verified to be closed.
11 They're actually taped in place to prevent any air
12 exchange between the actual containment and the ice
13 condenser.
14 And then the intermediate deck doors on
15 the lower inlet doors are verified that they're
16 operable or free to move, free to move operation.
17 CHAIRMAN WALLIS: Why does the flow go up
18 the ice condenser?
19 MR. GRUMBIR: I think maybe the best thing
20 is for Paul to --
21 CHAIRMAN WALLIS: It's a colder region.
22 You might think it would flow down.
23 MR. GRUMBIR: I believe it flows up.
24 MR. LEONARD: I can answer that question.
25 This is Paul Leonard. What happens is we have a

1 differential pressure created. We actually have three
2 zones --
3 CHAIRMAN WALLIS: Oh, I see.
4 MR. LEONARD: If you go back to the
5 earlier, we have the three zones, the lower
6 compartment, ice condenser compartment and upper
7 compartment.
8 CHAIRMAN WALLIS: Right.
9 MR. LEONARD: And since we have
10 essentially a sealed barrier between the lower volume
11 and the upper volume, any release and all our high
12 energy piping is in the lower volume, any release is
13 forced upward through the ice condenser.
14 CHAIRMAN WALLIS: So to get to the upper
15 containment, it has to go through the condenser?
16 MR. LEONARD: That is correct.
17 CHAIRMAN WALLIS: Okay, thank you.
18 MR. GRUMBIR: In addition, the flapper
19 doors, I'm sorry, the flapper valves -- let me back
20 up.
21 If you look down -- I guess I should have
22 brought a pointer, but if you look down in this area,
23 it doesn't show up, but there are some flapper valves
24 in there that allow water to flow down into the active
25 region of the sump.

1 In addition, the maintenance activities,
2 periodically, the baskets are emptied. We empty those
3 with a modified -- thank you -- with a modified
4 concrete vibrator. And after they're emptied we go in
5 and inspect them to make sure that there's been no
6 damage caused during the emptying process and then
7 refilled.
8 Same thing with flow passages. If there's
9 any ice build up during that time we would break that
10 off or check for that. And then also, we look at the
11 door seals and the air boxes. The air boxes are
12 located -- let's see, which way? They're down behind
13 there.
14 All of these surveillance and maintenance
15 activities are procedurally driven. We do also have
16 an aggressive foreign material exclusion program. Any
17 coatings that are inside the containment are safety-
18 related coatings or qualified coatings.
19 And then one of the other unique features
20 is we have an access port that allows us to look
21 between the ice condenser walls and the containment
22 liner so that there's some inspection opportunities
23 that can be performed through that.
24 I believe we are the only ice condenser
25 that has that capability.

1 CHAIRMAN WALLIS: This is a license
2 renewal. This is essentially the same as the original
3 design except that the sump strainers are much bigger.
4 That's the real change that's significant, isn't it?
5 MR. GRUMBIR: And the sump strainers,
6 that's the work that's in progress.
7 CHAIRMAN WALLIS: Otherwise, it's the same
8 as the original design essentially?
9 MR. GRUMBIR: That's correct. Any
10 questions? Next topic that I was going to discuss
11 real briefly was the system walkdown program. The
12 scope and the activities that are credited in the
13 license renewal application and through the REI
14 process are consistent --
15 VICE CHAIRMAN SHACK: Excuse me, this
16 substrainer issue again. What is your insulation?
17 MR. LEONARD: Our insulation is primarily
18 calcium silicate and RMI. We have very little
19 fiberglass. We have previously removed I would say
20 99.9 percent of all fiberglass from inside
21 containment.
22 VICE CHAIRMAN SHACK: How much is CalSil?
23 MR. LEONARD: Our CalSil is a very limited
24 quantity. We have a much larger -- right at this
25 time, a larger quantity because our pressurizer relief

1 tank is insulated, but we will be removing that
2 calcium silicate. What we have is right now like the
3 CVCS charging system/letdown system and the lines
4 coming from the pressurizer relief valves are the
5 extent of the calcium silicate that would be affected
6 by a break.
7 MR. GRUMBIR: Going back to the system
8 walkdown, some of the enhancements that we've credited
9 are that we're committing to perform our emphasizing
10 the scope of the walkdowns, looking at nonsafety-
11 related components and equipment and its impact on
12 safety-related equipment. And then also emphasizing
13 the need to perform inspections of areas that are
14 infrequently available or accessible such as during
15 the refueling outage.
16 We also increased the scope of the system
17 walkdown to make sure that any significant changes in
18 environmental conditions are also addressed. And then
19 also putting in administrative controls, formalizing
20 the procedure on this.
21 The system engineering effectiveness,
22 there was some question during the subcommittee
23 regarding is the system engineers going to have the
24 time to do these activities and that was one of our
25 concerns as well. And back in, I think it was 2004,

1 we reorganized our engineering department so that
2 there's more lines of defense so that the system
3 engineers and the system managers can take a step back
4 and make sure that they're looking at the overall
5 health of their systems.
6 There was also some question in the past
7 over the use of the 54 EFPY versus 48. What I'm
8 bringing up here is basically an indication or trying
9 to articulate that 48 EFPY is acceptable for Cook.
10 When we started the license renewal effort, we looked
11 at our past capacity factor and then considered about
12 95 percent of that moving forward. Unfortunately,
13 2003 was not a very good year for us with the fission
14 trusion event that we had, so that actually changes
15 the capacity factor that we can maintain going forward
16 to 97. So 48 is acceptable for Cook.
17 CHAIRMAN WALLIS: And it's lower because
18 of your years of nonoperation in the past?
19 MR. GRUMBIR: Between years -- the
20 lifetime capacity factor up until 2002.
21 VICE CHAIRMAN SHACK: Your traveling water
22 screen is mainly a fish removal screen, rather than a
23 weed removal screen?
24 MR. GRUMBIR: That was the starting event
25 that got us to put that in, that's correct.

1 CHAIRMAN WALLIS: Did the fish go to
2 market?
3 VICE CHAIRMAN SHACK: Make them into cat
4 food?
5 MR. GRUMBIR: Apparently not. I think we
6 flooded the market when that happened.
7 I also want to take a few minutes and talk
8 about implementation activities. There's been some
9 question or concern with other applicants over are we
10 just going to wait until the period of extended
11 operation and implement and that's clearly a concern
12 that we also had, so when we started working on the
13 project, we made -- we anticipated spending a fair or
14 some amount of time on the tail end to go in and make
15 sure that we have all the programs, as many of the
16 programs updated as we possibly could.
17 And this represents out of the 46 total
18 programs that were credited, 18 did not require any
19 enhancements; 16 required some enhancements; and 12
20 new programs. Our internal goal is much more
21 aggressive than our official commitment and that's to
22 have most of the programs completed by 2005. Those
23 that are tied with industry activities such as the MRP
24 or where we're looking for some operating experience
25 through the industry, those are activities that we're

1 going to defer a little bit into the next few years.
2 And rather than wait until 2014, our internal goal is
3 to have all these programs completely in place by 2009
4 which will give sufficient time for a little bit of
5 internal operating experience prior to the region
6 coming in and doing the inspection.
7 CHAIRMAN WALLIS: May I ask the Staff, a
8 lot depends on the quality of these AMPs. Are you
9 going to review them by 2009 and give some kind of
10 feedback to the licensee as to how satisfactory they
11 are?
12 MS. LOUGHEED: My name is Patrician
13 Lougheed. I'm from the region.
14 We are -- our current program does not
15 require us to review them by 2009. It basically says
16 within a year of the period of extended operation. So
17 we'd be more looking probably early 2011 is when we
18 would be coming out --
19 CHAIRMAN WALLIS: But they will be
20 reviewed thoroughly before the period of extended
21 operations?
22 MS. LOUGHEED: That is our plan, yes.
23 That is required by our inspection procedure.
24 Additionally, because we have the
25 residents on site, programs that are put in place,

1 they would be monitored, not officially for license
2 renewal, but by the residents.
3 MR. GRUMBIR: The flow in from here, any
4 of these items where we do have commitments, clearly
5 for these implementation activities, we track them in
6 our commitment management system which is the same
7 system that's utilized for any other licensee-type
8 commitments. It's consistent with the NEI guidance
9 and then over and above that, the project's
10 implementation, in order to ensure that there's
11 adequate turnover from the project into the line
12 organization, we've taken some measures in that regard
13 to ensure that that's smooth, such as the assignment
14 of a license renewal program owner that will be within
15 the engineering programs.
16 We've provided training along the way to
17 the various program owners so that they could
18 understand license renewal and provide us with input
19 as we were going through developing either the
20 application, the supporting material and then also
21 during the inspections and audits.
22 We're also going to ensure that any of the
23 activities that are performed by the site related to
24 a license renewal commitment implementation are
25 reviewed by that program owner. And then we're going

1 in and annotating, putting notes in procedures that
2 say this procedure or this step in the procedure is an
3 important attribute that was considered during the
4 license renewal effort.
5 And in closing, I just want to say that
6 the process provided us with a systematic opportunity
7 to refine our processes and programs, so that we make
8 sure that we're covering the aging effects. As I
9 indicated, our internal goal for implementation is to
10 be much more aggressive than the commitment for 2014
11 and 2017.
12 And we're adequately tracking those
13 commitments in our commitment management system. And
14 I believe that's all necessary in order for us to
15 demonstrate that we're committed to safely operating
16 the facility.
17 With that, any questions?
18 MEMBER DENNING: Could you explain a
19 little bit more about the state of the PRA results
20 that led you to -- or at least were part of the
21 motivation to put in the other diesel generators?
22 MR. GRUMBIR: I can start and then I can
23 get Joel Gebbre to filter.
24 Part of the reasons we were looking at the
25 supplemental diesels was a number of items. The

1 severe accident mitigation alternatives that were
2 performed for license renewal identified that that was
3 one area where there was some cost beneficial
4 modifications that could be made. And then in the
5 other arena we were looking at increasing our diesel,
6 our main diesel reliability and part of that included
7 the ability to go in and conduct on-line maintenance
8 activities.
9 I'll let Joel continue from there.
10 MR. GEBBRE: I'm Joel Gebbre from Indiana
11 Michigan Power. That's correct. The primary
12 motivation was to extend our diesel allowed outage
13 time from 72 hours to 14 days and that does allow us
14 to do a significant amount of maintenance, on-line
15 maintenance which also allows us to reduce our outage
16 risk when we take a diesel out of service during the
17 fueling outages.
18 MEMBER DENNING: And with regards to
19 severe accident mitigation strategies, was that mostly
20 related to powering of the igniters in the station
21 blackout situation?
22 MR. GEBBRE: That was one of the items.
23 The other was the cooling supply to the reactor
24 coolant pump seals.
25 MEMBER BONACA: Neither is the fans,

1 right?

2 MR. GRUMBIR: I'm not sure about the fans,

3 but the fans, but the igniters, definitely.

4 MR. GEBBRE: The igniters. The fans were

5 not included.

6 MEMBER BONACA: I don't understand how you

7 size this diesel, what was the criteria? I mean we

8 haven't heard yet the capacity of the diesels.

9 MR. GEBBRE: The diesels were sized so

10 that we could supply reactor coolant pump seal cooling

11 in the event of a station blackout scenario.

12 MEMBER BONACA: All right. Thank you.

13 MR. GRUMBIR: Any other questions? I'll

14 turn it back over to P.T.

15 DR. KUO: Thank you. Jonathan Rowley is

16 going to make the staff presentation.

17 MR. ROWLEY: Good morning. My name is

18 Jonathan Rowley. I'm the project manager, safety

19 project manager for the Donald C. Cook license renewal

20 application. I, along with other NRC staff, will

21 present the safety review findings and evaluations

22 documented in the Safety Evaluation Report.

23 The SER With Open Eyes was issued on

24 December 21, 2004, documenting the assent of the NRC's

25 review of the D.C. Cook LRA through early November

1 2004. At that time, there were two unresolved issues
2 and two issues that required confirmation.
3 Prior to the February ACR subcommittee
4 meeting, resolution of the four items had been reached
5 and resolution was discussed during that meeting.
6 The following SER was issued May 29, 2005
7 documenting the resolution of the four items and the
8 final position of the Staff for all items related to
9 the license renewal application.
10 To provide a quick overview of the Staff
11 review, I'd like to begin with Section 2, Structures
12 and Components Subject to an AMR.
13 System structures and components within a
14 scope of license renewal are subject to AMR have been
15 identified. The five listed components were brought
16 into scope as a result of the view of systems and
17 components subject to an AMR.
18 Next, please.
19 MEMBER BONACA: Just a question regarding
20 this. So first of all, you go through a process by
21 which you review these scoping and screening process?
22 MR. ROWLEY: Correct.
23 MEMBER BONACA: And then you make a
24 judgment that says yes, it's okay or no, it's not
25 okay.

1 Now as part of the judgment, if you
2 support the judgment, you then go in and see system by
3 system what is the result of that and whether
4 something has been missed and you find some open
5 items. Some components you should believe will be
6 missed, okay? So how do you go from that step to
7 concluding that all components now that are in scope
8 have been brought in scope?
9 MR. ROWLEY: Rau Hernandez, could you?
10 MR. HERNANDEZ: Hi, my name is Raul
11 Hernandez from Plus Systems. We went through every
12 section and we make sure that all the systems were
13 thoroughly reviewed. And we did an in-depth review
14 and we know that everything is within scope.
15 MEMBER BONACA: So I mean you make a
16 judgment that this is more of a minor oversight or
17 some disagreement on how the process should be applied
18 rather than being a problem with the scoping --
19 MR. HERNANDEZ: It wasn't systematic.
20 Most of them were simply differently defining the
21 system -- not a system, but a small oversight.
22 MEMBER BONACA: That's what we would like
23 to hear.
24 MR. HERNANDEZ: It wasn't a systematic
25 problem. It was minor oversights.

1 MEMBER BONACA: Because you want to
2 conclude that the components have been identified?
3 MR. HERNANDEZ: Yes.
4 MEMBER BONACA: Okay.
5 MEMBER DENNING: For example, here, like
6 the second bullet on emergency diesel generator
7 exhaust silencers. Is that on some standard list or
8 did you look at that and say exhaust silencers have
9 some safety significance?
10 MR. MARKS: Hi, I'm Cliff Marks, I'm
11 assisting ISL and I was performing a review in support
12 of the systems branch, particularly on the auxiliary
13 systems and that was one of them.
14 Some of the background that I had was in
15 preparation with viewing other plants of the same
16 vintage and type for license renewal and also
17 preparation of license renewal in other activities.
18 And using experience like that, probing questions were
19 asked in all the areas that you see up there,
20 including the exhaust silencers. And one of the
21 questions was could a failure of the exhaust silencers
22 affected the intended function of the diesels and
23 because of that line of questioning and probing we all
24 agreed that that was one of them. That's the kind of
25 questioning we performed.

1 MEMBER BONACA: Okay, well, this is a good
2 example. So you identified that you need the silencer
3 in order to have diesel operating for an extended
4 period of time. You must have concluded that?
5 MR. MARKS: We need the silencer to
6 perform its intended function which was to transfer
7 the flow of exhaust gas unimpeded to the atmosphere.
8 MEMBER BONACA: And so why was it missed?
9 MR. MARKS: We didn't miss it.
10 MEMBER BONACA: No, no, no --
11 (Laughter.)
12 MEMBER BONACA: Why was it missed by the
13 licensee. It's just an oversight or did they disagree
14 with your assessment?
15 MR. MARKS: The line of questioning was
16 that it should be -- that it does perform the intended
17 function and that we question that they agreed to it,
18 but that's the kind of in-depth probing questions
19 that we went through, each of the systems.
20 MEMBER DENNING: Could we just following
21 that one bit further and ask does the utility actually
22 agree that that was an oversight or is it just that it
23 was easier to give in?
24 (Laughter.)
25 MR. KALINOWSKI: My name is Bob

1 Kalinowski, tech lead for that renewal project. We
2 when we reviewed that, we did not totally agree. We
3 thought that if it would fail, it would fail open. In
4 other words, the nonsafety-related impact of the
5 safety function of these exhausts or silencers would
6 be that it could close off and go ahead and choke out
7 the exhaust. Items usually age. They go ahead and
8 fail or they'll go ahead and deteriorate which would
9 actually create an exhaust path. But when we looked
10 at it, we didn't feel that we had a strong enough
11 argument to go ahead an pursue that, so we went along
12 with the staff and agreed that that was the right
13 thing to do is to put the exhaust silencers in that
14 scope.
15 CHAIRMAN WALLIS: It's funny that you just
16 have silencers. I would think the whole exhaust
17 piping system fulfills this function of getting rid of
18 the gases.
19 MR. HERNANDEZ: The rest of the piping was
20 within scope.
21 CHAIRMAN WALLIS: It's strange that the
22 silencer wasn't then, wasn't it? Well, this isn't
23 really an important issue.
24 MR. HERNANDEZ: No, it's not.
25 CHAIRMAN WALLIS: It's pursuing your way

1 of thinking about it, the operation.

2 MR. HERNANDEZ: Yes.

3 MEMBER BONACA: Because the conclusion is

4 being made with the SER that all components in scope

5 have been identified. Now to make the conclusion

6 really you have to agree with the approach chosen and

7 the process and also the application of it, looked to

8 see if it's consistent and acceptable. Okay.

9 CHAIRMAN WALLIS: Thank you.

10 MR. ROWLEY: Two open items were contained

11 in Sections 3, age and management review results. The

12 first open item occurred in viewing the auxiliary

13 system, then with the use of the system walkdown

14 program to manage aging effects of internal surfaces

15 of 10 CFR 54.4(a)(2) component types.

16 The Staff's concern was that the visual

17 inspections performed by the system walkdown program

18 or (a)(2) component, external surfaces, were not

19 representative of aging effects on the internal

20 surfaces. The Applicant had not provided sufficient

21 information to demonstrate the aging effects on an

22 internal surface would be effectively managed at the

23 time to meet the ACRS rules for items of issuance

24 deadline, thus the open item.

25 Prior to the subcommittee meeting, the

1 Applicant provided information to demonstrate that in
2 addition to system walkdown, aging effects on internal
3 surfaces would be effectively managed by a combination
4 of the four additional items listed.
5 MEMBER BONACA: And I agree with this
6 issue resolution. I'm still puzzled on how system
7 walkdown contributes to this at all, since you're
8 talking about internal surfaces, you're not going to
9 walkdown the system and look at it. You can't.
10 I agree that these four additional
11 programs identified are adequate to manage aging of
12 internal surfaces.
13 MR. ROWLEY: Renee?
14 MS. LI: This is Renee Li. And as you see
15 from the slides, our main concern is that system
16 walkdown program alone cannot, is not adequate to
17 detect the internal surface aging effects.
18 MEMBER BONACA: But the point I'm making
19 is that the walkdown to me doesn't have anything to do
20 with managing the aging effects of internal surfaces.
21 I just don't understand how it has anything to do with
22 it.
23 It's nice, just do it. You do it for
24 other reasons, to look at maybe aging of external
25 surfaces.

1 MS. LI: Right, and that's why we asked
2 the REI and in response to our REI, it's okay. We are
3 going to have additional AMP and those are the ones
4 that the staff, except for managing the internal aging
5 effects.
6 MEMBER BONACA: Yes. I agree and I have
7 no issue with this except I'm still puzzled by how
8 system walkdown is still a contributor to this issue
9 resolution, to the --
10 VICE CHAIRMAN SHACK: It's defense-in-
11 depth. If you spot the water on the floor during the
12 system walkdown, you've --
13 (Laughter.)
14 DR. KUO: How it was missed, that's
15 basically what we're talking about.
16 MEMBER BONACA: We're looking at actual
17 leakage. That's really a stretch. All right, let's
18 go ahead.
19 MR. ROWLEY: The second open item dealt
20 with the flow-acceleration corrosion program. The
21 flow-acceleration corrosion program was stated as
22 consistent with GALL in the license renewal
23 application. In November 2003, Region 3 AMP
24 inspection revealed that it was consistent, but with
25 one exception. The monitoring and turning element of

1 CALL requires an examination of the detected wall
2 thickness degradation is less than the minimum
3 predicted, but GALL relates to the minimum allowable
4 wall thickness.
5 Cook's FAC program was based on a measure
6 of predicted wall thickness reaching a threshold
7 criteria. Sampling expansion was increased when
8 detected or predicted where results in wall thickness
9 of less than or equal to 60 percent of nominal wall
10 thickness.
11 The Applicant was requested to indicate
12 that the 60 percent nominal wall thickness criteria is
13 an exception to GALL and provide justification to
14 ensure that the nominal wall -- the minimum allowable
15 wall thickness is maintained in a period of extended
16 operation.
17 The Staff found exception and
18 justification in Applicant's response to the overall
19 items acceptable and thus the issue was resolved.
20 VICE CHAIRMAN SHACK: Can you explain to
21 me how that was resolved again? It indicates that
22 your predictions are off. Now do you go back and
23 somehow check at every location?
24 You make some maximum change in the
25 prediction and you're still okay?

1 MR. ROWLEY: Greg?

2 MR. CRANSTON: Hi, this is Greg Cranston.
3 I was the audit team leader.

4 What our concern was or what their concern
5 was in conjunction with using predictive values is you
6 could have a very small difference between what you
7 predicted and what actually happened and they would
8 have to increase their sample size and it wasn't
9 anywhere near close to being at that nominal wall.

10 They did take the information and trended
11 it forward as far as finding out what they actually
12 are comparing it to, how close they're a nominal wall.
13 And if the trend shows that they might approach that
14 particular threshold before the next inspection, then
15 they will increase the sample size in the vicinity,
16 determine what the cause is and do that type of
17 investigation.

18 So that was really what the change was.
19 The concern was if you took the words literally, you
20 could be well above nominal wall, but just because
21 your prediction was slightly off, you have to increase
22 your sample size and do a lot of extra work that
23 wasn't going to gain you any information.

24 So that's basically what the exception was
25 that we accepted.

1 VICE CHAIRMAN SHACK: Are you going to
2 change GALL?
3 MR. CRANSTON: Yes.
4 CHAIRMAN WALLIS: You could even have a
5 new pipe which had a wall thickness less than
6 predicted?
7 MR. CRANSTON: Yes.
8 (Laughter.)
9 MR. ROWLEY: While verifying the adequacy
10 of the AMPs in preparation of the final SER, Staff
11 identified additional information that was needed to
12 meet GALL recommendations for one of the AMPs. Cook
13 service water system reliability program did not
14 include a hardness test measurement when checking for
15 selective leaking.
16 The Applicant committed to enhance the
17 program to include hardness testing or an equivalent
18 physical test.
19 Concern has recently been raised about
20 aging management of various components. Cook's buried
21 pipe and inspection program is a new program that is
22 credited for managing the loss of material for various
23 carbon steel piping intent.
24 In recent years, most of the excavations
25 have been conducted of underground piping including

1 carbon steel, fire protection water and station drain
2 water piping.
3 More excavations are expected prior to
4 entering the period of extended operation and the
5 license has committed to enhance the various programs
6 to require an inspection of in-scope varied piping
7 within 10 years of entering a period of extended
8 operations, unless an opportunistic inspection has
9 occurred within that first 10-year period.
10 MEMBER BONACA: Could you tell us a little
11 bit about the multiple excavations, February 2001 and
12 2003 and what those found?
13 MR. ROWLEY: Yes.
14 MEMBER BONACA: What prompted them and
15 what was found?
16 MS. LOUGHEED: This is Patricia Lougheed
17 again. We looked at that during the inspection,
18 specifically. As far as I -- my memory of what we
19 looked at, I believe that all the inspections were
20 caused by valves that were not operating properly.
21 Only one case was there any sort of leakage involved.
22 It was not the piping itself, it was more valve
23 problems that caused the utility to go in and take a
24 look at -- replace the valves and as they did that,
25 they looked at the buried piping that was associated

1 with it.

2 MR. KALINOWSKI: This is Bob Kalinowski

3 again. She is correct. It was usually on account on

4 a valve packing leak and not account of any sort of a

5 pipe leak, so we'd go in, pull that out and replace

6 the packing for the valve, replace. There was no

7 outside deterioration on the valve or the pipe.

8 MR. ROWLEY: The Applicant has

9 demonstrated the below-grade soil and water

10 environment is not aggressive. This table contains

11 the pH, chloride and sulfate values for wells in the

12 years 1976 and 2000. The values are far below the

13 limits.

14 Section 4 of the SER addresses the Time-

15 Limited Aging Analyses, TLAA. One of the fatigue

16 parameters evaluated upper shelf energy for the

17 limiting beltline material. The Staff confirmed that

18 Applicant's upper shelf energy values calculated at 48

19 with respect to full power years. Staff's

20 calculations are given in the table for you.

21 And Cook's values were 57 and 66,

22 respectively.

23 CHAIRMAN WALLIS: This sulfate. You just

24 have two samples, six years apart, no 26 years apart.

25 Does sulfate fluctuate significantly from

1 year to year?

2 MR. ROWLEY: I'd have to ask Thomas Cheng

3 to address that question.

4 MR. CHENG: This is Tom Cheng with EMEB.

5 Could you please repeat your question because I sat in

6 the back and I can't hear.

7 CHAIRMAN WALLIS: Well, as you see, there

8 are two samples here which are 26 years apart and it

9 seems to me that sulfates might fluctuate and

10 certainly there's a difference in these values, from

11 year to year. So where do the sulfates come from?

12 They come from sulfur dioxide from coal burning or

13 something or from -- where do they come from?

14 MR. CHENG: Where it comes from I'm not

15 too sure.

16 CHAIRMAN WALLIS: Does it fluctuate from

17 year to year and what's your experience with sulfates?

18 MR. CHENG: I just said where it comes

19 from, I personally I really don't know.

20 CHAIRMAN WALLIS: Are two samples, 26

21 years apart sufficient in view of the likely

22 fluctuations from year to year?

23 MR. CHENG: There are four on-site wells,

24 based on the discharge permit requirement. They can

25 monitor the water quality quarterly, every three

1 months.

2 CHAIRMAN WALLIS: Does that sulfate

3 concentration fluctuate significantly?

4 MR. CHENG: No, based on your monitoring

5 results. It didn't show any -- but this is the only

6 one --

7 CHAIRMAN WALLIS: Any fluctuation at all?

8 Absolutely constant?

9 MR. CHENG: It's not absolutely, they

10 fluctuate.

11 CHAIRMAN WALLIS: But it's not a

12 significant fluctuation?

13 MR. CHENG: Yes.

14 MR. KALINOWSKI: This is Bob Kalinowski

15 again. Also, we do take more samples. Those are not

16 the only two taken. I believe we do sample that water

17 every year for EPA requirements.

18 MR. ROWLEY: Another fatigue parameter

19 evaluated was the rapid temperature pressurized

20 thermal shock. Staff confirmed the Applicant's

21 pressurized thermal shock values calculated for EFPY.

22 Staff's calculations are given in the table and both

23 the Staff and Cook's numbers were identical.

24 Next.

25 The two components or items were found in

1 Section 4. Updated final safety analysis report to
2 include commitments to evaluate component fatigue
3 analysis. The Applicant provided the updated SER
4 supplement discussion, performed additional actions to
5 address fatigue. That resolved those two issues.
6 In conclusion, actions have been taken and
7 identified or will be taken so that there is
8 reasonable assurance that activities will continue to
9 be productive in a renewal term in accordance with the
10 current licensing basis. The Applicant has met the
11 requirements of license renewals required by 10 CFR
12 54.29(a).
13 Are there any questions?
14 MEMBER BONACA: Well, part of the
15 inspection reports had documented that walkdowns that
16 were supposed to be part of the system walkdown
17 program were not conducted quarterly as stated. Also,
18 there were some issues to do with the inspections.
19 MR. ROWLEY: Yes.
20 MEMBER BONACA: And they had been
21 performed. What's the conclusion of the Staff from
22 this perspective? I mean these programs for license
23 renewal need to be developed for those to be
24 implemented properly. And do you still feel
25 comfortable with the implementation of these programs?

1 MS. LOUGHEED: I feel that -- first of
2 all, not all of the aging management programs have
3 been put in place. Okay, so I can't speak -- if they
4 meet their commitments and we have no reason to
5 believe that they wouldn't, then we are comfortable
6 with.
7 MEMBER BONACA: Not all of them are in
8 place, only two are in place.
9 MS. LOUGHEED: Right, and we will look at
10 them. There are actions which were not performed.
11 And so the question is when you do the final
12 inspections prior to entering the period of extended
13 operation, are you looking for these kinds of insights
14 on whether the licensee is following all the
15 commitments which are new, in part, they're new.
16 MS. LOUGHEED: That is one of the things
17 that we are planning in terms of doing these actual
18 inspections right before license renewal.
19 I would like to say going back on the
20 missed walkdown and the missed surveillance, one of
21 the things that we did look at in terms of how
22 significant these issues were, we found that the
23 number of surveillance that have been missed have gone
24 down dramatically over the last few years, especially
25 as more and more utilities transfer over to

1 computerized systems.

2 Back when this one surveillance was

3 missed, it was being tracked manually. It was a 5-

4 year surveillance. Now we're not seeing that problem

5 any more.

6 In regard to the system walkdowns, we

7 overall had a concern with the adequacy of the system

8 walkdown program and as a result of that concern the

9 Applicant made a number of additional commitments to

10 enhance the program.

11 It is an on-going program and the resident

12 inspectors follow that up on a routine basis. While

13 I can't, of course, promise that it will never be

14 missed, I don't believe that it would be routinely

15 missed.

16 DR. KUO: If I may also say just that the

17 regional inspectors will perform the inspections

18 before the plant enters into the periods of operation

19 according to the inspection procedure, 71003. And a

20 list of the commitments that is contained in the FSAR

21 supplement will be attached to this inspection

22 procedure so that -- at that time, inspectors will be

23 able to see what are the commitments that are made by

24 the Applicant and followed, basically perform the

25 inspection according to the commitment list.

1 MEMBER BONACA: This Committee has
2 expressed a number of times concerns -- maybe not
3 concerns, but raised questions regarding what we have
4 called in the past by way of commitments and the
5 ability of the regions to carry out these inspections.
6 In part, we're asking these questions because we don't
7 have a full appreciation of how many people are going
8 to be there, what effort is going to be done, the
9 process by which you're going to do that.
10 I think it would be good if you gave us a
11 sense, as we approach the first plant entering into
12 license renewal. Could you give us a sense of what
13 the effort would consist of, what kind of resources
14 are you going to use, what kind of people? I think
15 that would put to rest a number of questions that we
16 keep raising regarding commitments.
17 MS. LOUGHEED: And to be honest, sir, I'm
18 not sure that we've thought quite that far ahead. I
19 believe that the first plant that comes due is Ginna
20 in Region 1. That's followed by Dresden and Quad
21 Cities which are in my region, Region 3. I know it is
22 one of my tasks in the upcoming year to start planning
23 how we will accomplish those inspections and what
24 activities will be needed to be done and how many
25 people will be needed and what types of people will be

1 needed.

2 MEMBER BONACA: It seems to me one thing

3 you'll have to do is verify that whatever program they

4 develop is consistent with the commitments they made

5 to you.

6 MS. LOUGHEED: Absolutely.

7 MEMBER BONACA: The SER is descriptive of

8 the FSAR update.

9 MS. LOUGHEED: We anticipate that this

10 could be a very difficult inspection, yes.

11 And as I said, that's one of my tasks is

12 to make sure that it's developed, at least for our

13 region, because we have a number of plants coming up

14 in 2009, 2010 to make sure that the commitments are

15 reviewed and that they are adequately implemented.

16 And I wish I could tell you that we'd

17 already done it, but not yet.

18 MR. ROWLEY: Questions?

19 DR. KUO: If there's no further questions,

20 Dr. Wallis, this concludes the Staff's presentation.

21 CHAIRMAN WALLIS: Thank you very much.

22 MEMBER DENNING: I have a question that's

23 really more for the Applicant than for the Staff and

24 the first of those questions is instrumentation and

25 control system upgrades that might be expected over

1 the near term and then into the period of extended
2 operation, I see that there is a digital turbine
3 control system.
4 What else is going to happen in the future
5 as you look forward on the I & C systems?
6 MR. FADEL: Hi, I'm Dan Fadel, engineering
7 vice president for American Electric Power.
8 What our plans are, we do have a long-
9 range plan taking us out through the end of the
10 extended license period and in that long-range plan,
11 right now, a lot of things are in it that we are still
12 speculating on to some extent. Besides digital
13 upgrades, we are looking at potential power uprates.
14 We're also looking at long-term effects of
15 degradation, so we'll be watching primarily the
16 systems for the balance of plant. Those are the areas
17 where we expect to see the most need. Also, in
18 control room upgrades and so on and so there is a
19 comprehensive plan that again takes us out through the
20 end of the extended life.
21 MEMBER DENNING: I have a similar question
22 about the PRA and I'm not sure who is there that would
23 feel comfortable in responding to me, but starting
24 off, I wanted to just get a feeling for the core
25 damage frequency and the LERF, in particular, but I

1 was also wondering just what's going to happen to that
2 PRA? What is its status? Do you have a fire PRA?
3 Will you have a fire PRA? I mean, we're in a period
4 of expanded use of PRA in the regulatory spaces.
5 MR. FADEL: I'll let Joel answer.
6 MR. GEBBRE: Joel Gebbre, Indiana Michigan
7 Power.
8 Our current core damage frequency for our
9 PRA is $4.28e^{-5}$. In our large early release frequency,
10 it's $6.89e^{-6}$. As far as our fire PRA goes, we did an
11 analysis in accordance with the IEEE guidance in 1995.
12 It was estimated to be $3.76e^{-6}$. Right now, we are
13 doing some analysis for our diesel AOU. That's in
14 progress right now, as far as the fire PRA goes. We
15 also anticipate doing a full fire PRA in the future.
16 MEMBER DENNING: Thanks.
17 VICE CHAIRMAN SHACK: Now your license
18 renewal environmental impact statement says it's 5
19 times 10^{-5} for the CDF internal events. Is the 4.2 an
20 update?
21 MR. GEBBRE: I'm sorry, could you repeat
22 the question, please?
23 VICE CHAIRMAN SHACK: The license renewal
24 impact statement gives a CDF of 5 times 10^{-5} for
25 internal events. And you said it was 4.28.

1 MR. GEBBRE: Right, and we are
2 continuously updating that model. In fact, our latest
3 update was in April of this year, so it's likely been
4 updated since then.
5 CHAIRMAN WALLIS: Does it improve in model
6 changes or because something real has changed?
7 MR. GEBBRE: There are both. There are
8 model changes. We're going down, top down logic
9 remodeling and then also we update equipment in the
10 plant, incorporate design changes that improve
11 efficiency and safety. That also improves our core
12 damage frequency.
13 CHAIRMAN WALLIS: Do you consistently try
14 to do this? Do you try to upgrade your plants so that
15 the CDF is lower? What about sources of -- biggest
16 contributors and see what you can do to lower them?
17 MR. GEBBRE: Yes, and in fact, the
18 supplemental diesels that we're talking about, so we
19 can extend our diesel allowed outage time, that was
20 because our diesels are our second largest contributor
21 to core damage frequency at the station. And as Dan
22 Fadel mentioned, our long-term plan, we are looking at
23 long-term upgrades to a lot of those systems that are
24 major contributors to our core damage frequency.
25 MEMBER BONACA: So the additional diesels

1 must have made a significant difference?

2 MR. GEBBRE: Yes, they offset the

3 additional time that we're allowed to take the

4 emergency generator diesel generators out of service.

5 MEMBER POWERS: Could I just ask? How do

6 you know that that was the significant change? I mean

7 you quoted a point value to me. I presume there's

8 some uncertainty to it and you compared it to another

9 point value with some uncertainty? I mean maybe the

10 two were the same numbers within the uncertainty?

11 MR. GEBBRE: Right, we basically looked at

12 our base core damage frequency with the existing 72-

13 hour allowed outage time for the emergency diesel

14 generators and then we'd done the analysis with the

15 supplemental diesels in the 14-day allowed outage time

16 to show there is no corresponding increase in core

17 damage frequency.

18 MEMBER POWERS: So it didn't change

19 anything at all?

20 MR. GEBBRE: The numbers have changed

21 slightly. I do not have the latest numbers with me,

22 but basically in the submittal for the license renewal

23 request, we've showed basically negligible impact on

24 core damage frequency or large early release frequency

25 as a result of this increase to the allowed outage

1 time and in addition to the supplemental diesel
2 generators.
3 MEMBER POWERS: So it had no impact at
4 all?
5 MR. GEBBRE: For the most part.
6 MEMBER POWERS: It allowed you to take
7 longer outage times?
8 MR. GEBBRE: That's correct.
9 CHAIRMAN WALLIS: Anything else?
10 MEMBER BONACA: Any additional questions
11 from Members, from the public?
12 None. I mean we are well ahead of time
13 and if there are no further questions, I want to thank
14 the Staff and the license for the their presentations
15 and I'll turn the meeting back to you.
16 CHAIRMAN WALLIS: Thank you. I think we
17 have set a record in the shortest time that it takes
18 to review a final NCR license renewal.
19 I'd like to say this was part of our
20 continuing efforts to improve our efficiency, but I'm
21 not sure that we can get credit. The Staff and the
22 license get the credit.
23 We're not allowed to start the rest of the
24 meeting early, so we're going to have to take a break
25 until 10:15. We can then make use of that time to

1 prepare for other things we're going to do in the next
2 few days. So we will take a break until 10:15.
3 (Whereupon, the foregoing matter went off
4 the record at 9:29 a.m. and went back on the record at
5 10:14 a.m.)
6 CHAIRMAN WALLIS: Come back into session.
7 The next item on the agenda is the final safety
8 evaluation report on North Anna Early Site Permit
9 Application. The wise and knowledgeable Dr. Powers
10 will conduct this part of our deliberations.
11 MEMBER POWERS: Well, the wise and
12 knowledgeable Dr. Powers may be dim and stupid today
13 because of a late arrival into Washington, a very late
14 arrival into Washington last night.
15 We're going to talk about early site
16 permits, and particularly for North Anna. The
17 committee has had a chance to hear about this in the
18 past. The subcommittee has talked about it. We are
19 now going from a preliminary stage to a final stage,
20 so we're approaching finalizing this. We're going to
21 hear both from the applicant and the staff on this
22 issue. We have written an interim letter specifically
23 on the SER, though I think some of our comments may
24 have filtered down to the application, or be pertinent
25 to the application itself. There were at the time of

1 our interim review a few outstanding items, open items
2 to be resolved. And I'm sure that the applicant will
3 tell us what the status of those are, and the
4 resolution. To the extent that he is familiar with
5 and can comment on our interim letter and its
6 comments, I would appreciate that.
7 Well, with that, unless any of the members
8 have comments they'd like to make at the beginning of
9 this, our intention is to write a letter at the
10 conclusion of these briefings. Seeing no comments,
11 I'll turn it to Mr. Grecheck to present for Dominion.
12 MR. GRECHECK: Good morning. I'm Gene
13 Grecheck, Vice President of Nuclear Support Services
14 for Dominion, and it is our pleasure to be here for
15 this second meeting with the ACRS on the North Anna
16 ESP Application. We do have a number of people here
17 to support me today, and I just want to point out a
18 few of them. Marvin Smith over here at the table is
19 the project manager for the ESP project, and has been
20 working on the project since it commenced. And out in
21 the audience we have two other members of our ESP
22 team, Joe Hegner and Tony Banks who have been working
23 on the process from the origination of the application
24 all through the review. And also Steve Ralph from
25 Bechtel is here who will also be able to support us if

1 we get into some extremely technical discussion.

2 What we're going to do today is refresh

3 your memory on some of the things we covered during

4 the last meeting in March, just to remind you where

5 the North Anna site is, and some of the site features,

6 and then go through some of the resolution of the open

7 items and where we stand today.

8 So the first slide, again, why did we go

9 though this process. As you know, this is the first

10 application to go through the process, and there's

11 three applications that are running pretty much

12 concurrently. The reason that we started this back in

13 2001 actually, when we started writing the

14 application, where as you see up here it was to

15 determine the suitability of the site, try to resolve

16 any siting issues early, but most importantly to defer

17 our technology decision until it became time to do

18 that, justified by the business case. If you think

19 back at how quickly things have been moving in the new

20 nuclear era over the last several years, where the

21 things we thought we knew about various new reactor

22 designs, and new technologies four years ago is

23 entirely different from what we currently think we

24 know. So therefore, I think that part of the process

25 has been successful. It has allowed us to engage with

1 the NRC to work through siting issues without having
2 to narrow down a selection of technology at this
3 point.
4 MEMBER POWERS: And that was -- I mean,
5 that's the way the regulation has been written. To
6 facilitate exactly that sort of thing. And so it
7 works.
8 MR. GRECHECK: So to that extent the
9 process has worked. Of course we're testing the
10 regulatory process. There had been no previous early
11 site permit applications, so we needed to be able to
12 actually do this to understand how it worked, and of
13 course to keep the nuclear option open as we were
14 trying to make a business case.
15 MEMBER POWERS: I keep looking at that
16 word "test" the regulatory process. And is there some
17 message here? You didn't believe this was actually
18 going to work?
19 MR. GRECHECK: I think that the first time
20 you do anything there is certainly -- and there's
21 certainly some hesitation as to how the process is
22 going to work. But having said that, and having now
23 been through it to this point, I think we've all
24 learned something too. And I think both the staff and
25 the various applicants have acknowledged that for the

1 next series, if we were going to do it again there
2 would be things we would do differently, and I'll talk
3 about a few of those as we proceed through this
4 application. So there is a certain amount of testing
5 that's going on.
6 MEMBER POWERS: I'll remind you that we
7 are thinking that sometime this fall we might get
8 together and do a lessons learned on this. We
9 certainly would invite you to participate in that,
10 either in person, or in writing, or in any mechanism
11 that you would like to note on the email, whichever
12 way it is, because I think we'd like to capture some
13 of these lessons learned. I mean, the idea is to have
14 an efficient and effective process here.
15 MR. GRECHECK: And we would be very
16 interested in participating in that. All right. The
17 North Anna power station site, or the ESP site, again,
18 was originally designed as a 4-unit site. Two units
19 were built. Two units had construction permits issued
20 during the 1970s. Construction had actually commenced
21 on Units 3 and 4, and then was canceled. And in the
22 years after that cancellation, the construction work
23 that had taken place was demolished.
24 The next is a picture of the site. On the
25 right-hand side you see Units 1 and 2. Those are the

1 operating Westinghouse 3-loop PWRs. Immediately to
2 the left of the operating units you see a hole in the
3 ground. That hole in the ground represented the area
4 where the Unit 3 and 4 containment structures were
5 actually under construction at one time. And that is
6 the beginning of the ESP site. But if you look at the
7 diagrams on the next several slides, you can see that
8 the ESP site is significantly larger than just that
9 area. It extends significantly off to the left.
10 MEMBER APOSTOLAKIS: Would you point to
11 it?
12 MR. GRECHECK: Right in here is the Unit
13 3 and 4 containment area. But the ESP site runs way
14 out to here. And you'll see that on the next diagram.
15 But it runs significantly off to the side.
16 MEMBER APOSTOLAKIS: Thank you.
17 MEMBER SIEBER: Big enough for 12 modules.
18 MR. GRECHECK: Yes.
19 MEMBER SIEBER: Modules, George.
20 MEMBER APOSTOLAKIS: I know.
21 MEMBER POWERS: Little toy reactors.
22 MR. GRECHECK: Right. Included in the
23 plant parameter envelope are the PVMR and the General
24 Atomics GTMHR. So yes, there could be many modules,
25 actually up to 16 I think. Yes, up to 16 PVMR

1 modules.

2 All right. Then the next slide that's out
3 of the application shows a 50-mile radius around the
4 site. The lake is right in the middle. That's where
5 the plant is. You can see some of the major
6 geographical areas. See that Richmond is about 45
7 miles off to the southeast. See Charlottesville maybe
8 40 miles or so to the west. And coming up this way
9 toward the Washington area you can see that Manassas
10 is just outside the 50-mile radius of the plant. This
11 area is essentially quite rural. Since the lake was
12 built it has become somewhat of a vacation or second
13 home area, but it is still predominantly rural. No
14 major population centers, and no industry to speak of.

15 Next is a picture of the site itself. It
16 shows the site boundary. This would be the plant
17 boundary, or the exclusion zone, with a 5,000-mile
18 radius around the plant. And in that cross-hatched
19 area, this cross-hatched area right here represents
20 the ESP site which was part of the application.

21 Just to bring you up to speed on the
22 overall schedule of how we got here. You can see we
23 submitted the application back in September of 2003.
24 We've made four revisions to the application as the
25 review went forward. The last of those was back in

1 May. That was the final revision that took into
2 account all of the open items that we discussed during
3 the meeting with you back in March. And back in June
4 a few weeks ago the NRC staff did issue the final
5 safety evaluation report.
6 All right. If we go to the next slide,
7 you can see where we've come since the last time we
8 met with you. The draft SER that the staff issued in
9 December had a number of permit conditions, had a
10 number of proposed action items that would be carried
11 over into the COL phase. And then 28 open items that
12 represented issues that we needed to come to
13 resolution with. At the time as I recall when I sat
14 here at that time, I was indicating that we were going
15 to submit our response to all but one of those items
16 the next day, I believe it was we were indicating,
17 which we did. There was one seismic-related item
18 which took a couple of more weeks to submit, but all
19 of that did come in on time.
20 So if you look on the right-hand side,
21 this is where the final SER stands. There are eight
22 proposed permit conditions which the staff will
23 discuss with you. I will not go through those in
24 detail with you. There are 30 items which have been
25 deferred into COL space. And these are primarily

1 items which cannot be addressed now because they
2 depend on design detail, and therefore they are simply
3 flagged that at the time we do come in with a COL
4 those will be items that will have to be discussed
5 then. And then you can see that all of the items have
6 been satisfactorily closed.
7 If you had a chance to read the final
8 safety evaluation report, I'm sure you've read the
9 staff's evaluation of each of these items. And I was
10 not proposing to go through those in detail here,
11 although if you have any questions about them we can.
12 The vast majority of them, everything on this slide
13 were items that we characterized simply as the staff
14 requiring additional information. There was no
15 particular dispute or open issue. It was simply that
16 additional information was required. So for each of
17 these we provided that information in that letter that
18 was submitted the day after we met with you, and that
19 -- the staff was able to complete their review.
20 There were a few which I'll bring out that
21 were a little bit different and represented some
22 discussion. The first of those had to do with the
23 exclusion area. And what makes this one interesting
24 is the present environment of how power companies have
25 evolved since perhaps the first generation of plants

1 were built. We have generation deregulation in
2 Virginia. The existing plants are owned by a
3 subsidiary of Dominion called Virginia Electric &
4 Power Company, or Virginia Power. That is still
5 technically within the regulated portion of the
6 utility business. The entity of the company that is
7 doing the development of any potential new reactors is
8 on the deregulated side of the company. Those are
9 both subsidiaries of Dominion Resources, but they are
10 separate legal entities, and therefore in a purely
11 legal sense Dominion Nuclear North Anna, LLC, which is
12 the applicant for this site, does not currently have
13 any property rights over this site. Now, clearly we
14 will be able to deal with that at the appropriate
15 time, but at the time of this application, DNNA as an
16 entity does not have those controls. So clearly as a
17 legal matter before DNNA would be authorized under an
18 ESP to do any limited LWA work at the site, we would
19 not to have legal authority to do that. We would need
20 to have legal authority to perform site redress and
21 such things. And certainly those things will happen
22 prior to any of that work happening.
23 There was another question during the open
24 items to that talked about minimum distances. If you
25 recall we talked about that during the meeting, and

1 that was was it necessary in ESP space to put into
2 effect any kind of limitations as to how close to the
3 operating units could you get as part of the
4 construction process. And what led to that is that
5 the circulating water tunnels that were built as part
6 of the Unit 3 and 4 construction at the moment at
7 least we are still hoping to be able to use those
8 tunnels as part of any future construction here.
9 Those tunnels should be in good shape. They should
10 certainly be capable of handling the flow rates that
11 we would be expecting from new units. So as part of
12 the site investigation that would go into preparation
13 to submit a COL we are going to be doing some
14 investigation of those tunnels. If we have to do
15 refurbishment, or repair of those tunnels, those
16 tunnels do run through the Unit 1 and 2 sites. So
17 there was some question about what kind of limitations
18 need to be put in place. We have agreed with the
19 staff that there are sufficient processes in place for
20 the operating plants to be able to control any such
21 thing. So before we can make modifications to the
22 Unit 1 and 2 site, then clearly under the licensing
23 processes that govern operating reactors, whether it's
24 10 C.F.R. 50.59 or any review processes there. We
25 still need to be in accordance with the operating

1 licenses, and we will be. So it's not necessary to
2 put ESP restrictions over activities that are not
3 going to be taking place on the ESP site, but would be
4 taking place on the operating site.
5 There was some question about what the
6 minimum lake water temperature would be, and that has
7 been resolved by defining the site characteristics.
8 So that site characteristic will move forward with the
9 application as one of the items that needs to be
10 considered as part of the design process. There was
11 also a question about the absorption/retention
12 coefficient of the soil. And that had to do with
13 whether that needed to be specifically measured by
14 tests at the site, or could be done through an
15 empirical process. And again, we were not in a
16 position to be able to do actual testing since we are
17 not yet -- have not defined a precise location at this
18 -- in this ESP boundary as to where these units would
19 be built. So it would be difficult to do specific
20 testing for specific soil. So that has been resolved
21 by a proposed ESP license condition that would say
22 that any plant built here needs to be able to prevent
23 spillage of liquid radioactive material.
24 CHAIRMAN WALLIS: You mean the soil varies
25 so much over this site that you can't just take a few

1 samples?

2 MR. GRECHECK: It -- You have to test the

3 specific soil in the specific location. There's not

4 a tremendous variation, but there is difference

5 between weathered rock, and soil, and exactly what is

6 in each location, and it would have to be verified.

7 So rather than, again, trying to get into some

8 extensive hypothetical perspective, we just agreed to

9 a design condition on any future use.

10 The next one I brought up simply as an

11 example of the kinds of things that were brought up

12 during the staff's review that are important, but

13 again cannot be determined at an ESP stage. And that

14 had to do with the design of the ultimate heat sink.

15 This is a design-related issue, and has to be clearly

16 dealt with at COL time, but cannot be dealt with at

17 this point. So, again, it was just deferred as a COL

18 action item. And there was, again, some seismic

19 issues in terms of --

20 MEMBER POWERS: That's not necessarily

21 generically true. It just happens to be true for the

22 way you want to do things.

23 MR. GRECHECK: It is. The kind of thing -

24 - generically the issue is what is the level of design

25 detail that you have at this phase. And in some cases

1 you can -- if it's site-related you can define that
2 somewhat specifically. But if you're talking about
3 what a structure's going to look like, or what a
4 particular -- in this case it was uplift, and uplift
5 again is going to depend on location, and without
6 having the location specifically specified it's very
7 difficult to do those kinds of analyses.
8 MEMBER POWERS: Yes. Those pieces that
9 get near the boundary, the ones that are going to have
10 to be decided on an individual applicant's case. It's
11 one of those things it would be very hard to write
12 something down firm and fast. But you instantly
13 recognize them when you see them, I think. I mean, I
14 don't know how you write a review process that
15 specifies them, but I sure know them when I see them.
16 And so it's an agreement, you've reach an agreement,
17 great.
18 MR. GRECHECK: And finally in emergency
19 facilities we had a lot of discussion during the last
20 meeting. As a matter of fact, you mentioned that
21 during the -- or you mentioned that in your letter to
22 the NRC. I think this is clearly one of the areas
23 where some lessons have been learned, because we
24 think, and I think the staff agrees that we got into
25 some unintended review processes here. But in this

1 case we actually had to withdraw part of the
2 application because it had to do with major features,
3 and this major feature specifically was the design and
4 capability of the emergency facilities. And again,
5 it's very difficult to specify what the LUF or the TSC
6 is going to look like when you don't know yet what the
7 plant is. So we withdrew that portion, and basically
8 just said we're not asking for approval for that piece
9 of the major features.
10 MEMBER POWERS: And the staff has
11 indicated that they, (a), think that maybe they need
12 to rework their review guidance. Because, I mean the
13 problem is that major feature is not defined. And at
14 least when you look through -- you look at the
15 regulation itself, I think the authors of the
16 regulation were looking at a very high-level kind of
17 thing, and you have a tendency to go to too low a
18 level here it seems to me. I think that's what gets
19 us in trouble.
20 MR. GRECHECK: Our expectation certainly
21 when we entered into this process that since we were
22 dealing with a proposed site that would be clearly
23 covered under the features of the existing emergency
24 plan for two operating units, an emergency plan that
25 has been in place now for many, many years, that it

1 should not have been a very complex process to
2 conclude that that plan would be adequate for
3 additional units. And I think ultimately that proved
4 to be the case. But the process of getting there was
5 probably more difficult than it needed to be.
6 Okay. Some accomplishments of this whole
7 process is that we've established some boundaries for
8 any future COL applications here. For example, we
9 have defined a number of site characteristics. These
10 site characteristics have been agreed to, these were
11 characteristics we proposed. The staff has reviewed
12 those. The staff has agreed with those. So that
13 means that these become inputs into any future design,
14 or an application for a plant to be located here. And
15 anything that was going to be proposed here will have
16 to take into account the agreed-upon site
17 characteristics.
18 Those characteristics have been defined as
19 things like what is the low population zone, and what
20 is the exclusion area boundary. There are some
21 definitions of what the relevant site meteorologic
22 items are, and then of course the hydrology, and
23 geology, and seismology, to the extent that they
24 affect design decisions, have been defined now as
25 fixed characteristics.

1 MEMBER POWERS: I went through a couple of
2 these. I mean, I think these are important points.
3 You define these characteristics, and they become
4 boundary conditions for the subsequent design of a
5 plant if somebody decides they should build a plant
6 here. And these characteristics get fixed by this
7 process. So when you go through, and you look, and
8 you define these site boundaries, and you define the
9 population, you also look into the future and say is
10 there any reason to think that this is going to change
11 very radically. And you actually put some numbers in
12 and some projections. And some of them even actually
13 move down, which it's always remarkable when that
14 happens. But I mean, you do look at the applicability
15 of your population data.
16 MR. GRECHECK: We do.
17 MEMBER POWERS: Now we come to the site
18 meteorology. And what you do there, as I think I
19 understand it, and correct me if I'm wrong, is that
20 you look at the historical meteorology, and you define
21 some limiting conditions, and you do that fairly
22 conservatively. I mean, you find 100-year values and
23 say they're 50-year values, and things like that. And
24 you say, okay, what I've seen in meteorology in the
25 past is what I'm going to see in the future. Why is

1 that a legitimate thing to do? When I look at your
2 population you don't do that in the population area,
3 but you do do that in the meteorology area.
4 MR. GRECHECK: I think the major reason is
5 that there is a certain methodology to predicting
6 population changes. You know, you have some ability,
7 and of course it's not exact, but there is some
8 ability to project economic trends, and where
9 development is occurring, and what kind of development
10 is occurring, whether it is high-intensity or low-
11 intensity, what that's going to look like. And then
12 within some accepted boundaries you could make some
13 projections. Even though I think there is certainly
14 a lot of discussion, and a lot of work going on about
15 climate change items, there is at this point certainly
16 at a locational basis perhaps you can draw some
17 conclusions overall for global climate or something,
18 but at a locational basis, the methodology for making
19 some kind of prediction about what's going to be
20 occurring at a particular site is relatively limited.
21 So what you do is you say I'm looking at
22 extremes. The extremes are defined in the current
23 regulations and reg guides as looking at these 100-
24 year recurrences and things, and you say that these
25 are so unusual anyway, this does not represent typical

1 climate conditions. This represents extremes. And
2 these extremes probably, to the limit of our ability
3 to predict, probably bound whatever is going to
4 happen. But then on top of that you have to look at
5 the specific site, and recognize that the North Anna
6 site is not in any stretch of the imagination at any
7 meteorological extreme as far as what you would
8 expect, say, in the United States. It does not
9 represent particularly high wind speeds. It does not
10 represent particularly cold weather, or hot weather,
11 or heavy rain, or drought conditions, or any of the
12 various extremes that you would define around the
13 typical design. And recognizing that any plant that
14 you would build here would be built or designed by its
15 manufacturer to be able to be built at just about any
16 location within the country. They are going to be
17 building it to a set of conditions that are clearly
18 much more extreme than anything we're going to see
19 here. So we do our best historical reviews to be able
20 to identify what those conditions are. We recognize
21 that even with those 100-year returns we're talking
22 about limits that are clearly bounded by other sites
23 in the U.S., and then we say that from a design
24 standpoint that's really not going to be an issue.
25 Now, I'll agree with the staff. I know

1 that in their letter that they wrote back in response
2 to your previous question, they're saying that
3 whatever does happen should happen over a lengthy
4 period of time. So if the trends indicate that
5 something needs to change, there's going to be plenty
6 of time to be able to change those. But I think that
7 right now from an overall assurance of safety
8 standpoint, the issue would be mostly that anything
9 that gets built here is going to be designed to
10 meteorological conditions that far exceed anything we
11 would expect to see at the site.
12 MEMBER SIEBER: I think it's fair to say,
13 too, that when the plant is built and licensed to
14 operate, you will have tech specs, and restrictions on
15 water temperature and so forth that will be do-not-
16 exceed, and in the event that Lake Anna temperatures
17 rise above that, then you may not be able to go to
18 full power.
19 MR. GRECHECK: To the extent that we'd be
20 using the lake for safety-related cooling. Right now
21 our expectation is that we would not be, but yes, in
22 principle you're correct.
23 MEMBER POWERS: I actually like your
24 answer. I mean, I don't know that you could give any
25 other answer. I did -- I'll share with you my

1 experience. I received the staff's response, and
2 didn't particularly care for it, so I went looking.
3 And I went to the Journal of Climate bulletin in the
4 American Meteorological Society, and I just pulled out
5 random issues. And what I found was in the most
6 recent issue of the Journal of Climate were three
7 articles on long-range weather forecasting in local
8 areas, local areas being defined fairly big areas, but
9 the Eastern Seaboard of the United States is certainly
10 not one of them. And there are in fact cycles of
11 climate, driven by what's called the El Nino southern
12 oscillation. Occurs over years. And a cycle of
13 shorter duration. And at least some authors think
14 that these cycles are now coinciding with each other,
15 so we're getting peaks in both, and so they actually
16 predict with probably no more accuracy than your
17 population predictors, you know, some increase. And
18 what they disagree with is, for instance, in the area
19 of hurricanes, you know some say that, okay, we're
20 going to have more hurricanes, but they're going to be
21 milder ones. And other ones say we're going to have
22 more hurricanes and they're going to be worse ones.
23 It's interesting stuff.
24 There is -- my point being that there is
25 probably as much technology for predicting long-range

1 forecasting as there is for your population stuff, and
2 we just don't do it. And in your case I would have
3 given the answer that you gave, and it's justifiable,
4 don't get me wrong. I'm not faulting you the least
5 bit in what you've said here. It just surprises me
6 that we do that in the face of a fairly formidable,
7 that impressed me, literature base that says things
8 are changing.
9 And I agree with Mr. Sieber that, yes, I'm
10 not sure that this has a big safety impact, because
11 we'll put the tech specs on that'll control things,
12 and we'll be in good shape here. But we are in the
13 business of characterizing the site, and we ought to
14 try and do as good a job as we can. I am reminded,
15 one of the things that I very much learned on this
16 committee, when Professor Wallis came onto it he took
17 the view that it's the academic community that in some
18 sense reflects the public interest in these highly
19 detailed discussions. That academic community is
20 going to be looking at this literature that we find in
21 the technical journals on climatology, and when they
22 don't see it showing up in our thinking here, I'm not
23 sure what kind of impact we're having. It's just an
24 interesting concern right now. For the purposes of
25 our discussion, it's an interesting concern. We may

1 have more to say to the staff on the subject.

2 MR. GRECHECK: Okay. Moving on to the

3 next slide. Similar to site characteristics, we've

4 also defined plant parameter values. And again, to

5 refresh those of you that don't remember how this

6 happened, although we got into a small bit of that

7 discussion. We picked eight different designs at the

8 beginning of this process that was just about anything

9 that anybody was proposing back at the time that we

10 started writing the application, did an extensive

11 listing of plant parameters from all of those various

12 designs, and then attempted to create a bounding

13 envelope that would encompass all of them. I do have

14 a comment on a later slide that I think that's another

15 one of those lessons learned is that we didn't really

16 know what was important and what wasn't when we were

17 dealing with literally hundreds of these design

18 issues. And I do think we do understand that process

19 a little bit better now. But having said that, we've

20 gone through the review process, and various plant

21 parameter envelope values have been chosen as being

22 relevant by the staff as part of their review, and

23 those are being defined in the ESP as being bounding.

24 So at COL stage it'll be necessary to demonstrate that

25 whatever technology is actually proposed for this site

1 fits within those boundaries or would be subject to
2 further review.
3 And finally, we do want to take the
4 opportunity to commend the staff for the work that
5 they did on selection of permit conditions. I did
6 mention when I was here last time that we felt that
7 the proposed permit conditions back in March
8 represented a wide variety of bases for them, and it
9 was difficult in some cases to understand exactly what
10 that basis was. I think the staff has done a very
11 commendable job of trying to rationalize exactly which
12 ones were conditions, and which ones were action
13 items, and which ones were resolved as open items.
14 And I think primarily the conclusion that if an
15 existing regulation or an existing process already
16 takes into account a review that is necessary, it's
17 not necessary to specify that again in a license
18 condition. So again, I know the staff is prepared to
19 talk to you about the license conditions, but we have
20 no issues with them.
21 So overall it's been -- getting back to
22 that testing question, it's been a very interesting
23 process. There was a lot of hard work on our part
24 with a lot of late nights at times trying to come up
25 with the necessary evaluations to meet the staff's

1 review. I think the communication between the staff
2 and the applicant was very good. I think it does
3 represent probably a continuation of the work that the
4 staff has done that started with license renewal,
5 perhaps, but has carried over into this idea that a
6 dynamic, continuing discussion is very valuable. And
7 of course it is open to the public, and subject to
8 public observation and comment, but yet it is a
9 recurring, ongoing discussion rather than a number of
10 discrete opportunities.
11 The emergency planning major features
12 option is still of questionable value, and I think we
13 will clearly talk about that in any lessons learned
14 item. But I think if for no other purpose, it was a
15 good warm-up for my emergency planning staff. They
16 now have an idea of what kinds of things they're going
17 to have to deal with, and I know that they're already
18 starting to think, as Marvin's organization is going
19 to them and saying, okay, we're going to start working
20 on this COL application, they have a better idea of
21 what that means, I think. So from that perspective I
22 think it was good.
23 MEMBER POWERS: To put the best spin on it
24 you possibly can.
25 MR. GRECHECK: The plant parameter

1 envelope approach worked. And I think this is
2 probably one of the most important items, is that if
3 ESP is valuable, it is valuable for a company that is
4 not yet sure of what they want to pursue, because if
5 someone is pretty sure of the technology, there's
6 probably -- and I can't speak for all cases -- but
7 there's probably limited value to go through this.
8 You might as well go directly into a COL application,
9 if you think you know what you're going to do. But if
10 you don't, and you're trying to get through a site
11 review while you're trying to determine what's the
12 best technology, then you cannot allow yourself to get
13 so locked in to a particular design that it becomes
14 exclusionary to anything else while you're still
15 trying to make that determination. I know there was
16 a lot of trepidation both on our part, and on the
17 staff's part when this PPE concept was first proposed.
18 But I think all in all it has worked. But if we were
19 going to do that, again, we would certainly identify
20 considerably fewer parameters, because it turns out
21 many of them are either duplicative, or tend to not
22 really be necessary for the process.
23 MEMBER POWERS: We certainly live in a
24 just-in-time world when it comes to capital
25 expenditures.

1 MR. GRECHECK: Exactly.

2 MEMBER POWERS: And so it's good that this
3 worked, and I liked your comment that if you know the
4 technology you're going to use, skip this and go to
5 COL. That's an interesting comment.

6 MR. GRECHECK: And as I said, I think
7 there's lessons learned, and as I indicated before,
8 we'll be eager to participate in any review of that.

9 The final slide, I just wanted to throw
10 something up here just to say that as interesting as
11 this process has been, it is a relatively minor piece
12 of what happens next. The COL process is
13 significantly more complex. As it was envisioned by
14 the original regulations, I can remember a lot of
15 people talking about, well, you'll have this ESP on
16 the shelf, and you'll have this certified design on
17 the shelf, and you just bring these two together, and
18 everything is going to be just --

19 MEMBER POWERS: Hours later you get --

20 MR. GRECHECK: Everything's going to be
21 real easy. But if you just look at this, there's a
22 whole number of blocks in here of inputs into the
23 process for a COL that will go into the various
24 chapters. And we are looking forward to that process,
25 but it will be substantially more complex than the ESP

1 process, and I think that it is important to learn and
2 apply the lessons that we've learned through this
3 process in order to make that next one work. So we'll
4 have opportunities to talk about that in the future,
5 I'm sure, but it will be more complex than what we've
6 seen here.
7 MEMBER APOSTOLAKIS: Is the FSAR and the
8 chapters will be similar to the FSARs of the past?
9 MR. GRECHECK: Similar? Roughly similar.
10 MEMBER APOSTOLAKIS: The PPEs and all
11 that.
12 MR. GRECHECK: They will be different in
13 that they're -- if you looked at how the ESP
14 application was written in its electronic form, it was
15 heavily hyperlinked, and heavily cross-referenced to
16 source documents. The new FSAR will be even more so
17 because it will be incorporating by reference material
18 from the ESP, or from the design certification, and it
19 will not in many cases repeat that because those
20 features have already been reviewed and approved. So
21 there's going to be a lot of inter-linking between all
22 of those applications. And in my opinion, it's going
23 to be very difficult to read in a hard copy form.
24 You're going to probably need to do it electronically.
25 MEMBER APOSTOLAKIS: So the work that the

1 staff is doing on risk-informing the licensing process
2 would not affect any of this?
3 MEMBER POWERS: Well, it depends on how
4 far the staff gets.
5 MEMBER APOSTOLAKIS: And it depends on how
6 long it will take them to go to poll with this COL,
7 right?
8 MEMBER POWERS: I mean, in principle we
9 could have a whole revolution in the way we do plants
10 between now and then.
11 MEMBER APOSTOLAKIS: I doubt it, though.
12 I doubt it. Probably what they're doing refers to Gen
13 IV reactors. Because otherwise they would have
14 accelerated the process.
15 MR. GRECHECK: I'll say from our
16 perspective, the NEI has proposed a framework for a
17 COL application to the staff. I think the staff is
18 reviewing that now. Our expectation is that that
19 framework or some reasonable facsimile of it will
20 represent the basis for at least the first
21 applications that we'll be seeing.
22 MEMBER APOSTOLAKIS: So if some of the
23 thinking that has gone into this new licensing process
24 is to be part of this, then this is the place to do
25 it, in the review of the NEI document. That's a good

1 point.

2 MR. GRECHECK: All right. Well, that

3 concludes our portion of the presentation.

4 MEMBER POWERS: Let me ask you one

5 question. Do you think that having been through this,

6 that we now have a decent template that people can

7 follow if other people wanted to do things?

8 MR. GRECHECK: Yes. I think --

9 MEMBER POWERS: With the possible

10 exception of the major features issue on the emergency

11 planning.

12 MR. GRECHECK: If you go back and remember

13 the history, all three companies that are currently

14 having active ESP applications are all doing that in

15 partnership with the Department of Energy. And it was

16 done with the idea of doing exactly that, that we

17 would blaze the way through this process, try to

18 figure out exactly what needed to be done or not. And

19 one of the outputs of all that will be exactly this

20 more clearly defined process, with a more clearly

21 defined table of contents, and a content guide, and a

22 review guide for the staff. And I think we've made a

23 lot of progress.

24 VICE CHAIR SHACK: Your PPE should be a

25 fairly generic sort of thing. I mean, you guys

1 covered the waterfront.

2 MR. GRECHECK: There have been a few

3 changes to the technology offerings since then, but

4 yes, to the extent that it defined a very broad

5 technological envelope, yes. I think it was -- it

6 still has value going forward.

7 MEMBER APOSTOLAKIS: You made a statement

8 at the beginning that I find intriguing. You said we

9 know more about the reactor types than we knew three

10 years ago. And you smiled when you said that. What

11 is it that we know that warrants a smile?

12 MR. GRECHECK: Because now we're getting

13 into commercial issues, and feasibility, and

14 practicality, and things of that sort. I can

15 distinctly remember that in 2001, various gas reactor

16 vendors were actively stating that they could be

17 licensed in time for the next plants to be built. And

18 I think we generally now accept that that's not the

19 case. But four years ago that was clearly, I mean the

20 vendors clearly believed that they would be able to

21 move through the NRC licensing process in time to

22 support NP 2010.

23 MEMBER APOSTOLAKIS: But we know now that

24 this cannot be done because of what? Because we would

25 have to change the system significantly?

1 MR. GRECHECK: I think there is a variety
2 of things. I think there are probably a better
3 understanding of the technical differences between
4 what has been previously licensed, and what would have
5 to be, and therefore that just means more work and
6 more time.
7 MEMBER APOSTOLAKIS: Thank you.
8 MEMBER POWERS: Any other questions?
9 Thank you a lot, Gene. I appreciate your
10 presentation. Appreciate your participation, and the
11 effort. Very interesting, and I do hope that you can
12 help us on the lessons learned on this process.
13 Our next presentation is from the staff.
14 And I guess Ms. Sosa, you're going to?
15 MS. DUDES: Good morning. While they're
16 setting up, could I just do an intro?
17 MEMBER POWERS: I don't know. Have you
18 been good?
19 MS. DUDES: I don't know. I try to think
20 of new things to tell you.
21 MEMBER POWERS: Go ahead.
22 MS. DUDES: And also in the interest of
23 time as they're getting the slides ready.
24 MEMBER POWERS: You do have to identify
25 yourself for the record.

1 MS. DUDES: My name is Laura Dudes. I'm
2 the Section Chief from New Reactors. I just wanted to
3 remind everybody that today is the presentation for
4 the final safety evaluation report. This document in
5 conjunction with the environmental impact statement
6 will serve as the basis for the ASLB's review during
7 the mandatory hearing. Of note, I was happy to hear
8 Gene mention that he realizes, as I have Dave sitting
9 next to me, that with the plant parameter envelopes,
10 and our design certifications, which have COL action
11 items, it's the first time I've heard someone from
12 industry say, yes, we realize that going to COL is not
13 an easy marriage of an early site permit and a design
14 certification, and there is work to be done. So as
15 we're looking at these documents, we're looking at the
16 plant parameter envelopes, yes it was successful. I
17 think it was successful also in large part to the work
18 that the staff did in defining the permit conditions,
19 the COL action items. I know Goutam Bagchi, I think
20 he's here, was instrumental, along with Ms. Sosa and
21 Brad Harvey, in really working out those definitions
22 and establishing a good basis to take this ESP forward
23 so that when we have to use this, or if we do have to
24 use this document as a basis in COL, we have some
25 clear definitions, and some clear directions. So I

1 think they did a really outstanding job in doing that.
2 I think there was a slide in the beginning
3 that talked about not having a technology when you
4 went into ESP. That was not necessarily the original
5 vision of Subpart A of Part 52. In fact, I think if
6 you talk to some of the authors of this regulation,
7 they will tell you that they thought a technology
8 would be ready and referenced, and that it was a step.
9 But the staff actually was able to accommodate the
10 concept of the plant parameter envelope, and I think
11 they did so very well. It created more challenges.
12 It created more challenges as this was our first time
13 through Part 52 on an early site permit, and we had to
14 come to safety conclusions because as I said, once we
15 finalize this early site permit, many of these issues
16 will be considered final as we go to COL. So I think
17 the staff did a good job trying to come to safety
18 conclusions on site suitability within the plant
19 parameter envelope.
20 So I don't want to belabor that, but I did
21 want to say that was a -- commend the staff for their
22 work, and remind everyone that the final safety
23 evaluation report is a supporting document. Not
24 unlike when we do a design certification, and the
25 applicant's design control document is the basis for

1 that design certification, in early site permits, the
2 staff's final safety evaluation report and the
3 environmental impact statement will become the basis
4 for our safety conclusions. With that, Belkys? Thank
5 you.
6 MS. SOSA: Good morning. Belkys Sosa, New
7 Reactors. I'm the PM for the ESP North Anna review.
8 The purpose of today's meeting is to provide the ACRS
9 with an overview of the conclusions reached by the
10 staff in the North Anna early site permit safety
11 review. We'd also like to discuss the permit
12 conditions recommended by the staff, and the combined
13 license action items, as well as the bounding
14 parameters listed in the FSAR. Success today would be
15 that the ACRS gains an understanding of the conditions
16 and limitations recommended by the staff for inclusion
17 in any ESP that might be issued in connection with
18 this application, as well as to gain an understanding
19 for the COL action items identified in the SER.
20 MEMBER APOSTOLAKIS: So this implies that
21 the staff believes that it's hard for the ACRS to gain
22 understanding?
23 MS. SOSA: No. I would measure success if
24 when I leave here today you understand what this is.
25 MEMBER POWERS: They're really hostile

1 toward us. I mean, they write us responses to our
2 letters that are hostile.
3 MEMBER APOSTOLAKIS: This is the first
4 time I see, you know --
5 MS. SOSA: I thought it was a good letter.
6 MEMBER APOSTOLAKIS: -- the measure of
7 success is us understanding.
8 MEMBER POWERS: They may have a sound
9 reason. We'll explore that a little bit.
10 MEMBER DENNING: Shouldn't it be a
11 positive letter from us? Isn't that success?
12 MS. SOSA: Yes.
13 MEMBER APOSTOLAKIS: Success would be a
14 positive letter, actually, but yes. But that's okay.
15 MS. SOSA: Yes, that would be the actual -
16 -
17 MEMBER APOSTOLAKIS: But the assumption is
18 that if we understand, the letter will be positive.
19 MS. SOSA: Yes.
20 MEMBER APOSTOLAKIS: Very good.
21 MS. SOSA: Thank you.
22 CHAIRMAN WALLIS: How will you determine
23 that we understand?
24 MEMBER APOSTOLAKIS: By the letter. The
25 letter is the measure of success. If the letter is

1 negative, we just didn't understand.

2 (Laughter)

3 MEMBER POWERS: They should be prepared

4 for a failure to understand, then.

5 MEMBER APOSTOLAKIS: Anyway, I think we've

6 exhausted the humor of this.

7 CHAIRMAN WALLIS: This is a favorite

8 teenage excuse that, Dad, you just don't understand.

9 MEMBER APOSTOLAKIS: She never said that.

10 I think we're ready.

11 MS. SOSA: Dad, I hope you understand.

12 Hopefully I'll spend about 25 minutes trying to

13 achieve success here today. I'll briefly discuss the

14 conclusions in the report, as well as just the key

15 review areas where we had to resolve open areas,

16 present affirmative conditions, and the bounding

17 parameters.

18 MEMBER POWERS: I will comment that I

19 think we do need to understand how you rationalized

20 your permit conditions. To the extent that you can go

21 through that carefully for the poor, benighted ACRS

22 with its limited capacity for understanding, that

23 would be helpful.

24 MEMBER APOSTOLAKIS: We'll never let you

25 forget that.

1 MS. SOSA: Thank you. The final SER
2 document, the staff's technical review of site safety
3 analysis report, and emergency planning information
4 that was provided by the applicant in conjunction with
5 its application. The review conducted by the staff
6 confirmed that the application complied with the
7 requirements of Part 52 which is intended to address
8 the site-related issues, as well as Part 100, the
9 Reactor Site Criteria. The staff determined the
10 applicant's exclusion area is acceptable and meets the
11 requirements of Part 100 subject to the limitations
12 and conditions identified in the SER. Permit
13 Condition 1, which I will describe in more detail
14 later, provides reasonable assurance that the ESP
15 provides for control of the exclusion area.
16 The staff independently verified the
17 adequacy of the applicant's dose consequence
18 calculations from normal operations, and concluded
19 that the proposed site is acceptable for constructing
20 a plant falling within the PPE with respect to
21 radiological effluent release dose consequences from
22 normal operations.
23 The staff reviewed the applicant's
24 aircraft hazard analysis, and independently verified
25 the assessment of aircraft hazards at the site. The

1 staff concludes with respect to aircraft hazards that
2 the proposed site is acceptable for constructing a
3 plant falling within the applicant's PPE.
4 In the area of industrial security, the
5 staff concluded that the physical characteristics of
6 the site would allow a COL or construction permit
7 applicant to develop adequate security plans and
8 measures for reactors that might be constructed and
9 operated at the site.
10 MEMBER APOSTOLAKIS: I guess I'm
11 constantly confused by this. I think I mentioned it
12 last time, too, in the seismic area. Shouldn't we
13 expect the first bullet to be true since there are
14 units already there? I mean, how could you conclude
15 something different?
16 MS. SOSA: That's a good question. Still,
17 regulations require us to make sure that they comply
18 for additional units.
19 MR. SCOTT: Can I interject something,
20 George? One possibility would be if you had a site
21 that had a limited area, and your new reactor was
22 going to be close to the edge of the site where you
23 didn't have stand-off distance, for example, for
24 security purposes. So there are -- certainly it's
25 unlikely, but it's possible, and the staff clearly has

1 to evaluate it because the rules have that as a
2 criterion.
3 MEMBER APOSTOLAKIS: The rules say so. I
4 mean, I'm not questioning why the staff did it. It's
5 just that I find it a little surprising.
6 MS. SOSA: It's an easier review.
7 MEMBER POWERS: Well, you also can
8 conceive of the situation where a major international
9 airport is planned for 20 years down the road, post
10 retirement of the current reactors. I mean, these are
11 not inconceivable things. They do happen.
12 MEMBER APOSTOLAKIS: So you are looking
13 also into the future here?
14 MEMBER POWERS: Sixty years.
15 MS. SOSA: Well, what we did in our review
16 is take a look at what existing permits allowed for
17 some facilities to be built there, and the assessment
18 was based on that. So certainly nothing is there now
19 that would be a hazard.
20 MEMBER POWERS: But I'll remind you that
21 you also contacted the FAA --
22 MS. SOSA: Yes.
23 MEMBER POWERS: -- or at least you told me
24 you did, and several other things, regional planning
25 authorities, and whatnot, and found no plans for this

1 major international airport with large Airbuses flying
2 in.
3 MS. SOSA: That's correct.
4 MEMBER APOSTOLAKIS: Or out. Especially
5 the new one.
6 MEMBER POWERS: We only worry about the
7 ones flying in.
8 MS. SOSA: With their evacuation time
9 estimates, the applicant has shown that no physical
10 characteristics unique to the site --
11 MEMBER APOSTOLAKIS: One last point.
12 MS. SOSA: Yes.
13 MEMBER APOSTOLAKIS: The spirit of all
14 this regulation 52 is that you are doing a review of
15 the site independently of the fact that there are
16 already units there?
17 MS. SOSA: No, the units that are there
18 are also considered.
19 MEMBER APOSTOLAKIS: Well, in the terms of
20 interaction. But the fact that you have already
21 licensed those other two units, does that affect Part
22 52 at all?
23 MS. SOSA: No.
24 MEMBER APOSTOLAKIS: That's very
25 interesting. If not, why not? Well, this is not the

1 case.

2 MS. DUDES: We can use existing --

3 applicants can reference existing information. But

4 again, this is a separate federal action, and so we

5 are doing an independent review. To the extent that

6 one site could impact another, or that information is

7 the same and an applicant wants to reference that

8 similar information, that will facilitate the process,

9 and the review may be shorter, it may be easier for

10 the applicant to prepare because they have reference

11 materials. But we need to review this as a separate

12 action, and look at impact both of sites that are

13 there, because those are other -- and maybe the impact

14 of the new unit.

15 MEMBER APOSTOLAKIS: The only issue may be

16 that if the technology has advanced since the last

17 time we approved the existing units, you reach

18 different conclusions now, what do you do? I guess

19 Part 52 doesn't say anything about that. It just

20 focuses on the new reactor.

21 MS. DUDES: Right.

22 MEMBER APOSTOLAKIS: If there's a conflict

23 in the conclusions, somebody else has to decide.

24 MS. DUDES: Well, the existing sites are

25 licensed. They have a licensing basis through a

1 certain set of regulations, and then the new reactors
2 will be licensed to the regulations as well.
3 MEMBER APOSTOLAKIS: But there may be a
4 public relations issue there.
5 MEMBER POWERS: Well, I'll remind you,
6 George, that for instance, the methodology available
7 for doing the seismic hazard analysis has changed
8 since the original site plants were put in. And the
9 applicant is expected to specifically address that
10 issue, plus any revisions that should have been made
11 that haven't been made.
12 MEMBER APOSTOLAKIS: No, I understand
13 that.
14 MEMBER POWERS: So there's quite a little
15 bit --
16 MEMBER APOSTOLAKIS: There has to be.
17 Somebody else will decide, though, if there is a
18 conflict in the requirements, what to do about the
19 existing units.
20 MS. DUDES: Yes.
21 MEMBER SIEBER: I view these as two
22 independent actions. The existing plant is licensed
23 under one set of rules, and the new plants, proposed
24 plants are licensed under another set of rules.
25 MEMBER APOSTOLAKIS: And I agree with

1 that. But don't you see that you may have a problem
2 with the public at some point if the requirements are
3 different?
4 MEMBER KRESS: Well, you may have a --
5 MEMBER SIEBER: Maybe, but who knows.
6 MS. SOSA: If I may, if there's any issues
7 of safety concerns, then obviously the staff will work
8 with the existing units group to make sure that that
9 is factored.
10 MEMBER POWERS: And so you have indicated
11 you've done on the seismic analysis?
12 MS. SOSA: That is right. Yes.
13 MEMBER KRESS: Let's pursue this just a
14 little more. One of the things we tend to look at is
15 the LRF when we think about the new plants. LRF is a
16 surrogate for the prompt fatality QHO. Did we look to
17 see if the prompt fatality QHO is met at this site
18 before we decided it was suitable? In the sense that
19 you have already two units there. And you're going to
20 have an unknown number more units. And in my view,
21 LRF is you add up the LRFs for the various things.
22 Did we look to see if the QHO is met there? I know
23 it's not a requirement, which you know, is sort of a
24 strange thing, but did you even look at it? Because
25 it might color your view of things.

1 MS. SOSA: I will have to ask for
2 assistance from the staff.
3 MS. DUDES: Well, in general, in the early
4 site permit review that we did we did not consider
5 integrated risk from the existing units with the ESP.
6 I think we looked at the new application. And it is
7 a policy issue that the staff is working on in
8 conjunction with Research. In fact, I believe there
9 was some discussion with the committee on this, and
10 integrated risk, and how we would address that.
11 MEMBER KRESS: -- technology neutral
12 framework.
13 MS. DUDES: Right. Yes. But the
14 decisions that come out of that policy on integrated
15 risk could then be applied to ESPs. If there is a
16 decision that says you will consider integrated risk.
17 MEMBER KRESS: Will you go back and
18 revisit this?
19 MS. DUDES: Well, we may not revisit this
20 early site permit, but again, this is establishing a
21 site suitability, and if there's a policy that comes
22 up, we would address it at COL, or change our next
23 early site permit reviews. But the staff is
24 considering how to look at integrated risk. And I
25 think right now we're just looking at LRF independent

1 of the existing sites.

2 MEMBER KRESS: I would question the

3 quality of that judgment, but you know, I would have

4 looked at it anyway, whether there's a policy or not.

5 Because it's a safety issue, I think.

6 MEMBER SIEBER: But once you look at it,

7 even if it's adverse, there isn't anything you can do

8 about it because of the rules.

9 MEMBER KRESS: Well, you could not approve

10 the early site.

11 MEMBER SIEBER: I don't think you can do

12 that.

13 MEMBER KRESS: I think the staff has the

14 ability to use judgment on things like that. Whether

15 it's written into some rule or not, they can question.

16 MR. MATTHEWS: Mr. Kress, let me speak to

17 that just for a moment. The regulations have a unique

18 quality that they apply to the licensee as broadly as

19 they apply to the applicant. So, therefore, when the

20 applicant meets regulations, we're obligated to grant

21 the license.

22 MEMBER SIEBER: That's right.

23 MR. MATTHEWS: So no, there is an

24 expectation that we follow the regulations as well as

25 the applicant, and if we choose to address an

1 additional requirement then we have to get the
2 regulation changed.
3 MEMBER KRESS: Yes, but --
4 MR. MATTHEWS: We don't have that much
5 discretion.
6 MEMBER KRESS: Yes, you do have the
7 discretion.
8 MR. MATTHEWS: Excuse me, this is Dave
9 Matthews, Director of Regulatory Improvement.
10 MEMBER KRESS: You do have the discretion
11 to bring in the question of whether or not adequate
12 protection is actually there, whether they meet the
13 rules or not. You can always question it.
14 MR. MATTHEWS: There is always a factor of
15 judgment involved in a reasonable assurance finding.
16 I would agree with that.
17 MEMBER KRESS: I'm saying that would be
18 the avenue that one might pursue.
19 MR. MATTHEWS: We would view the exercise
20 of the staff's judgment to that degree that would
21 reflect that much flexibility in the determination of
22 reasonable assurance or adequate protection would
23 raise a policy issue, and it would have to be
24 presented to the Commission for resolution ultimately.
25 Now, the Commission could do that, but the staff

1 itself couldn't.

2 MEMBER KRESS: Of course. But you know,

3 I think it's within the staff's purview to do that, to

4 raise those kind of issues.

5 MEMBER APOSTOLAKIS: Presumably when they

6 meet the regulations, there is reasonable assurance.

7 MEMBER KRESS: No. Unless some special

8 conditions happen to come forward.

9 MEMBER APOSTOLAKIS: But this is broader

10 than just this site, right?

11 MEMBER KRESS: Yes. This may not have

12 anything to do with this site at all.

13 MEMBER APOSTOLAKIS: But this is where the

14 risk-informed licensing process of the staff is

15 developed and comes to the picture.

16 MEMBER KRESS: Yes.

17 MEMBER APOSTOLAKIS: This is what we've

18 been struggling with as a committee, trying to decide

19 what is the best way to proceed.

20 MEMBER KRESS: Right.

21 MEMBER SIEBER: Well, the issue here is

22 that this ESP has to be approved based on the rules

23 that are in place right now. And if you want to

24 consider some additional phenomenon that is not

25 considered in the rules, I think that the staff is

1 outside its purview in so doing. And once they
2 approve this ESP, and at some later time they change
3 the policy, this ESP still sticks. That's regulatory
4 stability. That was a primary goal of what this
5 agency does.
6 MEMBER APOSTOLAKIS: I think Jack you're
7 right. I think what Tom and I are trying to do is
8 make sure the staff gains an understanding of where
9 we're standing.
10 MEMBER KRESS: Well, I don't think he's
11 exactly right. I think the staff can always raise the
12 question of whether you have reasonable assurance of
13 adequate protection, whether or not you meet the
14 regulations or not. Based on special circumstances
15 exist. And they can always do that.
16 VICE CHAIR SHACK: Well, I mean, they
17 actually had a policy that you could ask for that risk
18 information even if it wasn't risk-informed if there
19 was a circumstance.
20 MEMBER KRESS: That's correct.
21 MEMBER SIEBER: That's right.
22 MEMBER KRESS: If there was a
23 circumstance. Then I've asked in the past what are
24 you going to do with that information. And the answer
25 has always been, well, it may raise the question of

1 whether we have reasonable assurance of adequate
2 protection. That's always the answer.
3 MEMBER BONACA: Logically, I mean, the ESP
4 goes through a process in which you are questioning,
5 or you're considering everything, there is around the
6 plant, including, you know, possible new airports, or
7 minor airports, or anything that happens in the lake
8 or whatever. You cannot ask questions about the
9 nuclear power plant sitting there? I mean.
10 MEMBER KRESS: Sure you can. That's the
11 point.
12 MEMBER BONACA: It's a facility that
13 exists.
14 MEMBER SIEBER: I would suggest that if we
15 have a concern about integrated risk from any given
16 site, that we address that as ACRS as a policy
17 question by the Commissioners, which we intend to do.
18 But to mix it up with this particular licensing action
19 I think is --
20 MEMBER KRESS: Well, you may be making a
21 mistake if we permit -- give an early site permit and
22 then all of a sudden we realize we shouldn't have.
23 You know, I'm not questioning this particular site,
24 but you know, it's a general issue.
25 MEMBER SIEBER: Well.

1 MEMBER POWERS: I'm just dying to ask, Dr.
2 Kress, how in the world they would ever get LRF
3 information?
4 MEMBER KRESS: Pardon?
5 MEMBER POWERS: How would they get LRF
6 information? They can't even calculate --
7 MEMBER KRESS: I would forget LRF and go
8 to Level 3.
9 MEMBER POWERS: They can't even calculate
10 CDF with the existing PRA technology.
11 MEMBER KRESS: I understand that. That's
12 another question.
13 MEMBER SIEBER: You've got a bigger
14 problem.
15 MEMBER APOSTOLAKIS: The other question is
16 whether this issue is one of adequate protection.
17 You're talking about goals here. They are not
18 adequate protection issue. So you know, you're right
19 I think, that if the staff feels that it is an
20 adequate protection issue they can raise it, but first
21 they have to feel it. They have to judge that it's --
22 and I don't think the issue of LRF is adequate
23 protection. It's just a policy issue.
24 MEMBER KRESS: Well, I asked in the past
25 if they calculated LRF as part of the non-risk

1 informed application, and they got values they didn't
2 like, what would that mean, and what would they do
3 with it. And the answer was, well, it would raise the
4 question of adequate protection in their mind. So I
5 don't know if that's the right answer or not, but
6 that's the answer I got.
7 MEMBER SIEBER: From a site standpoint you
8 still have to meet Part 100. And once you meet it,
9 under today's rules that's adequate protection.
10 MEMBER POWERS: I'm sure we're getting a
11 preview of a debate that will go on at some length in
12 the future, so maybe we can let Ms. Sosa continue her
13 presentation.
14 MEMBER KRESS: But I'm a little surprised
15 the staff didn't actually look at that. It didn't
16 show up in the SER anywhere.
17 MEMBER POWERS: Considering the amount of
18 work the staff had to do, I think anything that wasn't
19 actually required I would be surprised if they did.
20 MEMBER SIEBER: And in fact, just looking
21 at what the rules require happens when the staff does
22 their job, in my opinion.
23 CHAIRMAN WALLIS: Well, I'm eager to find
24 out what major feature H is.
25 VICE CHAIR SHACK: It is interesting,

1 though, as Tom points out, that you do compute the
2 average individual fatality risk for the new reactor,
3 but nowhere can you find the information for the old
4 reactor.
5 MEMBER SIEBER: Unless you generate it.
6 MEMBER APOSTOLAKIS: And this is the
7 conflict I was talking about. With the new rules, we
8 may --
9 VICE CHAIR SHACK: Well, this is not the
10 new rules. This is with the Part 52, the current rule
11 when you do the generic impact statement.
12 MEMBER APOSTOLAKIS: Yes, that's what I'm
13 saying. New in the sense that they did not exist when
14 the old units were licensed. A new approach to
15 things.
16 MEMBER POWERS: Please continue.
17 MS. SOSA: Okay. With the evacuation time
18 estimates, the applicant has shown that no physical
19 characteristics unique to the proposed ESP site could
20 pose a significant impediment to the development of
21 emergency plans. The staff concluded that the
22 proposed major features for the emergency plan are
23 acceptable and meet the NRC requirements, with the
24 exception of major feature H, that's the emergency
25 facilities and equipment. This includes technical

1 support center and the operational support center.
2 Based on the applicant's request, major feature H was
3 not evaluated, and the staff reached no conclusion
4 regarding the acceptability of major feature H.
5 MEMBER POWERS: In a communication to us
6 from the EDO -- to the ACRS from the EDO, he indicated
7 that the staff might try to revise some of its review
8 guidance in connection with these. Can you tell us
9 more about that?
10 MS. SOSA: The staff is currently looking
11 at updating the review guidance for lessons learned,
12 and this is one of the areas. I'd like to request the
13 assistance of Bruce Musico at this time for him to
14 expand a little bit on what they're thinking in the
15 area of emergency planning. Dan Barss, I'm sorry.
16 MR. BARSS: I'm Dan Barss, Senior
17 Emergency Preparedness Specialist and Team Leader for
18 the Licensing Team, responsible for the emergency
19 planning reviews. And we, as was mentioned earlier,
20 have a lot of lessons learned through this process.
21 And the major feature H particularly, which was
22 already talked about, addressed the facilities, and
23 it's kind of hard to tell when you're doing the plant
24 parameter envelope what those facilities are. So they
25 really couldn't be addressed.

1 As far as other lessons learned, we're
2 still working on those. There's a rulemaking in
3 process, and we're not sure where that's going to end
4 up yet. We've got some ideas, and we've drafted them,
5 but they're still in the review process, so I don't
6 know if it's appropriate to discuss them in too much
7 detail here, but we are reviewing them.
8 MR. MATTHEWS: This is David Matthews,
9 Director of Regulatory Improvement. The rulemaking to
10 which Mr. Barss is referring is an ongoing rulemaking
11 with regard to refinement of Part 52. It's not a
12 substantive change to Part 52 in the view of the
13 staff, but it is an opportunity to reflect upon the
14 process as we've undertaken it through successive
15 design certification reviews, and now these ESP
16 reviews, to introduce some clarifications that we
17 think are necessary. And this major features aspect
18 of that rule might suffer some changes, and I think
19 that's what the EDO was referring to, in addition to
20 the parallel changes we'd make to the review standard
21 with regard to ESPs.
22 CHAIRMAN WALLIS: Are we ready to move to
23 the next slide? We've spent a long time on this one.
24 MEMBER POWERS: Well, I am still a little
25 perplexed. I have a communication here from the EDO

1 that goes on at some length. Our comment to him was
2 we thought that the examination of some of these major
3 features and whatnot called for in the review guidance
4 was perhaps more extensive than it needed to be. And
5 in his response to us from that comment, the EDO goes
6 on at some length, basically saying no it isn't, and
7 then concludes but we're going to fix it so that it
8 isn't. So I'm trying to understand where we are on
9 this. Our rulemaking exercise doesn't seem to be
10 called for here. I mean, this is the staff's review
11 guidance that they have.
12 MS. SOSA: Dan Barss.
13 MR. BARSS: Dan Barss again. I think --
14 I'm trying to remember the response.
15 MEMBER POWERS: It goes on for a couple of
16 pages.
17 MR. BARSS: Yes.
18 MEMBER POWERS: And it basically says
19 don't tell us how to do our job.
20 MR. BARSS: Well, one thing we learned.
21 We wrote back in 1996, the staff wrote the guidance
22 that's referred to as Sub-2. And that was in response
23 to a SECY where they asked us to do that. And we said
24 we would use that, or the guidance was written as
25 draft. We came to the conclusion we could use it. We

1 put it in RS002, and now that we've used it, we've
2 found that there's a lot of detail in Sub-2 that
3 doesn't need to be there. It did ask us to look at
4 things that were below the depth of what really needed
5 to be looked at at this point. So that's some of the
6 lessons learned, and those are the things we need to
7 go through, that review guidance, and I guess fix it,
8 or modify it to be more appropriate to the process.
9 I believe the applicant mentioned that too, that the
10 level of detailed review was to them a surprise, and
11 we've now learned that there were some things that we
12 looked a little too far in it. Maybe we didn't need
13 to at this stage of the game.
14 MEMBER POWERS: Well, our comment
15 concerning the draft SER was to the effect that
16 there's stuff more detailed than you need to be. The
17 response seems to be, no that needs to be there, but
18 we're going to change it. I remain perplexed on what
19 the staff intends to do. It's just a peculiar
20 comment. Please continue.
21 MS. SOSA: Okay. Slide 6. The applicant
22 provided an acceptable description of current and
23 projected population densities in and around the site,
24 and properly specified a low population zone, LPZ, and
25 the population center distance. The staff review

1 verified the radiological consequences of bounding
2 design basis accidents at the exclusion area boundary
3 and the outer boundary of the LPZ.
4 Meet the requirements of 52.17. The staff
5 concludes that the applicant's proposed site
6 characteristics related to climatology and the
7 methodologies used to determine the severity of the
8 weather phenomena reflected in the site
9 characteristics are acceptable, and contain margins
10 sufficient for the limited accuracy quantity and
11 period of timing in which the data have been
12 accumulated.
13 MEMBER APOSTOLAKIS: Does the applicant
14 propose site characteristics?
15 MS. SOSA: Yes.
16 MEMBER APOSTOLAKIS: Oh. Propose is the
17 right word? Anyway, keep going.
18 MS. SOSA: Well, they submitted site
19 characteristics associated with their site.
20 MEMBER APOSTOLAKIS: They assess, perhaps.
21 MS. SOSA: They are proposing to I suppose
22 --
23 CHAIRMAN WALLIS: Suppose we learn more
24 about weather prediction in the future. This could be
25 factored into a COL, couldn't it?

1 MS. SOSA: Yes.

2 CHAIRMAN WALLIS: To sort of fix forever

3 your evaluation of weather at the site.

4 MS. SOSA: If at any time any of these

5 site characteristics are exceeded --

6 CHAIRMAN WALLIS: We might learn more in

7 the future about the weather. There might be trends

8 of the type that Dr. Powers talked about.

9 MS. SOSA: Yes. That's true.

10 MEMBER POWERS: Let me understand

11 something. Ms. Dudes indicated to us that this final

12 safety evaluation report, the environmental impact

13 statement and presumably the applicant's application

14 itself, or the documentary bases for which you will go

15 into a required public hearing?

16 MS. SOSA: Yes.

17 MR. MATTHEWS: The phrase is mandatory.

18 MEMBER POWERS: It's a mandatory hearing

19 required by the regulation itself.

20 MR. MATTHEWS: Correct.

21 MEMBER POWERS: And at that hearing the

22 public can comment on what they think about this,

23 right?

24 MR. MATTHEWS: There is a -- and OGC will

25 correct me if I get this wrong, but the mandatory

1 hearing has an opportunity for intervention and the
2 presentation of contentions to be considered by the
3 Board, which is members of the public, of course, who
4 can bring those forward. But they also have an
5 obligation under the mandatory hearing as a Board to
6 review these documents, and raise issues, I guess the
7 phrase is sua sponte, on their own volition. So it
8 isn't confined just to members of the public comments.
9 It also has the opportunity of the Board arriving at
10 their own decision irrespective of whether there's any
11 admitted contentions.
12 MEMBER POWERS: And if contentions or
13 comments are raised, the staff responds to those?
14 MR. MATTHEWS: At that point the staff
15 would represent that their position is as shown in the
16 SER, and if it's insufficient in the Board's view, we
17 would be asked to provide additional testimony.
18 MEMBER POWERS: And one presumes that the
19 public could be more familiar than I with climatology
20 research that's going on nowadays. Is staff in a
21 position to respond to comments on climatology
22 research?
23 MR. MATTHEWS: Absolutely. We'd be in a
24 position to respond within the confines of the NRC's
25 responsibility in those areas, and the degree to which

1 it affected or was germane to the staff's finding.

2 MEMBER POWERS: In the staff response to

3 an ACRS comment concerning climate and weather, it

4 says current regulatory controls are adequate when

5 measured -- it's unnecessary to mitigate adverse

6 aspects of natural phenomenon in safe operation of a

7 facility. Why did they think they were adequate? I

8 mean, it doesn't say why, it just says that they are

9 adequate.

10 MR. MATTHEWS: My recollection of that

11 response in the SER was that the regulatory controls

12 that are imposed are process-related, and in addition,

13 at the time of the staff's review, it's guided by the

14 review guidelines, and the reg guide associated with

15 those site characteristics. And it fell within the

16 guidelines that the staff had previously established

17 and vetted through the normal public participation

18 processes and the CRGR as appropriate guidelines for

19 determining acceptability under the requirements that

20 are broadly stated in the regulations. So, you know,

21 the staff's finding with regard to our representation

22 as adequate should be viewed in the light of adequate

23 as defined by the regulations and the guidelines that

24 have been outlined for implementation.

25 MEMBER POWERS: Well, that seems to be the

1 question that comes up, because in its review
2 guidelines, the staff says that it was going to assess
3 the applicability of past data to the future
4 performance. And the ACRS questioned whether they'd
5 actually done that or not. Now, the staff I think
6 makes an excellent point when it says since changes in
7 climate are gradual, operating plant licensees should
8 have adequate time to take action to mitigate the
9 effects of such changes. And I think that was the
10 point the licensee -- or the applicant in this case
11 made as well. But it still is perplexing that
12 attention is not given in explicit form to this
13 applicability.
14 MR. MATTHEWS: Let me speak to several
15 issues that are interrelated that I think, well I hope
16 will respond to the concern as it's been expressed.
17 We tried to capture this in the EDO's comments.
18 First of all, there's some process-related
19 issues here. One is that the licensee we will assert,
20 and the licensee will agree I'm sure, that they have
21 an obligation, a continuing obligation to maintain
22 their licensing and design bases. That licensing
23 basis is expressed in many forms, but one basic form
24 is the application that they present to us, and
25 subsequent documents generated by them representing to

1 us what they view to be the state of the world in this
2 instance climatology, its historical history, and
3 their expectations with regard to its changes.
4 Irrespective of the representation made at this time,
5 they have a continuing obligation to ensure that the
6 conditions surrounding their plant, and the
7 circumstances of their design stay within those
8 representations, which is basically they've got to
9 basically agree -- they've got to continually monitor
10 whether or not they're within their licensing basis.
11 And I will say design basis as well, but you can get
12 into an extensive discussion on the distinctions
13 between licensing and design basis, but I know you
14 don't want to do that at this point.
15 MEMBER POWERS: I'm going to accuse you of
16 taking the refuge of the scoundrel, and putting the
17 load on him.
18 MR. MATTHEWS: There is a portion --
19 MEMBER POWERS: You're reviewing this
20 document, and the question is have you done an
21 adequate review.
22 MR. MATTHEWS: Well, you could question
23 the degree to which the staff had sufficient
24 information upon which to base their finding within
25 the confines of the guidelines that they used, namely

1 the Standard Review Plan, and the associated reg
2 guides. And we're of the view that the information we
3 requested of the applicant, and as was presented to us
4 was sufficient to convince the individual staff member
5 responsible and his management that sufficient
6 representation of data was presented to allow them to
7 reach a they're-compliant-with-the-regulations
8 finding. And so we've made that finding based on
9 their representations.
10 Now, given that climatology in the future
11 is speculative for sure, even though we don't expect
12 there to be wide variation, you know, the so-called --
13 and I guess you could put the burden on the scoundrel,
14 but the so-called process-related response to those
15 uncertainties, and what we're talking about is changes
16 in margin really, is that they have an obligation to
17 sustain their licensing basis under all circumstances.
18 And if circumstances change, a good example of course
19 is when we have, for example, population changes.
20 I'll bring up a case in point. A few years ago a huge
21 NASCAR racetrack was built outside the Turkey Point
22 plant. Okay? Which it turned out, my recollection is
23 on any given Sunday there was 250,000 people in the
24 vicinity which hadn't been there at the time of
25 licensing. Okay? And I'm just giving this, maybe

1 it's not completely on point, but it's an example of
2 a changed circumstances of which --
3 MEMBER POWERS: Two hundred thousand
4 people looking for a train crash.
5 MR. MATTHEWS: That's right. Waiting
6 patiently for a train crash.
7 MEMBER POWERS: A nuclear accident would
8 be really exciting for these guys.
9 MR. MATTHEWS: So consequently, they were
10 under an obligation to revise their evacuation time
11 estimate, and represent it, and bring it to us.
12 MEMBER POWERS: But it really is the last
13 refuge of the scoundrel. Because you can say that
14 about anything.
15 MR. MATTHEWS: I know. But it is, I must
16 say Dr. Powers, it is a substantial underpinning of
17 the regulatory process. The license is granted under
18 the conditions that the applicant is responsible for
19 its maintenance. It's not our job. Now we of course
20 provide additional insurance through the life of the
21 plant by our oversight, and our inspection, and our
22 examination, and our audits, but we can't be expected
23 to identify every changed circumstance that might
24 affect operations and safety of operations. So
25 consequently, we put a strong obligation on the part

1 of the license to monitor these issues.

2 MEMBER POWERS: And I think there's no

3 argument there. The question we're dealing with here

4 is the adequacy of the review.

5 MR. MATTHEWS: I understand.

6 MEMBER POWERS: And your own guidance to

7 yourself on how you're going to do it. And you

8 included the phrase "we'll check on the applicability

9 of the data." And I don't think you've done it in

10 this case. Okay? I'm not -- I don't fault you very

11 much. Because I don't know how you could do very much

12 more of this other than to recognize the issue exists.

13 MR. MATTHEWS: I will represent to you a

14 possible logical conundrum that the staff is faced

15 with in these situations, if I might.

16 MEMBER POWERS: Sure. I bet I can

17 reproduce the conundrum. I think I understand it.

18 MR. MATTHEWS: Realize that we're in an

19 area that's fraught with high uncertainty. Okay? And

20 I would argue that if the applicant came in, based on

21 the uncertainty that exists, and argued for a

22 reduction in margin, the staff would be disinclined to

23 approve a reduction in margin based on the licensee

24 making a representation of high uncertainty.

25 MEMBER POWERS: That's an interesting

1 point. Yes, weather's going to get better --

2 MR. MATTHEWS: Right. So when I turn that

3 coin around, I would argue that the staff is limited

4 to increase the level of safety margin based on a

5 similar level of uncertainty. So it's kind of like

6 the double-edged sword issue.

7 MEMBER POWERS: I kind of wish you'd

8 brought up some of these points in your response to

9 it.

10 MR. MATTHEWS: Okay. And I want to make

11 one final point, and please take this in the spirit in

12 which it's intended relative to the staff's relative

13 responsibilities in areas such as meteorology. Okay?

14 It really isn't appropriate for the NRC staff to speak

15 with finality on the magnitude or extent of, let's

16 say, global warming, given that we have partners in

17 town that view that as their responsibility such as

18 the National Weather Service, and NOAA, and EPA. And

19 so for us to substitute our judgment in that regard as

20 a means of, quote, "leveraging an applicant into

21 additional margin" we do that with some trepidation

22 given our partnerships. And we didn't believe that

23 the issue as represented by this site, and this

24 applicant, rose to the level of raising a concern,

25 either site specifically or nationally that would

1 cause us to reach out to those partners to get their
2 views on it. It just didn't rise to that level of
3 concern. And again, part of my saying that is based
4 upon my process answer, which is there's an obligation
5 for both of us, the applicant and us, to monitor
6 changed circumstances. And we have plenty of
7 regulatory authority to reenter these discussions at
8 such time as the level of concern rises to the point
9 that we need to engage. And that really was the
10 substance of the staff's response, Dr. Powers.
11 MEMBER POWERS: It would have been
12 interesting to have it more explicitly stated. I
13 agree with you -- in some sense your sister agencies
14 actually feel a partnership with you. I mean, they
15 say so explicitly on their website. I checked. And
16 are willing to provide that information. You felt it
17 was not necessary. That's interesting. I kind of
18 wish you had. But maybe it's a judgment issue.
19 Please continue.
20 MS. SOSA: Slide 7. The applicant
21 determined that the -- I'm sorry, the staff determined
22 that the applicant made conservative assessments of
23 post-accident atmospheric dispersion conditions using
24 appropriate meteorological data and diffusion models.
25 The staff concludes that the short-term atmospheric

1 dispersion estimates are acceptable and meet the
2 requirements of Part 100. The staff will address
3 atmospheric dispersion estimates used to evaluate
4 radiological doses for the control room in its review
5 of any COL or construction permit application that
6 references this ESP. The staff concludes that the
7 applicant's characterization of long-term atmospheric
8 transport and diffusion conditions is appropriate for
9 use in demonstrating compliance with dose requirements
10 in Appendix I to Part 50. Any COL or construction
11 applicant must confirm that the parameters provided at
12 the ESP stage bound the actual values provided at the
13 COL or construction permit stage, and that the
14 calculation methodologies used for the confirmation is
15 consistent with that employed at the ESP stage.
16 Slide 8. Staff concludes that the
17 applicant's proposed site characteristics related to
18 hydrology are acceptable, with the noted conditions
19 involving water budget issues. I will discuss later
20 in the presentation during the proposed permit
21 conditions this question.
22 The staff concludes that the proposed ESP
23 site is acceptable from a geology and seismology
24 standpoint, and meets the requirement of 10 C.F.R.
25 100.23. Finally, staff concluded that the applicant

1 provided appropriate quality assurance measures
2 equivalent to those required by Part 50, Appendix B.
3 Key review areas. The staff review
4 included all the different areas listed here. The
5 bolded text refers to the areas that contained open
6 items at the time we last briefed the ACRS. There
7 were a total of 28 open items in the draft SER, one in
8 the exclusion area authority and control, four in
9 meteorology, eleven in hydrology, two in seismology
10 and geology, and ten in emergency planning. All of
11 those issues have been resolved in the final SER. In
12 their presentation, the applicant discussed some of
13 the major ones, so I won't go into that discussion
14 again here.
15 Permit conditions. There are a total of
16 eight proposed permit conditions in the final SER,
17 from the original 18 in the draft SER. The staff, as
18 the applicant discussed, had a challenge here of
19 trying to integrate, or be consistent in their
20 approach to defining permit conditions. So the staff
21 came up with the criteria for defining permit
22 conditions. And they're included under three
23 circumstances. One, the staff's evaluation in the SER
24 rested on an assumption that is not currently
25 supported, and which is practical to support only

1 after issuance of the ESP. For example, the sub-
2 surface conditions discovered in an excavation of the
3 site for the foundation. Second, the site physical
4 attribute exists that is not acceptable for the design
5 of system structures and components important to
6 safety. An example of that would be a condition that
7 may call for action to correct a deficiency, like
8 cracked or weathered rock that is not acceptable for
9 burying foundations, that you would have to be treated
10 with concrete, for example. Number 3. The staff's
11 evaluation requires a future act. And an example of
12 that would be approval by the state regulatory board.
13 And finally, should an ESP be issued for the North
14 Anna site, the staff believes that the ESP holder
15 should be constrained by these conditions.
16 VICE CHAIR SHACK: Now, when you went from
17 18 to eight, the other 10 became COL action items,
18 basically?
19 MS. SOSA: For the most part, yes.
20 VICE CHAIR SHACK: And you balanced them
21 between the permit conditions and the COL action items
22 on these three circumstances?
23 MS. SOSA: That's correct. We applied the
24 --
25 VICE CHAIR SHACK: The additional work

1 that was needed.

2 MS. SOSA: Right. A lot of the ones I

3 recall had to do with design interface site issues.

4 So, not enough information was available so it really

5 fell under the COL action item category.

6 Here are the proposed permit conditions

7 for the ESP site. The first permit condition, the

8 staff proposes to include a condition in any ESP that

9 might be issued in connection with this application to

10 govern the exclusion area control. Before

11 construction begins under the construction permit or

12 the COL referencing this ESP, the applicant must

13 obtain and execute agreements providing for shared

14 control of the North Anna ESP exclusion area,

15 including the state approvals.

16 Permit condition two requires the ESP

17 holder to obtain the right to implement the site

18 redress plan before undertaking limited work

19 activities. Permit condition three. An applicant

20 referencing this ESP is required to use a dry cooling

21 tower system during normal operation for Unit 4. And

22 again, this is the one having to do with the water

23 budget issues for Lake Anna.

24 Permit condition four requires the new

25 unit's radwaste systems be designed with features to

1 preclude any and all accidental releases of
2 radionuclides into any potential liquid pathways.
3 Again, in order to meet Part 100 requirements, you
4 heard about the absorption/retention coefficients, and
5 the applicant not being able to take measurements at
6 this time. Really didn't make a lot of sense since
7 they didn't have the exact location.
8 MEMBER POWERS: How do you require someone
9 to preclude all possible accident releases? I mean,
10 surely I can define an accident that cannot be
11 precluded.
12 MS. SOSA: Okay. These are the radwaste
13 systems. So designs can include liners to prevent any
14 accidental releases.
15 MEMBER POWERS: But I can still define an
16 accident that the liner doesn't work. I mean, it's
17 language that is colloquial, and not very precise.
18 Don't you need something more precise there? I mean,
19 all accidents.
20 MS. SOSA: The issue here was in order for
21 us to determine that the Kd value being zero, in order
22 not to have anything get into the groundwater, that
23 was the only language that we could come up with in
24 order for us to make our Part 100 finding.
25 MR. MATTHEWS: I could maybe add something

1 that might clarify this. Again, it has to do with
2 circumscribing the extent of the staff's review, and
3 it's within the four corners of the regulation in that
4 it focuses on design basis accidents. So
5 consequently, when we make that kind of statement,
6 it's within the confines of that class of accidents
7 which it has been agreed upon represent the design
8 basis accidents which have to be addressed. And they
9 include radwaste accidents. So that could be a caveat
10 on each of those kind of statements. I agree with
11 you. When we make that kind of broad statement you
12 could infer that we've gone way beyond the limits of
13 those accidents, and we haven't. We've stayed within
14 the regulatory strictures.
15 MEMBER POWERS: The way you've written it.
16 MR. MATTHEWS: I understand.
17 MEMBER POWERS: It doesn't -- I mean it ....
18 MR. MATTHEWS: All of these kind of
19 statements could be preceded "Within the confines of
20 the staff's review of the applicant's response to
21 current regulatory requirements."
22 MEMBER DENNING: Did regulatory
23 requirements specifically use terms like "include any
24 and all accidental releases"? I mean, those are the
25 things that are so objectionable.

1 MR. MATTHEWS: They do, but yet they're
2 within the confines of the definition of accidents.
3 MEMBER DENNING: So you're saying that it
4 kind of is required that you have that -- that you
5 qualify it a little bit by using the term that
6 qualified it as to what you meant?
7 MR. MATTHEWS: We could.
8 MS. SOSA: Next slide. Permit condition
9 five requires the ESP holder, and/or an applicant
10 referencing this ESP, to replace fractured or
11 weathered rock at the foundation level with lean
12 concrete before construction.
13 MEMBER SIEBER: Why did you specifically
14 talk about lean concrete? As opposed to other methods
15 of remediation, like Frankie piles, or selected fill,
16 that kind of thing.
17 MS. SOSA: This was actually suggested by
18 the applicant in their own application. So the staff
19 basically is paraphrasing that. It's a common method.
20 MEMBER SIEBER: It's a common method, but
21 it's restrictive, and expensive, and there are other
22 ways to do it that are more efficient.
23 MEMBER POWERS: And 20 years from now
24 another guy is going to come along and say, okay, I'm
25 ready to make use of this application, and I want to

1 do that. You've just created work for yourself.

2 MS. SOSA: Again, I think the applicant

3 can demonstrate that whatever alternative method they

4 have meets this intent, and that would be all that's

5 required. I mean, they wouldn't have to -- we

6 wouldn't have to reevaluate.

7 MEMBER POWERS: He's going to have to come

8 back to you and say I can't meet this condition.

9 MEMBER SIEBER: Yes, it's just another

10 little trip around the block.

11 MS. SOSA: Okay. Permit condition six.

12 The ESP holder and applicant referenced in this ESP is

13 prohibited from using engineering fill with high

14 compressibility and low maximum density, such as

15 saprolite.

16 Permit condition seven. The ESP holder

17 and applicant referenced in this ESP must perform

18 geologic mapping of future excavations for safety-

19 related facilities. And finally, permit condition

20 eight requires the ESP holder and applicant referenced

21 in this ESP to improve Zone II saprolitic soils to

22 reduce any liquefaction potential if safety-related

23 structures are to be found.

24 MEMBER SIEBER: Somewhere in the ESP

25 application it says that this is a hard rock site, but

1 these conditions speak like it's not a hard rock site.
2 Is it or isn't it?
3 MS. SOSA: I'd like to ask the assistance
4 of Dr. Munson to respond, please.
5 MR. MUNSON: This is Cliff Munson. I'm in
6 the Division of Engineering in NRR. All the
7 saprolite, all the soil will be cleared away for the
8 major Category I structures. This last item, Number
9 8, is referring to -- I don't know specifically what
10 structures, but they wouldn't be major structures. It
11 would be a tank or some other item that would be
12 placed on the soil itself. So they would have to
13 improve the soil in order to avoid liquefaction
14 problems.
15 MS. SOSA: Next slide. COL action items.
16 There are 30 COL action items in the final SER from
17 the 19 in the draft SER. COL action items are
18 included to ensure that significant issues are tracked
19 and considered during the COL stage. They identify or
20 highlight work that's needed at the COL stage.
21 Again, this is similar to the concept that
22 was established in design certification. However,
23 regulatory control is provided by listing them in the
24 actual permit, which is, unlike the design
25 certification, they list it in the actual rule. The

1 list of COL action items that you see in the FSAR is
2 by no means all-inclusive. So these are things that
3 the reviewers felt were important to track for the COL
4 review.
5 The plant parameter envelope identified
6 postulated values of design parameters that provide
7 detail to support the staff's review of an ESP
8 application. A controlling PPE or the bounding
9 parameter value is one that necessarily depends on the
10 site characteristics. The staff review the design
11 selected and the COL or construction applicant to
12 ensure the design fits within the bounding parameters
13 values identified in the ESP. Otherwise, the COL or
14 construction applicant will need to demonstrate that
15 the design, given the site characteristics in the ESP
16 complies with the regulations.
17 There are four bounding parameters
18 identified by the staff in the North Anna ESP site:
19 the maximum cooling water flow rate for Unit 3, the
20 maximum cooling water temperature rise, and the
21 maximum inlet temperature, and the minimum site grade.
22 They're all listed as bounding parameters.
23 CHAIRMAN WALLIS: Five degree water coming
24 out of a lake? The fish must be very unhappy.
25 MS. SOSA: This is, again, a bounding

1 parameter. Their design must meet these conditions,
2 and they have to demonstrate that at the COL stage.
3 CHAIRMAN WALLIS: That's a hot bath. I
4 mean, are you serious?
5 MEMBER POWERS: This is what you call a
6 robust design. It can take just about anything you
7 deliver.
8 MEMBER DENNING: Why does it specify Unit
9 3?
10 MS. SOSA: Unit 3 is the one --
11 MEMBER DENNING: Instead of any other
12 additional unit?
13 MS. SOSA: Unit 3 will be the one using
14 lake water. Unit 4 is the dry.
15 MEMBER DENNING: Oh, I see.
16 MS. SOSA: The major milestones for this
17 project included receiving the application in
18 September of 2003. We accepted the application
19 October of 2003. The notice for the mandatory hearing
20 was published in December of '03. The draft SER was
21 issued December of '04. Open items resolution went on
22 from January to May of '05. We held the ACRS meeting
23 on the draft March of '05. We received your interim
24 letter March 11. The Revision 4 of the application
25 was received May 16. We responded to the ACRS interim

1 letter June 3 of '05. The final SER was issued June
2 16 of '05.
3 MEMBER SIEBER: What's a green ticket
4 response?
5 MS. SOSA: That's the response to your
6 interim letter.
7 MEMBER SIEBER: Oh, okay.
8 MEMBER APOSTOLAKIS: Why is it green?
9 MS. SOSA: That's NRR's terminology.
10 Sorry.
11 MEMBER POWERS: And they sent us this red
12 flag based on a green ticket.
13 MS. SOSA: We have all kinds of colors.
14 We have yellow tickets, green tickets.
15 MEMBER APOSTOLAKIS: What does it mean?
16 MEMBER POWERS: It doesn't mean anything,
17 George. Forget about it.
18 (Laughter)
19 MEMBER APOSTOLAKIS: Somebody decides it's
20 yellow versus green.
21 MEMBER POWERS: No, you take it in, they
22 punch it, and that's it.
23 MR. MATTHEWS: Let me clarify. Don't
24 bother. Please continue. It can be satisfied in
25 private with a true indoctrination. Please continue.

1 MEMBER POWERS: Or maybe not.

2 MS. SOSA: Again, we expect your response,
3 hopefully, if we're successful today, July 25 of '05.
4 If you would like to color it, I'll take it anyway.

5 MEMBER POWERS: Can we slip that due date?

6 MS. SOSA: Can we discuss the due date?

7 MEMBER POWERS: Can we slip it a little
8 bit?

9 MS. SOSA: Well, we need about a month to
10 develop the new reg. And the published milestone for
11 that is August 29.

12 MEMBER POWERS: Oh, that's fine. Don't
13 worry.

14 MS. DUDES: Belkys, the short answer is
15 please no.

16 MEMBER POWERS: You may not like our
17 response.

18 CHAIRMAN WALLIS: I can't imagine us
19 taking so long to finish a letter.

20 MEMBER POWERS: You haven't seen the
21 letter, have you?

22 CHAIRMAN WALLIS: Well, either we finish
23 it by something like the twelfth, or we don't finish
24 it till August.

25 MEMBER KRESS: No, September.

1 CHAIRMAN WALLIS: September, okay, you're
2 right.
3 MEMBER KRESS: Unless we want to depart
4 from our usual way.
5 CHAIRMAN WALLIS: We'd have to alter the
6 bylaws to do that.
7 MEMBER POWERS: Please continue. This
8 discussion is going nowhere.
9 MS. SOSA: In summary, the staff issued a
10 first of a kind final SER for the North Anna ESP
11 application as scheduled June 16, 2005. The North
12 Anna site characteristics with the limitations and
13 conditions proposed by the staff comply with Part 100
14 requirements. Reactors having characteristics that
15 fall within the parameters identified in the ESP and
16 which meet the terms and conditions proposed in the
17 final SER can be constructed and operated without
18 undue risk to the health and safety of the public.
19 The staff's review concludes that issuance of the
20 North Anna ESP will not be inimical to the common
21 defense and security, or to the health and safety of
22 the public.
23 And because of the first of a kind nature
24 of this action, the staff had to work through some of
25 the issues identified during the review, mostly

1 involving the interface between the design and the
2 site issues. In general, the nature of the PPE packs
3 a lot of detailed design information. And that was
4 challenging. The staff is, again, identifying lessons
5 learned for possible input to future rulemakings and
6 revisions to guidance. And we believe the staff has
7 done an outstanding job in preparing this SER. And we
8 appreciate your committee's efforts to support
9 issuance of the new reg.
10 MEMBER POWERS: Not so congratulatory at
11 all here, are you?
12 MS. SOSA: I'm referring to the technical
13 staff. Eternally grateful. That concludes my
14 presentation. I'll be happy to address any questions.
15 MEMBER POWERS: Any questions for the
16 speaker? Well, let me comment again that I do
17 congratulate the staff on one of the most readable
18 SERs that's ever come across. You write excellent
19 SERs, lousy responses to ACRS comments, but wonderful
20 SERs. I had really no trouble understanding what the
21 staff had done in its review, where they had just
22 reviewed, where they'd done independent work, and in
23 most cases, not all, but most cases I could understand
24 the bases for the conclusions that the staff had come
25 to. That doesn't include weather, but there's an area

1 there. And I am quite pleased with your work to
2 define criteria for site permit conditions. I think
3 that's an excellent step, and one that I think the
4 Commission has to understand that you've taken here,
5 that I think you deserve some congratulations for
6 that. And that's the only comments I have. So seeing
7 no other questions?
8 VICE CHAIR SHACK: I'd like to see their
9 backup slide.
10 MS. SOSA: How do you know we have backup
11 slides? Did Raj show you?
12 MEMBER POWERS: That'll teach you.
13 MS. SOSA: I can put up there the long-
14 term climate response.
15 MEMBER POWERS: Please. Please show --
16 VICE CHAIR SHACK: Dr. Powers? I'd like
17 to make a couple of concluding remarks.
18 MEMBER POWERS: We've got to show Dr.
19 Shack his backup slide or I'll never hear the end of
20 it.
21 VICE CHAIR SHACK: I was hoping my
22 concluding remarks might prevent that, but if we need
23 to.
24 MEMBER POWERS: I have to live with him.
25 You guys get to leave, I have to stay here.

1 VICE CHAIR SHACK: Okay.

2 MEMBER POWERS: Show him the backup

3 slides.

4 MS. SOSA: There you go. This is

5 essentially the same issue that we've been discussing.

6 MEMBER SIEBER: We didn't agree to the

7 Kyoto Protocol.

8 MS. SOSA: Here's our definition for site

9 characteristics.

10 MR. MATTHEWS: And that's sufficient to

11 discuss backup slides.

12 CHAIRMAN WALLIS: Is there something you

13 don't want us to see here?

14 MS. SOSA: No. The rest is simply a list

15 of the COL action items, which I didn't think we were

16 going to have enough time to go through.

17 MR. MATTHEWS: I'd just like to say, and

18 I want to resonate with a couple of your comments, in

19 particular the one with regard to the readability of

20 this SER. I had Belkys put together one that had

21 "Brag Book" on the front of it.

22 MEMBER POWERS: I would love to see that,

23 by the way.

24 MR. MATTHEWS: In my meetings with my

25 staff, my management Commission staff, I use this as

1 an example of one of the first major steps forward
2 with regard to vetting, as I'll call it, proving the
3 COL process. We've had several successful design
4 certifications, as you know. They were occasioned by
5 rulemakings, and a very public, lengthy process, so I
6 need not belabor that. But with regard to this being
7 one of the first steps out of the box under this new
8 Part 52 process beyond those design certifications, I
9 commended it to my colleagues, even those whose staffs
10 were participants and contributors, that as an
11 integrated whole it presented a very good discussion
12 of how this is all supposed to work. And that's what
13 I found in the executive summary and the introductory
14 portions to be one of its great benefits. Before you
15 jump into these individual issues, you were able to
16 understand how this was expected to work, and it does
17 a good job of demonstrating a point that I think has
18 been lost in the popular media discussions with
19 Congress relative to what we see as the challenges
20 with regard to the integration of the ESP design
21 certifications and COL process. I believe that
22 there's a misperception that it was expected to have,
23 basically if you think of it in terms of years, three
24 finely meshed years that would generate a combined
25 license at the end. And I've been one who in my

1 public remarks and some of my writings have tried to
2 bring some realism into those discussions, and
3 indicate that there are regulatory gaps, and missing
4 teeth in those gears. And this document I think
5 demonstrates that clearly, particularly in regard to
6 this issue of the applicability of the plant parameter
7 envelope, and these what I call permit conditions and
8 COL action items. It begins to demonstrate in a very
9 clear way that there are some hurdles to be overcome.
10 Early in the discussion we had a comment
11 made about the word "test", and we keep hearing that
12 this was a test of the Part 52 process. That's a
13 common word that's been used as to -- I think DOE has
14 perpetuated it. NEI certainly has perpetuated that
15 we're in a testing phase. The staff takes some
16 exception to that definition of the word.
17 MEMBER POWERS: As well they should.
18 MR. MATTHEWS: In my view, the testing
19 portion only comes with regard to looking at the
20 degree of finality of certain of the technical issues
21 that the staff reviews, based on the limitations or
22 extensiveness of the applicant's representations as
23 they are able to bring them forward given their
24 commercial decisions at this time. So I think it is
25 a test of the degree of finality, and to some degree

1 the degree of clarity with regard to the regulatory
2 requirements. I think that major features discussion
3 we had is an example of an area where we need to look
4 at the clarity with which we've expressed our
5 expectations with regard to a major features
6 discussion. I'll comment on that point that I think
7 the major features discussion lacks some definition
8 that it needs in the regulations. However, I think
9 the staff will agree that the Supplement 2 to NUREG-
10 0654 has excessive level of detail in terms of its
11 expectations. Somehow, what I was trying to say is we
12 need to meet in the middle on that one. And that's
13 why I think the EDO is committed that we'll look at
14 Supplement 2, and to the degree that we can change it
15 within the confines of the regulation, we'll change
16 it. And reduce some of that detail that's expected of
17 the applicants. However, on the other end, we think
18 that Part 52 might need to be changed to provide some
19 more specificity about what we mean by major features.
20 So I don't believe that we're involved in
21 a test by virtue of these initial ESP applications.
22 I believe that the process itself has been examined
23 extensively through the course of several rule changes
24 over the past 10 years through a public rulemaking
25 process. And I believe the process is sound. What

1 we're testing is its application, and the degree to
2 which we can achieve some finality to the benefit of
3 both the staff and the applicant on some of these
4 issues. And anyway, that's what I wanted to say in
5 conclusion. We appreciate your comments, all of them,
6 and we look forward to continued interaction because
7 we're going to be back here again on two more ESPs in
8 the immediate future, and then we have several more
9 that have been offered as possibilities by future
10 applicants. So we're going to be busy, as will you.
11 Thank you.
12 MEMBER POWERS: What we had hoped to do is
13 that at some time between the near end of the Round of
14 Three, and the beginning of the Round of N is to get
15 a chance to get together and discuss lessons learned,
16 and possible streamlining of the process, or
17 refinements of the process, and things like that, more
18 in a collegial discussion and less formality. Not
19 because I think anything's flawed, in fact I think the
20 process really is -- I've characterized it as grading
21 graduate students. We're going to A to A sort of
22 thing, and not any -- correcting any major
23 deficiencies.
24 MR. MATTHEWS: We're not in the pass/fail
25 situation.

1 MEMBER POWERS: Well, you're passing very
2 well, and it looks like it works well, and it looks
3 like it was exercised well, except of course in your
4 responding to ACRS letters, and we'll go through that
5 in some detail.
6 (Laughter)
7 MR. MATTHEWS: We have a lessons learned
8 that will be under way, and we'd love -- we'd welcome
9 the opportunity to have that kind of collegial
10 discussion with you, because I think it would be a
11 benefit.
12 MEMBER POWERS: Yes, I think it would be
13 worthwhile, worth our investment of a little time on
14 this.
15 MR. MATTHEWS: On more than one occasion,
16 as somebody who also oversees the license renewal
17 process, that interaction with Dr. Bonaca and many of
18 the members has been useful through that process which
19 we see as one of continuous improvement as well. So
20 we'd like to start down the same road.
21 MEMBER POWERS: Yes. I think we can.
22 Let's see. I thank you for your presentation. I am
23 instructed to ask if anyone from the audience or
24 public cares to comment? Seeing no one anxious to do
25 that I will turn it back to you, Mr. Chairman.

1 CHAIRMAN WALLIS: We seem to be having --
2 thank you very much. We seem to be having
3 extraordinarily long breaks today, and we have a break
4 from now until 1:45 for lunch? I would be very happy
5 to meet for fewer days and have shorter breaks, but
6 that's all right. We will take a break until 1:45
7 since that's what the agenda forces us to do.
8 (Whereupon, the foregoing matter went off
9 the record at 12:07 p.m. and went back on the record
10 at 1:45 p.m.)
11 CHAIRMAN WALLIS: Please come back into
12 session. Welcome to the afternoon. The first item on
13 the agenda is the draft final regulatory guide having
14 to do with guidelines for lightning protection for
15 nuclear power plants. My colleague on my right, Jack
16 Sieber, is going to come onto this session and lead us
17 through it.
18 MEMBER SIEBER: Okay. Thank you, Mr.
19 Chairman.
20 4) DRAFT FINAL REGULATORY GUIDE, DG-1137,
21 "GUIDELINES FOR LIGHTNING PROTECTION FOR
22 NUCLEAR POWER PLANTS"
23 4.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN
24 MEMBER SIEBER: I'm sure everyone knows
25 that lightning has been around for a long, long time

1 and --

2 MEMBER POWERS: Gee, when did it start?

3 MEMBER SIEBER: I actually looked that up,

4 and I will in private session tell you. It is more

5 than 100 years ago.

6 CHAIRMAN WALLIS: Lightning started 100

7 years ago?

8 MEMBER SIEBER: More than.

9 CHAIRMAN WALLIS: Oh, more than? I see.

10 MEMBER POWERS: Does this mean it's fairly

11 dated information that you have?

12 MEMBER SIEBER: Actually, what we will

13 hear this afternoon is the latest information on

14 lightning protection represented as a draft regulatory

15 guide, DG-1137. And I would point out that there has

16 been professional interest in lightning protection for

17 over 100 years. The first standard that came out was

18 issued by the National Fire Protection Association, I

19 think 103 or 104 years ago.

20 On the other hand, it was designed for

21 commercial buildings, rather than citizen factories

22 and so forth. And even the earliest versions had

23 disclaimers written into them that say, "This standard

24 does not apply to electric generating and distribution

25 facilities."

1 And so from the standpoint of adopting or
2 applying what I think is a really good standard, which
3 is the NFPA standard, the staff can't do that because
4 of the disclaimer.
5 Now, the industry itself has its own
6 organizations: IEEE. And IEEE has developed over the
7 years standards for lightning protection and grounding
8 schemes and so forth that apply specifically to power
9 plants of all types, including nuclear substations,
10 transmission lines, and so forth.
11 And as far as lightning protection is
12 concerned, there are a number of standards, mainly
13 four, which, in turn, reference another full set of
14 standards that basically address various aspects of
15 lightning protection.
16 The draft regulatory guide endorses with
17 one exception the four IEEE standards. I think the
18 staff did a good job along with its contractors from
19 Oak Ridge, did a good job in putting this together.
20 This draft regulatory guide has already
21 been through the public comment period. And the
22 public comments have been incorporated. And so what
23 I would like to do is introduce to you Christina
24 Antonescu, who will make today's presentation along
25 with her colleagues from Oak Ridge National

1 Laboratory.

2 Christina? Would you like to go first?

3 MR. KEMPER: Yes, if you don't mind. My

4 name is Bill Kemper. I'm the Section Chief for the

5 Instrumentation and Control Section in the Office of

6 Research. I just wanted to make a couple of comments

7 before we begin the presentation.

8 MEMBER SIEBER: Okay.

9 MR. KEMPER: This reg guide is the result

10 of several years worth of work. It actually started

11 in the year 2000, a fairly complex issue. But I

12 appreciate your comments about that reg guide. We

13 share that view, I think. It's a good product.

14 We worked collaboratively with NRR,

15 specifically EEIB, and Oak Ridge National Lab to

16 develop this document, which describes acceptable

17 means for minimizing the consequences of lightning

18 strikes safety-related equipment at nuclear power

19 plants.

20 This guidance really is based on a

21 considerable amount of industry experience relating to

22 lightning effects on nuclear power plants. And it's

23 intended to complement regulatory guide 1.180, which

24 is the guideline for evaluating electromagnetic

25 radiofrequency interference in safety-related

1 instrumentation and controls, providing a means,
2 really, to ensure that the electrical surge
3 environment in a nuclear power plant is consistent
4 with the assumptions of that standard.
5 So, with that, I'll turn it over to
6 Christina. And thank you very much.
7 MS. ANTONESCU: Thanks, Bill. Thanks,
8 John.
9 4.2) BRIEFING BY AND DISCUSSIONS WITH
10 REPRESENTATIVES OF THE NRC STAFF
11 MS. ANTONESCU: As Bill mentioned, I'm
12 Christina Antonescu. I work on the I&C of the
13 Engineering Research Application Branch within the
14 Office of Research. I am a program manager at the
15 NRC. And I have an electrical engineering degree. I
16 have been a staff member in the I&C Section of the
17 Office of Research for almost 15 years.
18 I'm joined today by two of my contractors
19 who had involvement in the development of the
20 technical basis for this draft guide. Roger Kisner,
21 on my left, is a researcher and a program manager at
22 Oak Ridge National Lab. He has a Master's in nuclear
23 engineering, over 30 years' experience with electrical
24 and electronic systems as well as measurement
25 technologies. Mr. Kisner is also a registered

1 electrical engineer.

2 Dr. Richard Wood, on my right, is also a

3 researcher and program manager at Oak Ridge National

4 Lab. He has a Ph.D. in nuclear engineering and over

5 26 years' experience with digital I&C technology.

6 The purpose of the briefing is to discuss

7 DG-1137, the draft guide on lightning. We'll discuss

8 the background and approach and the need for guidance

9 on lightning protection. I will also give you an

10 overview of the draft guide and our responses to the

11 public comments.

12 We are here to request concurrence, of

13 course, from ACRS to issue this draft guide. Now let

14 me start by also giving you information about the

15 guide itself. The focus of the reg guide is on new

16 plants. Its purpose is to define a road map of the

17 good practices that ensure adequate lightning

18 protection to make certain those practices are

19 available for new plant construction.

20 VICE CHAIRMAN SHACK: Why the emphasis on

21 the new plants? It's a reg guide. It's not

22 mandatory.

23 MS. ANTONESCU: No, it's not. In my

24 presentation, I'll answer this question. You'll see.

25 Why we generate this guidance, DG-1137

1 provides needed guidance as for new plant license
2 applicants. This guide responds to NRR user need
3 request 2002-017. Consensus lightning protection
4 practices have evolved since NFPA-78, as John has
5 mentioned. NFPA-78 is referenced in the standard
6 review plan, chapter 7, along with IEEE 665, as part
7 of the electromagnetic compatibility systems. There
8 has been no regulatory guidance on lightning
9 protection. So clearly this would be useful at this
10 point.
11 Finally, we feel comprehensive guidance
12 can assure adequacy and consistency of lightning
13 protection approaches employed for new plants.
14 So the development of the technical basis
15 involved systematic approach. First, lightning data
16 were gathered from actual nuclear power plant
17 experience. These data were collected from LERs, NRC
18 inspection reports, and industry reports, such as from
19 EPRI.
20 Second, the accepted practices of industry
21 were evaluated: IEEE; NFPA, the National Fire
22 Protection Association; and UL, the Underwriter Lab.
23 And, third, we had planned to perform
24 confirmatory research, including the failure modes and
25 effects analysis. But those tasks were struck early

1 in the program because the first two components of the
2 approach were adequate and sufficient for establishing
3 the technical basis.
4 So NUREG/CR-6866 documents these findings
5 from exploring the first two components, makes
6 recommendation for establishing the guidance.
7 Experiences related to lightning events
8 were gathered over a 24-year period. A total of 240
9 events were uncovered. Chris Rourk of the NRC
10 conducted a study covering the period between 1980 and
11 1991. His study uncovered 174 events. Recently Oak
12 Ridge conducted their own study of the period between
13 1992 and 2003 and uncovered 66 events.
14 We carefully examined all these reported
15 events. And these are some of the findings. Most
16 significant impact on plant is from local lightning
17 strikes versus the propagated through transmission
18 lines.
19 And lightning-inducted electrical
20 transients from transmission lines do not typically
21 propagate directly on the plants. About 32 percent of
22 the 240 lightning-related events resulted in a reactor
23 trip.
24 CHAIRMAN WALLIS: How do they do that if
25 they don't propagate into the plant?

1 DR. WOOD: The direct strikes.

2 MS. ANTONESCU: These were direct strikes

3 at the plant.

4 CHAIRMAN WALLIS: Direct strikes not

5 involving transmission lines?

6 MS. ANTONESCU: No. They were not

7 propagated for the transmission lines.

8 MEMBER DENNING: And what sense, then,

9 that leads to the trip? What actually leads to the

10 trip itself? How is the trip initiated?

11 DR. WOOD: There are a variety of

12 equipment failures and things like that. A little

13 later in the presentation, it will talk about some

14 specific --

15 CHAIRMAN WALLIS: It depends on where the

16 plant is hit.

17 DR. WOOD: Right.

18 MS. ANTONESCU: Yes, it depends on where

19 the plant is hit.

20 DR. WOOD: So the specific mechanism that

21 leads to the trip varies depending on what the strike

22 is.

23 MEMBER DENNING: Typically is it an

24 electrical surge, then, that leads to it? I mean, do

25 we really take out that many -- I can't believe that

1 lightning strikes result in that many --

2 MR. KISNER: It's not that the equipment

3 -- there are cases of equipment damage. But it's more

4 a case of spurious signals.

5 MEMBER DENNING: But surge is the

6 mechanism.

7 MR. KISNER: Yes.

8 CHAIRMAN WALLIS: So it has to come in

9 some conducting path, doesn't it?

10 DR. WOOD: Through these service entrants,

11 the power distribution into the plant.

12 CHAIRMAN WALLIS: Which is not what you

13 call a transmission line and it's between the switch

14 here on the plant somewhere?

15 DR. WOOD: Right.

16 MS. ANTONESCU: Yes. I'll talk about the

17 specifics later on.

18 MR. KISNER: Lightning has anywhere -- the

19 transmission line. It can hit a remote substation 75

20 miles away, knock the power out. So you have a loss

21 of power. But the transient doesn't make it in.

22 You can have a strike on a transmission

23 line at or around the transformer yard at the plant.

24 You can have a strike inside of the yard. Now it's

25 propagating its way in.

1 There have been cases of strikes to piping
2 and vents and components as a part of the building
3 which were not properly grounded and so on. Those
4 transients made it into the plant onto signal lines,
5 onto power lines. It's a very wide variety of
6 experiences.
7 DR. WOOD: We'll talk in a little more
8 detail about that.
9 MEMBER APOSTOLAKIS: But if you look at
10 the first two bullets, there is a period of 11 years
11 in the first one and 11 years in the second. Yet, the
12 number of events is less than half.
13 DR. WOOD: She'll get to that.
14 MS. ANTONESCU: Yes. I will get to this
15 particular point.
16 MEMBER APOSTOLAKIS: Okay.
17 MS. ANTONESCU: So 27 percent of the 240
18 lightning-related events result in loss of off-site
19 power, and 60 percent of the 240 events result in
20 equipment malfunction. These results show lightning
21 occurrences impact plant availability, but, more
22 importantly, these results confirm that lightning
23 strikes can challenge safety system in nuclear power
24 plants.
25 MEMBER POWERS: One would presume that the

1 industry would be concerned about these things. Do we
2 know what they're doing about this?
3 MS. ANTONESCU: Yes.
4 MEMBER POWERS: I mean, it strikes me as
5 unusual to have a lightning strike actually cause a
6 reactive trip. I mean, it seems like an undesirable
7 thing.
8 DR. WOOD: Right. The industry has been
9 concerned about it and has been actively engaged in
10 the standards committees bodies, improving the
11 practices, and upgrading their plant facilities. And
12 that relates to why the focus of this guide is on new
13 plants, rather than existing plants because the
14 industry is already working and improving their
15 performance.
16 MEMBER POWERS: I understand.
17 MS. ANTONESCU: As you can see, the trend
18 towards a lesser number of events is filed between
19 1992 and 2003. I will talk about it in more and more
20 detail in the next couple of viewgraphs, but we feel
21 that this is due to plants took a more proactive
22 approach to maintain and improve their lightning
23 protection systems. So we have less events of
24 lightning during that period of time.
25 Next slide actually shows the data, a

1 recent trend toward reduction, as I said, in
2 lightning-related events. The number of events from
3 1980 into 2003 shows a peak in the rate of occurrences
4 during the mid 1980s and a decline in the next decade
5 with a couple of outliers in 2003 and 1991.
6 There are no definitive causative effects
7 that can clearly explain why this trend exists.
8 However, one reasonable explanation is that it appears
9 that utilities have made a concerted effort to
10 maintain and upgrade lightning protection systems and
11 after the lightning incidents.
12 We did have an EPRI and SCC 41 study that
13 looked at four plants and two with significantly
14 higher levels of lightning protection. So we learned
15 that plants took a more proactive approach to
16 maintaining lightning protection systems.
17 MEMBER POWERS: I know that at our
18 regions, where lightning strikes are extremely common,
19 do we have sort of what I would call a lightning
20 frequency map for our various plants?
21 MR. KISNER: We actually have that as a
22 back-up slide. We didn't include that in the main
23 lineup.
24 MEMBER POWERS: When you get a chance.
25 MR. KISNER: Yes. What I did was actually

1 overlaid the plant locations, the map of those, with
2 what they call a keratonic map, and put the two
3 together so we can see what plants --
4 MEMBER POWERS: Most interesting.
5 MR. KISNER: The end result of looking at
6 that map is to finally say, "Well, a few plants are
7 going to be hit hard, like in the Florida region and
8 some other regions. Other places, there is no zero."
9 MEMBER POWERS: Yes.
10 MR. KISNER: There is a place where
11 lightning never --
12 MEMBER POWERS: Yes. It's like tornadoes.
13 There's no zero.
14 MR. KISNER: There's no zero. So,
15 therefore, you're really obligated to make plants in
16 all locations live up to all the standards that apply.
17 MEMBER POWERS: Okay. Well, most
18 interesting.
19 MS. ANTONESCU: So this chart, the next
20 slide, shows a breakdown of the LER data by event
21 categories, the reactor trip and loss of off-site
22 power, the dominant events as extracted from the LER
23 database over the 24-year period.
24 From this chart, we can see a decline in
25 the number of events during the second period. So

1 this could again indicate that plants have been
2 improving their lightning protection systems through
3 maintenance and upgrade.
4 So, in conclusion, based on all of the
5 data, it seems clear that consensus practices are
6 becoming more mature. And we believe efforts to
7 ensure lightning protection are improving. Thus, NRC
8 needs to evaluate those practices for endorsement as
9 part of this project.
10 MEMBER APOSTOLAKIS: Okay. We are
11 improving. Are we good enough? Was the previous
12 situation bad enough? I mean, so okay. We're looking
13 at an event, and the trend is downward. That's good.
14 Why should we worry about it? Has any PRA shown that
15 lightning is a dominant contributor or even mid-level
16 contributor?
17 MR. KISNER: So far lightning shows that
18 it trips plants.
19 MEMBER APOSTOLAKIS: Yes.
20 MR. KISNER: No incident has occurred that
21 we saw where lightning caused a safety system or
22 protection system to become nonfunctional.
23 MEMBER APOSTOLAKIS: Right.
24 MR. KISNER: So, therefore, its pathway,
25 its connection in PRA is one of excessive trips. And

1 that's where it's at.

2 DR. WOOD: There was a study by

3 Brookhaven, -- one of Christina's programs sponsored

4 that -- where they looked at digital system failures.

5 And it identified EMI. And in that category of EMI

6 was also included surge induced by lightning as one of

7 the significant environmental stress contributors to

8 I&C system misoperation or failure. But there's not

9 been a probablistic assessment and also an assessment

10 of the cost benefits of --

11 MEMBER APOSTOLAKIS: So all of this is

12 done in the name of defense-in-depth, then?

13 DR. WOOD: Yes.

14 MEMBER DENNING: Well, I think they've got

15 to be a little bit careful here, George, because we

16 are now moving towards digital control systems. And

17 there's clearly the potential for common cause failure

18 of safety-related systems here.

19 Whether the evidence shows that it's

20 happened or not, clearly it's an area that requires

21 looking at. Whether there's been adequate looking at

22 it so far I don't know, but I would be hesitant to

23 jump to the conclusion that this is just a matter of

24 trip without the potential for the common cause

25 failure of other systems because that's the concern.

1 MEMBER APOSTOLAKIS: Well, systems we
2 don't have. We don't control anything with digital.
3 MEMBER DENNING: Well, we are starting to.
4 We actually do, George. And it's going to happen. I
5 mean, that's what's going to be. I mean, I don't
6 think there's any question it's going to be that way.
7 MEMBER APOSTOLAKIS: No. I know.
8 MEMBER DENNING: And it's more than just
9 -- I mean, there are digital systems now that are
10 important.
11 MEMBER SIEBER: Well, the digital systems
12 aren't the only thing, you know. There are all kinds
13 of relays and actuating devices that may be even
14 electromechanicals that can be affected by lightning.
15 So this is not a new deal. In fact, you
16 know, all of your motor protection and transformer
17 protection and breaker schemes rely on the
18 establishment of a good common ground for the plant in
19 order to be able to detect things like differentials.
20 And so it goes well beyond digital I&C.
21 The bigger question is section D of the
22 draft guide makes it apply to new plants only, even
23 though we know that some older plants are going to be
24 backfitted with digital I&C.
25 Now, I sort of pondered that in the

1 process of reviewing all of this. And I note the fact
2 that we did do a radiofrequency interference and surge
3 protection set of guides. And this is a companion
4 guide to those guides.
5 Those guides specify what the devices
6 ought to be able to tolerate and reject. This guide
7 limits the strength of the RFI and the surge that it
8 would impose on those systems.
9 So to me there is not necessarily an
10 inconsistency. And at least the backfit rule would
11 prevent us from making this applicable to existing
12 plants.
13 On the other hand, I think it's a mistake
14 to say that it's just digital I&C that is causing this
15 change. I presume the staff agrees with that.
16 MS. ANTONESCU: Yes, we do.
17 MR. KEMPER: Yes. In fact, from my
18 experience in working with power plants, most reactor
19 trips are a result of secondary effects, like low
20 rejections, loss of feed pumps, loss of condensate
21 system. You're right. It's a big rotating machinery
22 is what typically gets you. It's not so much the
23 digital I&C.
24 MEMBER SIEBER: Well, having worked in
25 power plants, digital I&C can get you, too.

1 MR. KEMPER: Absolutely, absolutely, yes.

2 MEMBER SIEBER: And usually when it does,

3 it gets you bad. But there are all kinds of

4 opportunities for the plant to trip.

5 MS. ANTONESCU: So this viewgraph

6 summarizes the risks seen from the operating

7 experience. Review of operating experience shows that

8 lightning can cause a risk to a nuclear power plant

9 facility.

10 As you recall from the previous viewgraph,

11 lightning contributes to a significant number of loss

12 of off-site power events. And lightning can result in

13 loss of fire protection and may initiate a fire. And

14 lightning can cause a reactor trip as accompanied by

15 random systems and component misoperation and failure.

16 So we do have more information about it in

17 the NUREG/CR that Oak Ridge put together.

18 CHAIRMAN WALLIS: But they don't really

19 write them in the current codes through a certain

20 path. It's just that you don't quite know what is

21 going to fail because you haven't analyzed it yet.

22 The process by itself isn't random, the cause and

23 effect. And there is a traceable cause.

24 MEMBER DENNING: Well, this is not a minor

25 statement, Graham. I mean, the way I interpreted that

1 third bullet was they were saying lightning causes a
2 reactor trip. Now, in conjunction, you might have
3 random system failures and stuff like that. I think
4 the real question is, do you have causal failures as
5 well, that the lightning causes not only the --
6 CHAIRMAN WALLIS: Well, they cause all
7 failures, don't they?
8 MEMBER DENNING: I don't know what they
9 mean.
10 CHAIRMAN WALLIS: Your random system
11 failures are actually the ones caused by the
12 lightning, aren't they?
13 MR. KISNER: No. Well, you can have
14 situations in which the lightning causes a transient
15 surge, the surge itself knocks out some --
16 CHAIRMAN WALLIS: That's what you mean,
17 isn't it?
18 MR. KISNER: And then there's a cascade of
19 --
20 CHAIRMAN WALLIS: Right.
21 MR. KISNER: And so the random failures
22 can be a part of the cascade, but the --
23 CHAIRMAN WALLIS: So they are cause and
24 effect?
25 MS. ANTONESCU: Yes, there is a first

1 consequence --

2 MEMBER DENNING: That's very poor

3 terminology, then, to call that random.

4 MEMBER APOSTOLAKIS: You wouldn't call

5 them random. Random means independent. Random means

6 actually independent of the lightning. I mean,

7 something is out for maintenance. That has nothing to

8 do with lightning. And it is part of the cut set.

9 And then the lightning causes the other events.

10 DR. WOOD: Yes. I think you're right.

11 The word "random" should be struck.

12 MEMBER APOSTOLAKIS: Independent.

13 MR. KISNER: I don't believe we actually

14 used the word in our CR. And I don't think the reg

15 guide had anything close to that in it.

16 MEMBER APOSTOLAKIS: But still, though, I

17 mean, in spite of the comments you gentlemen made

18 earlier, you don't have an actual event that did all

19 this stuff, did you?

20 MS. ANTONESCU: We had an event, actually

21 --

22 MEMBER APOSTOLAKIS: That did all of this?

23 MS. ANTONESCU: At Yankee-Rowe, we had --

24 DR. WOOD: Yes. In the NUREG, I think

25 there's a diagram showing a cascade of events from one

1 particular LER.

2 MEMBER APOSTOLAKIS: And what was the net

3 result?

4 MR. KISNER: The net result was the plant

5 was out for several days. And there was significant

6 damage to equipment. There were communication

7 failures. There were failures of doors to lock or

8 unlock, to lock people access.

9 Some things failed. It almost looked

10 random, but there was no random. It was causal

11 reports. And ultimately they got the plant back

12 operating after quite a few days. There were some

13 close calls.

14 In the end, the reactor tripped and shut

15 down properly within milliseconds of the first action.

16 MEMBER DENNING: I think George's question

17 really relates to, do you have any cases where you had

18 to trip and you also had degradation of safe shutdown

19 capability coincident? That is, did it happen that

20 that particular failure that occurred was in a safe

21 shutdown system that would have --

22 MR. KISNER: We postulate such a thing

23 could possibly happen. I've never seen that happen,

24 looking for that but have not found it, which is good.

25 DR. WOOD: Had we seen something like

1 that, then I don't think there would be any question
2 that the staff would probably have proposed this apply
3 to existing plants as well as a backfit.
4 MEMBER SIEBER: But they would have to
5 meet a higher burden to --
6 DR. WOOD: That's true.
7 MEMBER APOSTOLAKIS: So the reason why it
8 doesn't apply to existing plants is --
9 MS. ANTONESCU: Well, because plants
10 already employ lightning protection.
11 MEMBER APOSTOLAKIS: But as a backfit
12 tool, you don't think it is going to pass the
13 backfitting, right?
14 DR. WOOD: We haven't done an assessment.
15 MEMBER APOSTOLAKIS: Which confirms what
16 I have been saying all along, that it is not a
17 risk-significant contributor, but that is okay.
18 DR. WOOD: Right.
19 MEMBER DENNING: There is not sufficient
20 evidence to indicate it is a risk-significant
21 contributor, correct.
22 MS. ANTONESCU: Yes, there is not enough.
23 MEMBER SIEBER: I think it's also
24 important to -- at least from my own viewpoint the way
25 I look at this, taking surges or IFI into a digital

1 protection system is a lot different than taking them
2 and causing failures in digital control systems. You
3 know, a controller can go out. And the parameters zip
4 out. And the plant will still trip.
5 On the other hand, there is at least in
6 the United States only one plant that I know of that
7 potentially might put in a digital protection system.
8 All the rest are analog-type systems.
9 And so there is to my mind a built-in
10 sturdiness to non-digital systems in the protection
11 scheme that would tell me that it's okay not to apply
12 the sophistication of this reg guide to existing
13 plants.
14 To me, it is also probably a pretty sure
15 thing that new plants, new reactors with new concepts
16 will have digital protection systems.
17 DR. WOOD: There are a few plants that do
18 have digital protection systems.
19 MEMBER SIEBER: Yes, but it's a very small
20 number.
21 DR. WOOD: A very small number.
22 MEMBER SIEBER: Yes.
23 MEMBER APOSTOLAKIS: Good.
24 MS. ANTONESCU: So this is the slide that
25 actually shows a lightning event that can initiate a

1 cascade of effects. Possible consequences of
2 lightning strike are shown in the diagram. The
3 entries in the diagram are representative and are not
4 intended to be exhaustive.
5 The primary facts, like damage to
6 electrical distribution system, damage to electric
7 motors, generation of spurious signals, can lead to
8 isolation of system circuit breaker --
9 MEMBER APOSTOLAKIS: When you're say,
10 "failure of power supplies," what do you mean? Do you
11 mean station blackout?
12 MEMBER SIEBER: Breaker trip.
13 MS. ANTONESCU: Power.
14 MEMBER SIEBER: Just breaker trips. You
15 may lose a bus someplace because of the lightning.
16 MEMBER APOSTOLAKIS: So you still have the
17 --
18 MR. KISNER: Well, in the one case of
19 Yankee-Rowe, they have lost some diesel because of the
20 lightning.
21 MEMBER SIEBER: Yes, it's possible.
22 MR. KISNER: I mean, they managed to get
23 things going back manually and, you know, after a
24 number of steps. So it's not inconceivable that you
25 could go completely --

1 MEMBER DENNING: Dr. Apostolakis will now
2 take back his earlier comment. It's just
3 defense-in-depth.
4 MEMBER APOSTOLAKIS: This is
5 defense-in-depth. I don't think it's
6 risk-significant, but the defense-in-depth is fine.
7 You know, we have to --
8 CHAIRMAN WALLIS: Damage to an electric
9 motor would certainly fry a computer. Electric motors
10 are major.
11 MEMBER APOSTOLAKIS: You know, in the old
12 days, when we did this, external events, for the first
13 time, it would be much more convincing if, instead of
14 these columns, you had two or three actual scenarios
15 of PRAs.
16 You don't have the certain frequency. And
17 then with adding the lightning strike, that frequency
18 went up some rough estimate because then it would be
19 much more convincing. And that is what we did with
20 fires in the old days.
21 You know, the scenarios exist in the
22 internal event PRA. You know, pick some because right
23 now it's really no. It's not. No. It is. I mean,
24 yes. Okay. I mean, that's why we have a PRA.
25 MEMBER SIEBER: I think they're just

1 trying to make the point that this is what happens.

2 MEMBER APOSTOLAKIS: I understand the

3 point, but what I'm saying, the point would be

4 stronger if you did that. I'm not disagreeing with

5 the point.

6 CHAIRMAN WALLIS: But in the future, the

7 worst event would presumably be a lightning strike

8 which disabled a large proportion of the digital

9 control and information system.

10 MEMBER APOSTOLAKIS: Yes.

11 CHAIRMAN WALLIS: That would be presumably

12 the worst thing that you could think of. So the

13 operators didn't know what was happening or got false

14 information or things started and stopped randomly and

15 so on. Isn't that the thing that --

16 MEMBER APOSTOLAKIS: At some point --

17 CHAIRMAN WALLIS: -- people have worried

18 about?

19 MR. KISNER: And that actually happened

20 with the Yankee-Rowe?

21 CHAIRMAN WALLIS: Yes. It was a long time

22 ago.

23 MR. KISNER: It was.

24 MEMBER APOSTOLAKIS: Is that the plant

25 that is shut down now?

1 MR. KISNER: It is now shut down. It
2 won't happen there again.
3 MEMBER APOSTOLAKIS: It won't happen
4 again.
5 MEMBER SIEBER: That wasn't digital
6 systems either.
7 MR. KISNER: No, no. That was analog
8 systems.
9 MEMBER SIEBER: Yes. It was totally
10 analog. And so it's not related. I think it's also
11 a mistake to say that if a lightning strike can fry a
12 motor, it will surely fry a computer. It depends on
13 the standards that each is built to and whatever
14 inherent weaknesses in the insulation systems each
15 has.
16 I could picture a lightning strike coming
17 in on a 6 kV or 4 kV bus that might fry a motor or
18 trip a circuit breaker that a computer could ride
19 through if it had the proper power supply. So let's
20 not jump to that assumption. I don't think --
21 DR. WOOD: It's got to get through the
22 different protective measures.
23 MEMBER SIEBER: That's right.
24 MR. KISNER: Which gets back to the point
25 we mentioned and you mentioned earlier, as you said,

1 setting the environment. As you said, if you set the
2 surge environment correctly, then the other work of
3 the EMI can take place and be properly applied.
4 MEMBER SIEBER: That's right. Right.
5 MR. KISNER: So we want to make sure we're
6 fitting that environment. Now, how do you fit that
7 environment? Well, you follow certain rules. You
8 design circuits and route them a certain way. And
9 that's what this is about.
10 MEMBER SIEBER: All right. Okay. Moving
11 on.
12 MS. ANTONESCU: Moving on. So the results
13 are that the primary facts can result in isolation of
14 systems. And that, in turn, can lead to major actions
15 in the plant like back to trend connections.
16 CHAIRMAN WALLIS: As opposed to the
17 description, do you have any analysis of it in a
18 quantitative form?
19 MS. ANTONESCU: No, we don't have.
20 MEMBER APOSTOLAKIS: That's what I asked.
21 CHAIRMAN WALLIS: Yes. Well, I'm sorry.
22 I'm asking it again in a different way perhaps.
23 MEMBER APOSTOLAKIS: With a different
24 accent.
25 CHAIRMAN WALLIS: The description is very

1 nice, but unless you put some numbers on it, I'm not
2 quite sure what it means.
3 MEMBER APOSTOLAKIS: That's what we did
4 with fires.
5 CHAIRMAN WALLIS: You said, how does it
6 affect the PRA and the --
7 MEMBER APOSTOLAKIS: You take a sequence.
8 And you say, "Look, this is the frequency you guys are
9 getting now. If I postulate a certain lightning
10 event, here is how these things would change." You
11 don't have to be very precise, but if you show that
12 there is a significant change --
13 CHAIRMAN WALLIS: Was it a 10^{-18} event in
14 the CDF or --
15 MEMBER SIEBER: No, it was not.
16 MEMBER APOSTOLAKIS: With all of this
17 discussion between Jack and Rich, I'm wondering now.
18 Is there a single event that can disable all of the
19 digital I&C in the plant? I don't know. I mean, we
20 might as well speculate.
21 MR. FLACK: George, this is John Flack
22 with ACRS.
23 I believe this may have been a generic
24 issue at some point. And if it was, it would have
25 been resolved that way. And if it was resolved that

1 way, it was probably prior to their thinking about
2 I&C, which means, then, that if you introduce I&C now,
3 you may want to revisit that generic issue. But it
4 may have been a generic issue, which would then have
5 to be quantified and so on.
6 MEMBER APOSTOLAKIS: Anyway, it was an
7 innocent comment that created a surprising amount of
8 reaction.
9 CHAIRMAN WALLIS: Often they're the best.
10 Often they're the best.
11 MEMBER APOSTOLAKIS: It's more convincing
12 to put a sequence up there and show these things,
13 rather than saying what you're saying now. If I were
14 you, I'd move on.
15 MS. ANTONESCU: Okay. Thank you.
16 CHAIRMAN WALLIS: George, what is a
17 comment which is not innocent?
18 MEMBER APOSTOLAKIS: Sorry?
19 CHAIRMAN WALLIS: Can you give me an
20 example of a comment which is not innocent?
21 MEMBER POWERS: Most of my comments.
22 MEMBER APOSTOLAKIS: The ones you make.
23 MEMBER POWERS: The ones you make, Graham,
24 are not innocent. I see people nodding in the back in
25 the audience.

1 MEMBER APOSTOLAKIS: The ones we make over
2 here are very --
3 MEMBER SIEBER: Actually, there hasn't
4 been an innocent comment in this room for a long time.
5 MS. ANTONESCU: So the next slide shows
6 the need for guidance technically does exist for
7 guidance on the lightning protection. New
8 technologies being used in plants, new plants will
9 employ such technology to a greater extent.
10 So nuclear power plants see widespread of
11 the digital and low-voltage analog electronic systems.
12 Electric and electronic components can fail due to
13 transients and current electronic devices are more
14 vulnerable than --
15 MEMBER APOSTOLAKIS: What you mean is
16 additional considerations for the need of guidance.
17 Is that what the title should be?
18 MS. ANTONESCU: Yes, yes.
19 MEMBER APOSTOLAKIS: Again, I mean, we've
20 beaten this to death, but it seems to me you are going
21 out of you way to convince us that this is a
22 worthwhile project. That's fine. Go on. That's
23 fine. That's fine.
24 MEMBER SIEBER: Well, if you look at it
25 not from the standpoint of accident prevention or

1 minimizing consequences, this is really an electrical
2 engineer's design process.
3 MS. ANTONESCU: Right.
4 MEMBER SIEBER: And if it weren't a
5 nuclear power plant, you would go through these steps
6 of setting specifications, both as to the capability
7 of the devices and the surges in RFIs that are imposed
8 on those devices and limiting those if you were
9 designing an electric car or a refrigerator. And so
10 this is just part of the design process.
11 MS. ANTONESCU: So additionally lightning
12 research at new plants must be consistent with that
13 measured at existing plants. The reason is to make
14 sure that the existing electromagnetic guidance is
15 adequate for the new plant. So current EMC guidance
16 is in the reg guide, 1.180, as you said before.
17 MEMBER SIEBER: Right.
18 MS. ANTONESCU: So the test levels are
19 based on expected electromagnetic and surge
20 environment established through extensive plant
21 measurements.
22 In conclusion, lightning protection is
23 needed to address new and potentially more vulnerable
24 technology and to ensure that the EMC guidance remains
25 adequate.

1 This slide, the next slide, shows
2 lightning-related activities over the last 20 years at
3 NRC and several other organizations. Standards
4 activities in lightning protection intensified in the
5 1990s, there is lots of information of this slide, I
6 know. And the colors are representative of work by
7 different organizations.
8 So standards studies, guidance development
9 all contributing to the development of this guide.
10 And there are a couple of them. I'm not going to go
11 through all of them, but the NRC lightning-related
12 activity dated back to a reg guide, draft reg guide,
13 in 1979.
14 There was also an information notice in
15 1985 and an engineering evaluation report. Then we
16 had an inspection report from Yankee-Rowe that
17 describes in great detail the series of events at a
18 nuclear power plant.
19 And in 1991, we had a petition for
20 rulemaking that was originated by Richard Grille,
21 former NRC staffer. And he was petitioning the NRC to
22 address concerns related to lightning.
23 And then in 1992, the NRC staff issued a
24 report authored by Chris Rourk. And then in 1996,
25 there were two unpublished NRC reports written on

1 lightning. One was on the technical basis, and the
2 other one was on some analysis for preparation of a
3 reg guide. Afterwards, around 2002, we got a user
4 need from NRR followed by our work in 2005 on
5 developing a reg guide.
6 In 1981 also, there was an EPRI/NSAC 41
7 report, which found wide differences in protection
8 between nuclear power plants. In 2001, the UL 96A
9 covers insulation practices, including air terminals,
10 down conductors, and grounding systems.
11 And now we come to the four primary IEEE
12 standards that form the basis of lightning protection.
13 Those are the ones that we're actually endorsing and
14 we'll discuss later.
15 Current industrial guidance on lightning
16 protection comes from NFPA-780 and UL 96A, as John has
17 mentioned. Basically, neither of these were intended
18 to be applied to power plants.
19 The NFPA-780 provides facility protection
20 guidance and philosophy. Virtually all lightning
21 protection standards referenced it. However, it
22 excludes electric generation facilities, the same with
23 UL 96A. It provides facility protection, insulation
24 practice, but, however, it excludes electrical
25 generating distribution and transmission systems. So

1 in both cases, the principal focus is on fire
2 prevention and personnel protection, no impact on
3 electrical systems.
4 MEMBER SIEBER: On the other hand, it does
5 talk about lightning protection systems. And it has
6 good maintenance and training --
7 MS. ANTONESCU: Right.
8 MEMBER SIEBER: -- sections in there,
9 which IEEE doesn't have.
10 MS. ANTONESCU: Exactly. That's why we
11 are trying to adopt some of these practices.
12 MEMBER SIEBER: And it's sort of
13 unfortunate. I guess all you can do is recommend to
14 the industry that they read them and perhaps on their
15 own adopt some of these practices.
16 MR. KISNER: Well, in our endorsing of at
17 least one or two of these IEEE standards, they, in
18 turn, call out 780.
19 MEMBER SIEBER: Yes, yes. But it's sort
20 of a roundabout kind of a way. You know, you've got
21 to go through this long chain to get to it.
22 MEMBER APOSTOLAKIS: That's standard for
23 IEEE standards.
24 MEMBER POWERS: Yes.
25 MEMBER APOSTOLAKIS: They cite each other

1 like crazy.

2 MS. ANTONESCU: Yes.

3 MEMBER POWERS: They do, in an effort to

4 make them incomprehensible in mortal men.

5 MEMBER APOSTOLAKIS: Eventually you end up

6 where you started.

7 MEMBER SIEBER: Okay.

8 MS. ANTONESCU: So given the information

9 we discussed, I want to give a more detailed

10 description of DG-1137. What is DG-1137? It

11 describes acceptable practices for design and

12 qualifications related to requirements of 10 CFR.

13 So it does describe acceptable practices

14 that contribute to fulfilling the relevant regulation

15 and safety criteria, specifically GDC 2 for protection

16 against natural phenomena and GDC 3, protection

17 against fire; and then GDC 17, electrical power system

18 requirements.

19 The purpose of the guide is DG-1137

20 provides guidance on lightning protection that is

21 acceptable to NRC staff. The purpose is to minimize

22 challenges to operability of safety-related systems

23 due to lightning-induced transients and to minimize

24 spurious operation of safety-related systems due to

25 lightning-induced transients.

1 What it does is it supplies guidance on
2 design and installation practices for lightning
3 protection systems. It recommends general defense
4 against lightning strikes. It provides a reasonable
5 assurance that a lightning event will not challenge,
6 compromise, or cause spurious operation of
7 safety-related systems in nuclear power plants.
8 CHAIRMAN WALLIS: Actually, it doesn't
9 provide any guidance at all, does it? It just
10 endorses other people's standards.
11 MEMBER SIEBER: That's guidance.
12 MS. ANTONESCU: But that is guidance.
13 CHAIRMAN WALLIS: But it doesn't provide
14 direct guidance in itself.
15 MEMBER SIEBER: No.
16 CHAIRMAN WALLIS: Indirectly by indirect
17 action endorsing other standards?
18 MS. ANTONESCU: By indirect endorsement of
19 --
20 CHAIRMAN WALLIS: And you sort of assumed
21 that they're good enough, but you haven't analyzed
22 that they are good enough to provide --
23 MEMBER APOSTOLAKIS: Unless there's a
24 presidential directive that federal agencies should be
25 using --

1 MEMBER SIEBER: Consensus standards.

2 MEMBER APOSTOLAKIS: -- the maximum

3 possible.

4 CHAIRMAN WALLIS: That's right, I know,

5 but the guidance -- okay. There was nothing in the

6 guidance itself which provides some guidance generated

7 by the NRC. It's all referenced to something somebody

8 else did.

9 MEMBER SIEBER: Yes. The guidance to --

10 MS. ANTONESCU: The guidance is the

11 endorsement of acceptable practices that industry is

12 using.

13 DR. WOOD: One way to look at it is it

14 provides guidance by giving a road map on which

15 standards to use.

16 MEMBER SIEBER: Right.

17 CHAIRMAN WALLIS: That's right.

18 MS. ANTONESCU: So how is it useful? It

19 establishes the foundation for updating review

20 guidance on lining protection in nuclear power plants

21 and standard review plan. And, in addition, the guide

22 is complementary to reg guide 1.180.

23 So the scope of DG-1137, coverage is

24 plant-wide. It starts in the plants which are with

25 components related to plant power systems. It

1 includes power plant buildings an also electrical
2 distribution systems and safety-related systems within
3 a building and any other ancillary facilities.
4 What it does not cover is transmission
5 line high-voltage equipment which is outside the scope
6 because there are grid issues. And what is not
7 addressed is protection against secondary facts that
8 are ready at the EMI because that is covered in reg
9 guide 1.180.
10 DG-1137 --
11 MEMBER APOSTOLAKIS: So wait a minute.
12 The stuff in there within the box of the dashed line
13 --
14 MR. KISNER: It actually starts --
15 MEMBER APOSTOLAKIS: -- that's what you
16 protect?
17 MR. KISNER: It starts at the switchyard.
18 MS. ANTONESCU: It starts at the
19 switchyard.
20 MEMBER APOSTOLAKIS: Including the
21 switchyard?
22 MS. ANTONESCU: Including --
23 MEMBER APOSTOLAKIS: So why isn't it in
24 the box?
25 MR. KISNER: Well, the box is only

1 referring to --

2 MS. ANTONESCU: The building.

3 MR. KISNER: -- those things that are

4 within the building, protected in a sense by the

5 building but has nothing to do with --

6 DR. WOOD: Yes. The dashed line isn't

7 intended to --

8 MS. ANTONESCU: It's just showing the

9 building, the protected --

10 MEMBER SIEBER: If you look at the typical

11 switchyard, there are a few components in there,

12 perhaps the main unit transformer or more likely the

13 main unit circuit breakers, in the bus feeds that

14 belong to the station. The rest of it is external

15 electrical transmission and distribution equipment,

16 which isn't covered.

17 MS. ANTONESCU: Right.

18 MEMBER SIEBER: And so there should really

19 be a little dashed thing into the switchyard to cover

20 those few pieces of equipment that belong to the

21 station.

22 MEMBER APOSTOLAKIS: Well, the thing

23 that's confusing, I mean, you said that the line

24 there, the box, does not indicate protection. It

25 says, "Protected." So immediately your mind goes, you

1 know, what's inside is protected.

2 What you're saying is that is --

3 MS. ANTONESCU: We actually have a debate

4 about that.

5 MEMBER APOSTOLAKIS: It's not a question

6 of blame. It's just better communication if you move

7 the line a little bit.

8 MEMBER SIEBER: On the other hand, the

9 switchyard and the transmission system is protected.

10 And the reason why it's protected is because it's in

11 the utility's best commercial interest to do so --

12 MS. ANTONESCU: Right.

13 MEMBER SIEBER: -- and not because of some

14 nuclear safety reason.

15 MEMBER APOSTOLAKIS: But can the utility

16 do anything about the grid? I thought that now

17 they're supposed to keep a --

18 MEMBER SIEBER: It depends on who owns

19 what section.

20 MEMBER APOSTOLAKIS: But somebody owns it,

21 right?

22 MR. KEMPER: That's correct, usually.

23 MEMBER APOSTOLAKIS: Ferrell Gray from

24 Southern California Edison said the other day that we

25 keep a distance between. We don't want to get

1 involved and be accused.

2 MEMBER SIEBER: The nuclear power plants

3 keep their distance from the grid. And that was the

4 case even before deregulation. The transmission and

5 system operators ran their own ship. And the

6 connection between the switchyard and the power plant

7 consisted of just a few devices, enough to get the

8 electricity out and get our auxiliary power back in.

9 But otherwise there are standards for

10 transmission and distribution systems that have ground

11 protection and have differential trips, pilot water

12 trips, all kinds of things, that protect against the

13 lines against lightning strikes and will isolate a

14 section of transmission line from the plant to prevent

15 a surge into the plant or at least minimize it. But

16 that's not considered under the standards.

17 MS. ANTONESCU: It's not under the

18 standards, yes.

19 CHAIRMAN WALLIS: I didn't understand this

20 figure because it seemed to me that what you want to

21 do is you either want to direct the surge to ground or

22 you want to somehow have a breaker which prevents it

23 getting into the plant. There's nothing in this

24 figure that indicates anything like that.

25 MR. KISNER: Right. This figure was just

1 showing what are the major --

2 MEMBER SIEBER: What's affected.

3 MR. KISNER: -- kind of --

4 CHAIRMAN WALLIS: But the grounding system

5 isn't connected to anything. I don't know what it's

6 doing here.

7 MR. KISNER: No. It was merely

8 decorative.

9 CHAIRMAN WALLIS: But that's very

10 important. I mean, a lot of these standards deal with

11 how you ground things, --

12 MR. KISNER: Later you'll see a slide in

13 --

14 CHAIRMAN WALLIS: -- how you evaluate the

15 U.S. impedance in all of these things.

16 MR. KISNER: Exactly. And later you will

17 see a slide which under these major component areas --

18 CHAIRMAN WALLIS: That can be very

19 significant.

20 MR. KISNER: We show which of the

21 standards apply to them.

22 MEMBER APOSTOLAKIS: But doesn't this say

23 that anything that can be affected by a lightning

24 strike is protected? What do you leave out? Nothing.

25 I mean, you're under the building. You're protecting

1 everything.

2 MS. ANTONESCU: Yes.

3 MEMBER SIEBER: In effect, yes.

4 CHAIRMAN WALLIS: It would help if you

5 would say, "Lightning comes in here. And this is how

6 you divert it" or something. Are you going to tell us

7 that?

8 MEMBER SIEBER: The standards tell you

9 that.

10 MEMBER APOSTOLAKIS: I believe already

11 they have regretted putting this up there.

12 MEMBER SIEBER: Yes.

13 MR. KISNER: We should put an electric

14 schematic up there. I can see it right now.

15 MR. KEMPER: We should have provided an

16 electrical schematic. You're right.

17 MEMBER SIEBER: The standards do describe

18 delta-y and establish the ground. It describes

19 protection systems. If you get down to some digital

20 transmitter someplace, it will probably be grounded

21 for RFI interests, but it won't have lightning

22 protection built into it. That's already part of the

23 station distribution system.

24 MS. ANTONESCU: Right. So DG-1137

25 provides guidelines in specific areas relevant to

1 lightning protection. These elements are grounding --

2 CHAIRMAN WALLIS: Well, grounding involves

3 a lot of the conductors buried in the ground.

4 MEMBER SIEBER: No.

5 CHAIRMAN WALLIS: Isn't that? I mean, a

6 considerable amount of the conductors in the ground.

7 MS. ANTONESCU: What we --

8 CHAIRMAN WALLIS: Otherwise the impedance

9 is much too big otherwise.

10 MEMBER SIEBER: Well, you have a big map.

11 And everything is --

12 CHAIRMAN WALLIS: Big map, right.

13 MEMBER SIEBER: Everything is connected to

14 that map.

15 CHAIRMAN WALLIS: You have a big map.

16 MS. ANTONESCU: What we --

17 MR. KISNER: Not just nuclear power plants

18 but --

19 MEMBER SIEBER: Every power plant.

20 MR. KISNER: -- plants, substations all

21 put a ground grid down.

22 CHAIRMAN WALLIS: Right.

23 MR. KISNER: And then at periodic

24 intervals, a grounding rod is run into the ground.

25 CHAIRMAN WALLIS: Right, right.

1 MR. KISNER: And an impedance is
2 established, low impedance is established, to meet
3 some minimum criteria for the entire structure.
4 CHAIRMAN WALLIS: Is this within the scope
5 of license renewal you inspect these ground things?
6 MEMBER SIEBER: No.
7 MEMBER BONACA: I haven't seen it, no.
8 MEMBER SIEBER: No.
9 MR. KISNER: Those are not generally
10 inspected.
11 MEMBER SIEBER: On the other hand, it's
12 sort of obvious if you have a bad ground, you get a
13 light in the control room at the control for the
14 breaker that says the ground is bad because you will
15 show a differential between the common station ground
16 and a specific device that is ground. And so that
17 becomes a normal part of the operator's process when
18 he sees ground lights.
19 If you get an unintentional ground on two
20 different devices, they are both going to trip. And
21 so establish --
22 CHAIRMAN WALLIS: Well, it's difficult to
23 get consistent grounds, though.
24 MEMBER SIEBER: Yes. Well, if you take a
25 Simpson in a power plant and you put one probe here

1 and another probe --

2 CHAIRMAN WALLIS: Right.

3 MEMBER SIEBER: -- 50 feet away, you could

4 read as much as 5 volts difference.

5 CHAIRMAN WALLIS: That's right. I get

6 that. I mean, I have two water pipes coming in my

7 house. And they go in the ground and all over the

8 place. And I can measure quite a potential between

9 them that fluctuate around.

10 MEMBER SIEBER: Yes.

11 CHAIRMAN WALLIS: Anyway.

12 MEMBER SIEBER: That's just sort of the

13 way the world works.

14 MR. KEMPER: Many of the things we're

15 talking about here really involved the maintenance and

16 testing of the lightning protection system, which is

17 more in the scope of this documents.

18 MS. ANTONESCU: So other elements are air

19 terminals, which are lightning rods, the purpose of

20 them to intercept lightning; bonding, down conductors

21 conducting lightning occurring from top to bottom, so

22 connecting the air terminals to the overhead ground

23 wire to the subsystems; cables; distribution voltages;

24 surge protection devices; and maintenance and testing.

25 MEMBER SIEBER: Yes. Since we're talking

1 about some of the details of how the grounding system
2 works, I notice you took exception to the conductivity
3 of concrete. And I know the number that was in the
4 standard was wrong at 30 ohms per centimeter.
5 Where did 30 k-ohms? I tried to check
6 that and couldn't find it in any of my references.
7 Where did you guys find it?
8 MR. KISNER: That's a good question.
9 MEMBER SIEBER: That seems pretty low to
10 me, too.
11 MR. KISNER: Three thousand seems low?
12 MEMBER SIEBER: Thirty thousand ohms.
13 MR. KISNER: Thirty k-ohms.
14 MEMBER SIEBER: Thirty k.
15 MR. KISNER: Thirty k?
16 MEMBER SIEBER: Yes.
17 MR. KISNER: Yes. That number was one of
18 our colleagues had investigated that. And I'm afraid
19 I am not able to give you that number.
20 MEMBER SIEBER: Yes. Well, I --
21 MR. KISNER: He's on a cruise, and we
22 don't have --
23 MEMBER SIEBER: I couldn't --
24 MR. KISNER: We don't have a direct line,
25 unfortunately.

1 MEMBER POWERS: That's the most exotic
2 story I've ever heard.
3 MR. KISNER: Yes, I know.
4 (Laughter.)
5 MEMBER POWERS: You guys thought to make
6 this one up.
7 DR. WOOD: We'll be happy to go to the
8 Caribbean and find him.
9 MEMBER SIEBER: Somehow I don't believe
10 that.
11 MEMBER POWERS: Our committee maybe ought
12 to go there.
13 DR. WOOD: Maybe so.
14 MEMBER SIEBER: Do you think he will ever
15 come back?
16 DR. WOOD: I don't know.
17 MEMBER APOSTOLAKIS: Go where?
18 MEMBER SIEBER: He's on a cruise. I think
19 we should go and meet with him and discuss this. No.
20 I just wonder where the number came from because --
21 MR. KISNER: It was 3,000, 3 k, not --
22 MEMBER SIEBER: Three k? Okay.
23 MR. KISNER: Three k. Yes.
24 MEMBER SIEBER: Okay. But, in any event,
25 if you know, I would be interested in knowing where --

1 DR. WOOD: We will get back with you on
2 that one.
3 MS. ANTONESCU: We'll get back to you.
4 MEMBER SIEBER: It's not crucial to our
5 discussion, but I wasn't able to find it.
6 MS. ANTONESCU: Sure.
7 MEMBER POWERS: Why would we not be very
8 sensitive to the role of the humidity?
9 MEMBER SIEBER: What, the concrete?
10 MEMBER POWERS: Yes. Is the --
11 MEMBER SIEBER: Well, it's only important,
12 humidity is only important, on the surface. I think
13 what they're talking about is if you take a concrete
14 structure and it's grounded to the mat at one end and
15 you've got a fence post sticking out the other end,
16 how well will the fence attract lightning?
17 And what is the resistance to the current
18 flow after the fence gets fried? And it's important,
19 for example, that containment has lightning rods on
20 it. And if you didn't have those, containment would
21 become a conductor. And it's not clear to me exactly
22 what would happen, but it probably wouldn't be good.
23 MEMBER POWERS: Well, it's a conductor all
24 along and protection.
25 MEMBER SIEBER: Well, I would prefer to

1 have it hit the lightning rod and come down and the
2 lightning rod is a conductor, rather than going
3 through all the cracks and so forth in the concrete.
4 It just seems like a better deal to me.
5 But it becomes important when you're
6 trying to establish the extent to which a structure
7 like a fence around a plant will become charged at
8 50,000 volts or 500,000 volts or essentially stay at
9 ground, particularly if you have a guard.
10 MR. KISNER: Usually you don't want to be
11 going through the concrete thinking that it's a
12 conductor.
13 MEMBER SIEBER: That's right.
14 MR. KISNER: You want to be going through
15 the --
16 MEMBER SIEBER: You want a ground defense.
17 MR. KISNER: And you want to go from
18 points A to B in multiple paths --
19 MEMBER SIEBER: Yes.
20 MR. KISNER: -- with a maximum pen radius,
21 with a minimum number of kinks --
22 MEMBER SIEBER: Right.
23 MR. KISNER: -- and points where the
24 voltage can be -- the vector can be concentrated --
25 MEMBER SIEBER: Yes.

1 MR. KISNER: -- and go straight into the
2 ground mat and then be sure that it itself is going
3 into the earth ground uniformly across the grounding,
4 --
5 MEMBER SIEBER: Right.
6 MR. KISNER: -- although if you could see
7 a picture of the voltages in 3-D --
8 MEMBER SIEBER: It would be --
9 MR. KISNER: -- with a strike on one end,
10 you would think, "Well, it's going to be all the
11 ground." Not so. You'll see a conduction across the
12 entire plane as the thing they call GPR, ground
13 potential rise, occurs. And you see that rise go up
14 and prorogate across the entire --
15 MEMBER SIEBER: It actually will move,
16 that people move.
17 MR. KISNER: Yes. And the GPR is one of
18 the reasons that a lot of things can fail because what
19 you thought was ground and had every reason to believe
20 would be turns out to be at 3,000 volts or 10,000
21 volts for so many milliseconds or microseconds.
22 MEMBER SIEBER: That's why I became a
23 mechanical engineer.
24 MS. ANTONESCU: How should this guide be
25 used? It applies to new plants -- as a result, no

1 backfitting at existing plants is intended -- for use
2 in evaluating licensee submittals for design
3 certifications and combined licensees.
4 MEMBER APOSTOLAKIS: So let me understand
5 this now again. I think we mentioned it earlier.
6 Existing plants now are beginning to use digital I&C.
7 Are they expected to protect them against lightning?
8 DR. WOOD: Right.
9 MEMBER APOSTOLAKIS: And if they are, how
10 are they going to do it?
11 DR. WOOD: If you go to reg guide 1.180,
12 they're expected to ensure that the surge environment
13 and the EMI environment at their plant is consistent
14 with the characteristic environment that was used to
15 establish this.
16 MS. ANTONESCU: Already established for
17 the measurements that --
18 DR. WOOD: So if that leads them to say,
19 "We need to make some changes to the lightning
20 protection system" at their plant, that's where this
21 last bullet comes in.
22 MEMBER APOSTOLAKIS: In other words,
23 nothing stops them from using this guide?
24 DR. WOOD: That's right.
25 MS. ANTONESCU: Nothing stops them, no.

1 MEMBER APOSTOLAKIS: But, then, Dr.
2 Shack's comment earlier is perfectly valid. I mean,
3 all regulatory guides are optional.
4 DR. WOOD: Voluntarily, yes.
5 MS. ANTONESCU: Voluntarily, yes.
6 MEMBER APOSTOLAKIS: So what is the
7 difference here?
8 DR. WOOD: I guess it was a question of
9 whether or not it was going to be imposed on existing
10 plants requiring changes.
11 MEMBER APOSTOLAKIS: But regulatory guides
12 are not imposed.
13 MEMBER SIEBER: Once you establish that as
14 an acceptable regulatory solution, there is an
15 implication that it is the minimum. And if you impose
16 it on plants --
17 MEMBER APOSTOLAKIS: Where applicable,
18 right?
19 MEMBER SIEBER: -- that were designed and
20 built to some other standard, that becomes a backfit.
21 And the burden on the staff to establish that this is
22 important is greater than if you apply it to a new
23 licensee who hasn't constructed any physical plant as
24 yet because that becomes, then, a part of the decision
25 process as to whether you are going to build the plant

1 or not. So it's a regulatory issue.

2 MEMBER APOSTOLAKIS: When do you demand

3 that something goes through the backfit rule? When

4 you issue a new rule?

5 MEMBER SIEBER: If it requires you --

6 MEMBER APOSTOLAKIS: This is something

7 mandatory.

8 MEMBER SIEBER: If a new rule --

9 MEMBER APOSTOLAKIS: A requirement of some

10 sort.

11 MEMBER SIEBER: -- a requirement causes

12 you to make a physical change to the plant that

13 changes the design basis, that puts you in 1.109.

14 MEMBER APOSTOLAKIS: Which is not, though,

15 tied to adequate protection. If it's an issue of

16 adequate protection, you don't do that.

17 MEMBER SIEBER: That's right. Well, if

18 you need to reestablish adequate protection by

19 enhancing some regulation, --

20 MEMBER APOSTOLAKIS: That's right. You

21 don't --

22 MEMBER SIEBER: -- you have to show that.

23 And then 1.109 doesn't apply.

24 MEMBER POWERS: Just to be absolutely

25 clear, now 1.109 applies to all changes and

1 regulation. Some of them deal with adequate
2 protection. And staff is not allowed to make a
3 cost-benefit analysis.
4 MEMBER SIEBER: That's right.
5 MEMBER APOSTOLAKIS: Okay. But, anyway,
6 I don't see why this can't be just a regulatory guide
7 like anything else. I don't see the benefit of the
8 first two bullets.
9 MEMBER SIEBER: There isn't any.
10 MEMBER APOSTOLAKIS: There must be some
11 reason why you are proposing it, but it's not
12 everything to me.
13 MEMBER SIEBER: I think you have to do
14 this in order to make the standards that apply to
15 devices and the standards that apply to their power
16 supplies consistent with one another.
17 MEMBER APOSTOLAKIS: You have to do
18 "this." What do you mean by "this"?
19 MEMBER SIEBER: Impose this standard.
20 This standard --
21 MEMBER APOSTOLAKIS: So you disagree with
22 the first two bullets? I mean, you wouldn't put them
23 there.
24 MEMBER SIEBER: The new standard for
25 digital I&C applies to new plants. This standard

1 applies to new plants. So that's consistent. And
2 that's also consistent with this --
3 MR. KEMPER: If I could offer a thought
4 here? The existing plants already have programs
5 whereby they show compliance with general design
6 criteria 2, 3, and 17, which is appendix A of Part 50.
7 We all know that.
8 So this is another way of doing that. It
9 may be perfectly consistent with what many plants are
10 doing or it may have some deviation. So we're saying
11 that we're not proposing that this should supplant
12 their existing compliance system.
13 So that's really what this term and what
14 we're trying to indicate here is we're not trying to
15 impose this is one acceptable way of meeting these
16 requirements, not necessarily the only way, though.
17 MEMBER APOSTOLAKIS: Why didn't you say
18 that in so many words, that this is not intended to
19 supplant what you are already doing but it's a
20 regulatory guide? If you choose to use it, that's
21 fine.
22 MS. ANTONESCU: I think we said that in --
23 MR. KEMPER: That's written, I think, in
24 the language of the reg guide. Isn't it, Christina?
25 DR. WOOD: I think the language of the reg

1 guide includes this, that the licensee can voluntarily
2 adopt this if there's a clear nexus between this
3 guidance and what they are doing to upgrade their
4 plant.
5 VICE CHAIRMAN SHACK: There's that subtle
6 arm-twist, though, that although it's not mandatory,
7 when you come in with a new plant, it looks pretty
8 close to mandatory.
9 MEMBER SIEBER: Well, they keep asking you
10 questions as to why you didn't adopt this guide and
11 that guide and that guide because the reg guide says
12 it applies to these situations and depends on whether
13 you want to build a plant or answer questions, you
14 know. And you've got a choice.
15 CHAIRMAN WALLIS: Does the first box there
16 say applies only to new plants or to new plants?
17 MEMBER SIEBER: That's what section D,
18 "Implementation," says.
19 CHAIRMAN WALLIS: So it's of no use
20 whatsoever until someone wants to build a new plant?
21 MEMBER SIEBER: That's not true. Let me
22 give you an example.
23 MS. ANTONESCU: It's also for
24 considerations for upgrades on a voluntary basis.
25 MEMBER APOSTOLAKIS: The second bullet is,

1 in fact, wrong. Right? A regulatory guide will not
2 be considered as a candidate for backfitting. So it
3 doesn't make sense to say, "No backfitting is
4 intended" unless there's something again I'm not
5 seeing.
6 MEMBER SIEBER: No.
7 MR. FLACK: It's to meet the GDCs. If
8 they meet the GDCs now, they don't have to meet this
9 reg guide. Meet the GDCs now.
10 MEMBER APOSTOLAKIS: The GDCs are so
11 high-level. Come on, John.
12 MR. FLACK: But that is where the
13 requirements are. That's where the regulation hits
14 the road in GDC.
15 MEMBER SIEBER: That's the regulation.
16 VICE CHAIRMAN SHACK: But, I mean, he has
17 his current licensing basis. Unless you supply some
18 new requirement, I don't see that he would pick this
19 up. You're protesting too much here.
20 MEMBER APOSTOLAKIS: Exactly. You're
21 protesting too much.
22 MEMBER SIEBER: Let me give you an
23 example, and this was before these guys came along.
24 I worked in a plant that had diesel generators that
25 had mechanical timers on them to load the loads onto

1 the bus that the diesel was supplying.

2 They could never get the time set right.

3 So they decided to take out the analog timers and put

4 in the digital timers. The digital timers met the

5 basic RFI and surge protection standards.

6 And they worked for about 18 months until

7 the first failure occurred. And, unfortunately, two

8 failures occurred in one shift, which basically said

9 both diesels were inoperable, which is a Level III

10 violation and a civil penalty. Okay?

11 And the violation was based on the general

12 design criteria and not on the regulatory process

13 under which these devices were installed. And the

14 fault was surges on the D.C. buses that were induced

15 by relay closures. It wasn't lightning, but it was

16 the same kinds of things. You get a lot of spikes

17 when coils are energized and deenergized. And those

18 spikes were enough to reset the CPUs on the timers.

19 So the overall rule is the general design

20 criteria in this case. The guidance provides you with

21 the methodology that if you apply, you can show that

22 you meet the intent of the three GDCs that apply.

23 CHAIRMAN WALLIS: I'm reading the reg

24 guide. The introduction unless I've missed something

25 doesn't say anything about applying to new plants.

1 MEMBER SIEBER: D, section D.

2 CHAIRMAN WALLIS: But it should be an

3 introduction.

4 MEMBER SIEBER: It's always in section D.

5 CHAIRMAN WALLIS: You have to read the

6 whole thing before you find out it doesn't apply to

7 you?

8 MEMBER SIEBER: No. The first thing you

9 read is section D. I learned that in 1980.

10 CHAIRMAN WALLIS: Do you read it

11 backwards?

12 MEMBER SIEBER: Yes.

13 CHAIRMAN WALLIS: Why don't you put right

14 at the first line --

15 MEMBER SIEBER: The most important thing

16 is section D.

17 CHAIRMAN WALLIS: -- in the introduction,

18 "This applies to new plants"?

19 MEMBER APOSTOLAKIS: Why is that so, Jack?

20 CHAIRMAN WALLIS: Why?

21 MEMBER APOSTOLAKIS: Why is the most

22 important section section D?

23 MEMBER SIEBER: If it doesn't apply to

24 you, you can put it in your --

25 CHAIRMAN WALLIS: But you have to read the

1 whole guide until you get to section D.

2 MEMBER SIEBER: No, no. If you know that,

3 you start with D.

4 CHAIRMAN WALLIS: Well, this seems --

5 MEMBER APOSTOLAKIS: Anyway, it seems to

6 me that the second bullet there was not correct. "No

7 backfitting is intended." That doesn't make sense in

8 the context of the regulatory guide.

9 MS. ANTONESCU: All right.

10 MEMBER APOSTOLAKIS: So if you have some

11 words to the same effect in the guide itself, change

12 them.

13 MS. ANTONESCU: All right.

14 MEMBER APOSTOLAKIS: This is supposed to

15 be an acceptable method for doing business.

16 MS. ANTONESCU: Well, it is available.

17 MEMBER SIEBER: Section D is the same in

18 every reg guide. That's the standard format.

19 CHAIRMAN WALLIS: So you always read

20 section D first?

21 MEMBER SIEBER: I do.

22 MR. KEMPER: This language simply will

23 give the licensee the right to assure himself that the

24 regular inspection team is now not going to come and

25 look and inspect him for compliance with this

1 document. That's all.

2 MEMBER APOSTOLAKIS: But that's a

3 regulatory guide.

4 MR. KEMPER: That's right.

5 MEMBER APOSTOLAKIS: The word

6 "backfitting" doesn't belong. You can make that

7 clear. That's fine. Those words are fine. Oh, okay.

8 So good. So you're asking them to go read four

9 standards.

10 MEMBER SIEBER: Four standards. And this

11 is the primary one.

12 MS. ANTONESCU: Now let me tell you about

13 that.

14 MEMBER APOSTOLAKIS: You are actually

15 pretty generous. It's only --

16 MEMBER SIEBER: These are the primary

17 ones.

18 MS. ANTONESCU: It could have been a lot

19 more.

20 MEMBER SIEBER: These, in turn, reference

21 another dozen standards. These are really good

22 standards.

23 MS. ANTONESCU: So that's regulatory

24 position one, which endorses design installation

25 practices in four primary IEEE standards. IEEE 665

1 deals with grounding practices. Sixty-six covers
2 grounding and surge protection for medium voltage.
3 IEEE 1050 covers I&C grounding. And C62.23 covers the
4 surge protection.
5 MEMBER APOSTOLAKIS: So reaffirmed means
6 that somebody looked at it and gazing at it and the
7 revision, they decided that they didn't need --
8 MEMBER SIEBER: Yes.
9 MS. ANTONESCU: Right. That's correct.
10 MEMBER SIEBER: The standards committee
11 will review them on a periodic basis.
12 MS. ANTONESCU: Right. So these standards
13 encompass all the areas that we believe are important.
14 So we are endorsing them in their entirety.
15 MEMBER APOSTOLAKIS: All of them?
16 MS. ANTONESCU: Yes.
17 CHAIRMAN WALLIS: The next slide looks
18 like the path of a lightning strike to me.
19 MEMBER SIEBER: This one?
20 MS. ANTONESCU: This slide actually shows
21 the application of each standard to the plant areas
22 addressed by the guidance, the diagrams we saw before.
23 So the combination of these four standards
24 fully covered necessarily lightning practices. No one
25 IEEE covers all the lightning protections that are

1 necessary. And these four primary IEEE standards
2 refer to several other standards.
3 You can see them because they call out
4 other standards. The applicable portions; that is,
5 the sections referenced by the primary standards of
6 those standards, are included in the endorsement of
7 the four standards.
8 So, as you can see, the endorsed standards
9 are shown in blue. And the yellow standards are
10 referenced by the primary standards. They're in
11 yellow.
12 MEMBER SIEBER: It reminds me of the
13 fellow in "Oh, what a tangled web we weave."
14 (Laughter.)
15 MS. ANTONESCU: The second regulatory
16 position identifies relevant practices for inspection,
17 testing, and maintenance. The endorsed IEEE standards
18 do not address inspection, testing, and maintenance of
19 lightning protection systems, as John has mentioned.
20 So additional guidance is provided.
21 The guidance includes inspection
22 guidelines, testing/maintenance guidelines, and
23 comprehensive records. And these guidelines are
24 derived from analysis of NFPA-780, again, as you
25 mentioned before. And they provide informative

1 guidance on inspection and testing and maintenance.

2 MEMBER DENNING: Do these differ from

3 current requirements for testing and maintenance of --

4 for existing plants now, what do they use for this

5 kind of guidance?

6 MS. ANTONESCU: They have been using the

7 existing guidance in NFPA-78, which was now revised to

8 780. And we're now putting down --

9 DR. WOOD: I guess the point is it's

10 consistent with what they would have.

11 MS. ANTONESCU: It's consistent. Yes,

12 it's consistent with existing --

13 MEMBER DENNING: Okay.

14 MEMBER SIEBER: And then you compare that

15 with the --

16 MS. ANTONESCU: So this basically

17 describes the technical content of the reg guide.

18 This guide was released for public comments in

19 February of this year. And I want to talk now about

20 the comments and our responses to them.

21 Resolution to the public comments, we have

22 two correspondence. Progress energy and TVA submitted

23 a total of five comments on DG-1137. Public comments

24 can be grouped into general categories. And we agree

25 with the technical comments and have incorporated

1 appropriate changes.

2 Changes for the first comment, wording was

3 added to include relevant non-safety-related equipment

4 in the scope. The second change, wording was added to

5 acknowledge that alternative methods may be acceptable

6 given sufficient technical justification.

7 And the third one was no change because

8 comments simply acknowledged the value of guidance on

9 such practices. So we actually resolved all of the

10 comments.

11 MEMBER SIEBER: In favor of the

12 commenters.

13 MS. ANTONESCU: In favor of the

14 commenters.

15 MEMBER SIEBER: Right.

16 MS. ANTONESCU: And, to sum up, we feel

17 that DG-1137 is ready for issuance. It provides

18 needed guidance to the applicant and reviewer to

19 support licensee-covered plants.

20 It is supported by well-documented

21 technical bases that embody the cumulative work of NRC

22 and industry. It addresses the few technical comments

23 from the public. And we are finally here seeking ACRS

24 concurrence to publish this effective guide.

25 And also we feel it supports the

1 Commission goals to promote safety by minimizing risk
2 of lightning in these events and enhances regulatory
3 effectiveness by giving guidance on acceptable
4 practices and reduces the potential of regulatory
5 burden by clearly identifying necessary practices.
6 MEMBER SIEBER: If any member has any
7 additional questions or comments that they would like
8 to make at this time concerning this subject, now is
9 a good time to do it.
10 MEMBER APOSTOLAKIS: So if you issued the
11 guide without any statements regarding its
12 applicability to future or existing plants, would that
13 give you heartburn?
14 MEMBER SIEBER: Yes.
15 MEMBER APOSTOLAKIS: I didn't ask you.
16 Why? I mean, it's an optional way of doing business.
17 MS. ANTONESCU: I think my next step is
18 CRGR. So the question will be, is there any backfit?
19 MEMBER APOSTOLAKIS: No. It's a
20 regulatory guide. The issue of backfit doesn't arise
21 at all. No. You're not imposing it on anybody that
22 is not --
23 MS. ANTONESCU: I think the results
24 actually show that's the operating experience. We had
25 a number of events that actually show decline in

1 lightning events. We feel that backfit --

2 MEMBER APOSTOLAKIS: You can issue the

3 guide and then say somewhere in there to avoid what

4 Bill said earlier that, you know -- well, first of

5 all, state the obvious. At least it's not mandatory

6 and that you expect that the guidance in this would be

7 more appropriate or applicable to new plants and leave

8 it at that without saying --

9 MS. ANTONESCU: We could say --

10 MEMBER APOSTOLAKIS: -- without referring

11 to backfitting, which has no place here, and without

12 being so explicit that this applies to new plants.

13 DR. WOOD: Now, I think as a technical

14 issue, this guidance is valid for anybody who wants to

15 use it. It can provide value to all the plants. The

16 issue of backfitting and what wording is necessary in

17 there really is a regulatory issue.

18 MEMBER APOSTOLAKIS: Let me take another

19 point of view. There is an enlightened licensee out

20 there. They start putting digital I&C through an

21 existing facility. They use this guidance. And they

22 come to the NRC. And the reviewer says, "Oh, excuse

23 me. This applies to new plants. I can't accept what

24 you have done.

25 MEMBER DENNING: No, no.

1 MEMBER APOSTOLAKIS: What do you mean,
2 "No"? If it says --
3 MEMBER DENNING: No, no. They clearly
4 have --
5 MEMBER APOSTOLAKIS: I just picked an
6 extreme to show you the --
7 MEMBER SIEBER: We may have a differing
8 concept about what regulatory guides do and what they
9 mean. There is a standard format for regulatory
10 guide, section D, which is entitled "Implementation."
11 You have to put something in there, you know, because
12 every licensing manager, which there are probably 100
13 in the country, reads that first and does it apply to
14 me or not.
15 And, on the other hand, the implication of
16 a regulatory guide is this is one acceptable way you
17 can design and structure a plant to meet these
18 regulations, in this case three general design
19 criteria from appendix A. That doesn't preclude you
20 from adopting some alternative method, which should be
21 equal to this method. So then it becomes a backfit
22 just at that point.
23 You've got to do this or something just
24 like it. And so that's basically why it comes down
25 that --

1 VICE CHAIRMAN SHACK: George's point is
2 the last two bullets tell you everything you need to
3 know.
4 MS. ANTONESCU: Right.
5 MEMBER APOSTOLAKIS: Yes. There is a
6 sentence in section B, which now I will read first,
7 that says, "This guide only applies to new plants.
8 And no backfitting is intended to approved in
9 connection with this issuance."
10 MEMBER SIEBER: That's right.
11 MEMBER APOSTOLAKIS: That's way too strong
12 based on what this lady and gentlemen told us today.
13 I would say, "This guide is intended primarily for new
14 plants," period. Forget about backfitting.
15 Backfitting doesn't apply here at all.
16 MEMBER SIEBER: I think they're trying to
17 ease their way through CRGR.
18 MR. KEMPER: Yes. As part of producing a
19 reg guide, we have to address the backfit question as
20 part of the process. So we have to decide whether it
21 exists or not.
22 MEMBER SIEBER: Yes.
23 MR. KEMPER: Now, in reg guide 197 we
24 presented you all a couple of weeks ago, we took a
25 stand. We said it's applicable to new plants, but on

1 a voluntary basis, existing plants can implement this.
2 You know, we use words like that. So we could
3 certainly do something like that, I think, and still
4 not have trouble with CRGR, I think.
5 MS. ANTONESCU: Or maybe we can say
6 something that the guide is available for further
7 consideration and further upgrades on a voluntary
8 basis but was not imposed --
9 MEMBER APOSTOLAKIS: You're stating the
10 obvious again.
11 MS. ANTONESCU: -- on existing plants.
12 MEMBER APOSTOLAKIS: "This guide is
13 intended to be applied primarily to new plants,"
14 period, nothing else. CRGR are not children. You can
15 tell them that this is not backfitting. They know
16 that, even if you don't tell them.
17 MEMBER SIEBER: Well, there's actually
18 some --
19 MEMBER APOSTOLAKIS: You don't have to put
20 it in the official documents.
21 MEMBER SIEBER: There's actually some
22 value in recommending it for use --
23 MS. ANTONESCU: It's a cost-benefit
24 analysis.
25 MEMBER SIEBER: Yes, in situations where

1 a licensee may want to upgrade his plant and is
2 hunting for standards to make everything compatible,
3 as a good design engineer should do because design
4 engineers typically are not licensing engineers. And
5 they will not go through all these reg guides if it
6 says, "Doesn't apply to me."
7 So there is some value in that. And the
8 staff may want to consider it. I think it's a good
9 point.
10 MEMBER APOSTOLAKIS: The words "no
11 backfitting is intended to approved in connection with
12 this issuance" are simply wrong. Even if you want to,
13 you cannot approve anything of the kind. I would just
14 --
15 MEMBER SIEBER: No. You can impose that
16 guide on the industry and say, "You have to do this,"
17 but then you have to show that imposition is required
18 to meet adequate protection.
19 MEMBER APOSTOLAKIS: Then it's not a
20 regulatory guide, is it? It's something else.
21 MEMBER SIEBER: Well, you can make it a
22 regulatory guide if you don't want to go through a
23 rulemaking.
24 MR. FLACK: George, if they raise the
25 generic issue of plants putting in new I&C and the

1 resolution of that generic issue passes the backfit
2 test, which requires them then to use this as a guide,
3 then if it passes the backfit test, then it becomes
4 the guide and the intent.
5 MEMBER APOSTOLAKIS: What would be wrong
6 with saying, "This guide is intended to be used
7 primarily for new plants," period? Isn't that the
8 same idea?
9 MS. ANTONESCU: Yes.
10 MR. KEMPER: Well, we'll try that. That
11 sounds good.
12 MEMBER SIEBER: Thank you.
13 CHAIRMAN WALLIS: So you intend to make
14 this change?
15 MS. ANTONESCU: Yes.
16 MEMBER APOSTOLAKIS: Well, I'm going to
17 put it in the letter, in the main letter or in the
18 comments.
19 MR. KEMPER: I mean, we'll just confer
20 with our colleagues in NRR, make sure that they don't
21 have an issue with this.
22 MEMBER SIEBER: Those words sound like --
23 MEMBER APOSTOLAKIS: You guys don't have
24 to agree here.
25 MR. KEMPER: Yes, they do. Yes.

1 MEMBER APOSTOLAKIS: It just puzzles me
2 that there's so much -- I mean, it's, again, another
3 innocent statement.
4 MEMBER SIEBER: Are there any other
5 questions or comments from any of the members?
6 MEMBER APOSTOLAKIS: No, not from me.
7 MEMBER SIEBER: If not, is there any from
8 our --
9 MEMBER APOSTOLAKIS: I must say I learned
10 something today, though.
11 MEMBER SIEBER: Yes, yes. I learned that
12 25 years ago. I'm glad I could tell you.
13 One other thing I would like to say is I
14 really appreciate the cooperation of the staff in
15 supping me with the materials because, frankly, it
16 takes a long time to read all of this stuff. And I am
17 interested in it and wanted to understand it. And
18 there is a lot of material. It is not an easy
19 subject. So I owe you all a debt of gratitude. I
20 think you made a fine presentation.
21 Mr. Chairman, I --
22 MEMBER APOSTOLAKIS: Twenty-five minutes
23 early.
24 CHAIRMAN WALLIS: So once again I find
25 myself -- thank you very much. Thank you. Once again

1 I find myself in a position of offering this Committee
2 a long break. I'm really puzzled by today because
3 usually I'm in the other position of trying to hurry
4 things up. But we will take a break until 3:30.
5 And then, George, you're going to have
6 charge of the -- break until 3:30.
7 (Whereupon, the foregoing matter went off
8 the record at 3:07 p.m. and went back on
9 the record at 3:32 p.m.)
10 CHAIRMAN WALLIS: I'm now handing the
11 meeting over to George Apostolakis to lead us through
12 this --
13 MEMBER APOSTOLAKIS: Okay.
14 CHAIRMAN WALLIS: -- next session, next
15 topic.
16 MEMBER APOSTOLAKIS: The purpose of this
17 meeting this afternoon is to review and comment on the
18 Draft Final Revision 2 of Regulatory Guide 1.152,
19 Criteria for Use of Computers in Safety Systems of
20 Nuclear Powerplants.
21 The existing Rev 1 of this -- of the
22 guidance -- of the Regulatory Guide endorses an IEEE
23 Standard 7-4.3.2-1993. The IEEE Standard has been
24 updated, and now it's IEEE Standard 7-4.3.2-2003, to
25 keep up with the state of the art. And as a result,

1 now we need this Rev 2 to express the regulatory
2 position regarding this new IEEE Guide.
3 The Draft Guide endorses the updated IEEE
4 Standard, but also it goes beyond the standard and
5 includes a regulatory position providing guidance
6 regarding cyber security. And the Guide has been
7 subjected to public comment period, and there are
8 several comments from the public where people disagree
9 with this particular part of the Guide.
10 And the staff came back and said, "No, we
11 believe that it's important to have this, because we
12 can't wait for the industry or the technical societies
13 to develop a position." So the staff is here to brief
14 us on these issues, and it is requesting a letter from
15 the Committee regarding this Guide.
16 And without any further comments, I will
17 turn the microphone to you, Mr. Aggarwal.
18 MR. AGGARWAL: Thank you, George.
19 MEMBER APOSTOLAKIS: Thank you.
20 MR. AGGARWAL: Mr. Chairman, let me first
21 introduce my colleagues who are with me here today.
22 On my left is Mike Waterman from our division. He was
23 in NRR when this Guide went through for public
24 comment. Adam Wilson is an intern in our division,
25 and Matt Chiramal is representing NRR on the topic.

1 George, thank you very much for doing an
2 outstanding job. You really took most of the thunder
3 of my talk, but that's fine.
4 (Laughter.)
5 As George stated, the purpose is the staff
6 would like to briefly discuss the Reg. Guide 1.152,
7 and we are looking forward to obtaining the
8 Committee's concurrence on these regulatory positions,
9 as is stated in the Reg. Guide.
10 Again, as George pointed out, Revision 1
11 was issued in 1996, which endorses Standard 7-4.3.2-
12 1993.
13 Mr. Chairman, excuse me -- I just forgot
14 -- I would like to recognize Mark Cunningham, our
15 Deputy Division Director, who is also joining us.
16 MEMBER APOSTOLAKIS: I didn't know he was
17 still alive.
18 (Laughter.)
19 MR. AGGARWAL: Well, this is why I thought
20 I'd make it known that he is still here.
21 MEMBER APOSTOLAKIS: We haven't seen him
22 in, what, years now, right? You used to be a regular.
23 He's too high now for us.
24 (Laughter.)
25 MR. AGGARWAL: No, he's just regular --

1 MEMBER APOSTOLAKIS: He's a senior
2 manager. I'm sorry, Mr. Aggarwal.
3 MR. AGGARWAL: That's fine. He's still
4 regular.
5 (Laughter.)
6 As you know, this is in an arena which is
7 updating almost every day, and the IEEE has produced
8 and kept up to date and issued the Rev in 2003, which
9 is endorsed by this Reg. Guide. And this Reg. Guide
10 provides broad guidance on cyber security, which is
11 not addressed in the standard.
12 It is the opinion of the staff that it is
13 critical that we establish a stronger security
14 framework for computer systems in our nation's nuclear
15 powerplant. And that is the reason that we are taking
16 a lead to include this guidance for the first time in
17 our Regulatory Guide.
18 As pointed out, Draft Reg. Guide 1130 was
19 issued in December 2004 for public comment.
20 Initially, we only received one comment letter by
21 February 11th. We decided to extend the comment
22 period, because we believed more the better because we
23 have a better and improved technical document. As a
24 result, we received 20 comment letters.
25 Mr. Chairman, I would also like to point

1 out that in this particular case we have gone extra
2 mile, and that is we provided all the documents which
3 are before you dated May 31st to every commenter who
4 had made a comment. We have never done that before.
5 And the reason why -- we want the public to know well
6 in advance where we are going, what we are doing, if
7 anyone has a concern, and this is the time that they
8 can come and speak.
9 MEMBER APOSTOLAKIS: Excuse me. You say
10 you provided all the documents in addition to the
11 DG-1130. What are documents were there that you
12 provided?
13 MR. AGGARWAL: The public comments, as
14 well as the resolution of public comments. All of the
15 documents which you see in your letter --
16 MEMBER APOSTOLAKIS: Yes.
17 MR. AGGARWAL: -- they were put in
18 ADAMS --
19 MEMBER APOSTOLAKIS: Oh, okay.
20 MR. AGGARWAL: -- publicly available area.
21 We went extra mile. We sent those documents directly
22 to each commenter.
23 MEMBER APOSTOLAKIS: So you're saying
24 normally this is not done?
25 MR. AGGARWAL: We never do -- put it in

1 ADAMS at times, because when we submit a package to
2 ACRS, it is up to you when you want to release it.
3 Okay?
4 MEMBER APOSTOLAKIS: Oh. So you don't
5 make them public.
6 MR. AGGARWAL: We don't make them public,
7 right. They only come to know when they are here in
8 this meeting.
9 MEMBER APOSTOLAKIS: Oh, I see. I see.
10 I didn't know that.
11 MR. AGGARWAL: But this time we wanted to
12 make the public be aware that, hey, this is what we
13 are doing, because there were many articles in
14 newspapers and coverage there. So we didn't want to
15 hide the --
16 MEMBER APOSTOLAKIS: That's fine.
17 MR. AGGARWAL: Mr. Chairman, also I'd like
18 to point out that we consulted for in development of
19 the Reg. Guide the Office of NFIR, Office of the Chief
20 Information Officer, General Counsel, and, of course,
21 our colleagues in NRR. And I might say that there are
22 no diverse views on this topic. The staff is united.
23 Mr. Chairman, also, I'd like to point out
24 that the outside -- and I understand there were some
25 discussions earlier, in an earlier presentation with

1 regard to implementation policy. The policy of the
2 agency is, at least last 10 years, 15 years, that all
3 regulatory guides are the best technical documents the
4 staff can produce, but they are voluntary.
5 In other words, if licensees may decide --
6 choose to decide to do it or do whatever pleases him,
7 and there is absolutely no backfit in this Reg. Guide
8 or any Reg. Guide issued over the last 10 years, or
9 probably hereafter. Any plans which are already
10 certified, again, it is optional if they retain the
11 system and using this Reg. Guide, they can use it,
12 because all the staff is saying that if you do it this
13 way, this is acceptable to us. This is one method.
14 So this is the position of the agency,
15 that any Reg. Guide, at least for 10 years in the
16 electrical I&C area we have issued, there are ways we
17 will definitely apply it to newer plants. But with
18 regard to backfit, it is optional.
19 So essentially in the Reg. Guide we have
20 three regulatory positions. Number one is essentially
21 saying that we endorse the standard for meeting the
22 Commission's requirement or regulations with respect
23 to computer-based safety systems and to maintain high
24 functional reliability.
25 Mr. Chairman, I would also like to point

1 out to you that the staff vigorously participates in
2 the standard's activities, such as IEEE. Just like
3 our Regulatory Guides in many areas are outdated, the
4 standards are also outdated.
5 CHAIRMAN WALLIS: Well, let me get back to
6 this question of voluntary standard.
7 MR. AGGARWAL: Yes, sir.
8 CHAIRMAN WALLIS: I noticed that in the
9 bit that you contributed, not just the endorsement but
10 all this -- the NRC part, most paragraphs begin with
11 the statement, "The licensee should," and that seems
12 to be more a specification of what should be done
13 rather than something that's voluntary. And it
14 says --
15 MEMBER APOSTOLAKIS: And in the standard
16 "should" is different from "shall." The ACRS feels
17 it's the same thing.
18 CHAIRMAN WALLIS: I mean, the licensee
19 should have a digital system security program. Do you
20 mean there's an alternative to that?
21 MEMBER APOSTOLAKIS: It could be. In this
22 case, I guess --
23 VICE CHAIRMAN SHACK: If you turn to
24 Section D, which, of course, I immediately did --
25 (Laughter.)

1 MR. AGGARWAL: Exactly.

2 VICE CHAIRMAN SHACK: -- I found out that
3 no backfitting was intended to implied with this
4 document.

5 CHAIRMAN WALLIS: That's right.

6 MEMBER SIEBER: That's why it should.

7 CHAIRMAN WALLIS: This is a very positive
8 sort of statement. Most of these are very positive
9 statements, almost like demands. I mean, you're
10 setting up the specifications in a way that -- it's
11 very specific, you know. They're saying the licensee
12 should do this, this, this, this, this, and this.

13 So it's getting a bit far from being
14 voluntary. It's rather hard to see how they would set
15 up an alternative set of specifications which would
16 meet the same objectives. I guess it's okay, but I'm
17 just --

18 MR. AGGARWAL: Well, you know, whatever
19 the meaning of a word is, as long as people
20 understand. And we are doing this for 15 years at
21 least, and the implementation section makes it
22 clear --

23 CHAIRMAN WALLIS: I know. I know. But
24 this -- this Regulatory Guide, the way it's written,
25 it's almost like a rule to me, the way it's written.

1 MEMBER DENNING: But the fact that it
2 doesn't say "shall" --
3 CHAIRMAN WALLIS: I know, I know.
4 MEMBER DENNING: -- is very important.
5 CHAIRMAN WALLIS: I know. I know.
6 MEMBER SIEBER: "Should" is advice.
7 CHAIRMAN WALLIS: I know.
8 MEMBER SIEBER: "Shall" means do it.
9 CHAIRMAN WALLIS: It's just an aside.
10 It's --
11 MR. AGGARWAL: A helpful hint.
12 (Laughter.)
13 CHAIRMAN WALLIS: And then, the other
14 question I have in reading this was the licensee
15 should do all these things. Are they capable of doing
16 them all?
17 MEMBER APOSTOLAKIS: I'm sorry?
18 CHAIRMAN WALLIS: Are they capable? I
19 mean, do they know how to ensure that there aren't
20 worms and Trojan horses and bombs, and all of that?
21 MEMBER APOSTOLAKIS: This is a broader
22 question that I was planning to raise with the staff.
23 I don't know where the appropriate time is, but there
24 doesn't seem to -- I mean, this is consistent with
25 other standards that were reviewed in the mid '90s

1 regarding I&C. It's not clear to me what the measure
2 of success is here.
3 I mean, we're asking them to have this and
4 that, do this and that, but we are not really telling
5 people what method to use. So how would you know that
6 somebody has implemented this successfully? And it's
7 very interesting that today the issue came up
8 somewhere in another context.
9 You know, the Regulatory Guide 1.200,
10 which has to do with quality of PRA, it says, you
11 know, you should do common cause failure, you should
12 include this and that, but it doesn't tell you how.
13 And, apparently, there are beginning to be some
14 problems now, because the licensees are saying, "Yes,
15 we met all of these. We did all of these."
16 CHAIRMAN WALLIS: But PRA can't be tested.
17 MEMBER APOSTOLAKIS: But they are not
18 doing --
19 CHAIRMAN WALLIS: Those can't be tested.
20 MEMBER APOSTOLAKIS: If you don't explain
21 to people what you expect them to do, then eventually
22 you will be unhappy with some of the things they
23 choose to do.
24 CHAIRMAN WALLIS: You almost have to have
25 some NRC hackers try to get into the plant.

1 MEMBER APOSTOLAKIS: So this is the
2 standard practice in this field, I mean, to just tell
3 people that they have to do certain things, but we are
4 not really telling them how to do it?
5 MEMBER SIEBER: Yes.
6 MEMBER APOSTOLAKIS: How is the reviewer
7 going to satisfy himself or herself that this is done
8 satisfactorily? I mean, you've had experience now of
9 years of reviewing things. So you must know whether
10 there are any problems along these lines.
11 MR. AGGARWAL: Matt, do you want to --
12 MR. CHIRAMAL: My name is Matt Chiramal.
13 I'm with the NRR. Basically, the IEEE 7-4.3.2 has a
14 lot of reference documents, along with other
15 standards, which tell you the detailed steps that are
16 taken during the life cycle of the product.
17 MEMBER APOSTOLAKIS: Yes. But I remember
18 we read all this stuff, and it said, you know, you
19 have to have reviews, you have to have this. I mean,
20 I have participated in reviews that were extremely
21 superficial, and now the reviews that were extremely
22 technical. They were both reviews, though. So one
23 can say, yes, we had -- we had the review.
24 CHAIRMAN WALLIS: Well, look at the
25 experts in the field in Microsoft Windows, they have

1 this Windows they put out, and they're forever putting
2 out modifications that improve the design and the --
3 MEMBER SIEBER: The security of the
4 system.
5 CHAIRMAN WALLIS: -- security, and so
6 obviously it's not something which is done and this is
7 perfect from day one.
8 MEMBER SIEBER: Actually --
9 CHAIRMAN WALLIS: If Microsoft has all of
10 these problems, I would think these plants would have
11 them in spades.
12 MEMBER SIEBER: The easiest way to avoid
13 Trojan horses, viruses, worms, is to not connect to
14 the outside world. And I can't think of good reasons
15 why powerplant digital control systems or protection
16 computer should be connected to the outside world that
17 -- I will tell you that every licensee wants to do it,
18 because the plant manager wants to look at this data
19 at home.
20 The guy who maintains the computer wants
21 to be able to do that by remote control when he's on
22 vacation. And once you start that, you open yourself
23 up to invasion.
24 MEMBER APOSTOLAKIS: But there were some,
25 as you know, comments to that effect.

1 MEMBER SIEBER: Yes.

2 MEMBER APOSTOLAKIS: And it seems that the
3 public -- the public, and probably the industry, did
4 want a one-way communication. So you are saying even
5 if you have one-way communication, you're still
6 vulnerable?

7 MEMBER SIEBER: You can't have one-way
8 communication.

9 MEMBER APOSTOLAKIS: That's what they say.
10 I don't know whether --

11 MEMBER SIEBER: You just can't do it.
12 It's got to be send a signal and get a reply. But
13 that's where the vulnerability is, in my view.

14 MR. CHIRAMAL: And those are some of the
15 details that look at the design to make sure that when
16 they get a handshake from the message, that's separate
17 from the safety system.

18 MEMBER APOSTOLAKIS: But, again, in your
19 reviews in the last 10, 15 years, have there been
20 cases where the reviewer was at a loss whether what
21 was done was satisfactory? Because the standards
22 don't really tell you how to do things.

23 MR. CHIRAMAL: When we look at the
24 documentation that, for example, the tests -- we look
25 at the test procedures and the test results, the V&V

1 documentation, the QA --

2 MEMBER APOSTOLAKIS: Maybe the tests are

3 the easier part, because they are concrete. They did

4 something. But the other parts, let's say, you know,

5 the life cycle of the software, make sure you review

6 this, review that, and you have quality here, there,

7 and there. I don't know how one satisfies oneself

8 that this is done correctly.

9 You've wanted to say something for a while

10 now.

11 MEMBER BONACA: Well, I think the industry

12 has a lot of working groups that they have formed. If

13 I remember, one is called NewsMag or --

14 MR. AGGARWAL: That's right.

15 MEMBER BONACA: And those working groups

16 are very active in looking for interpretation, in

17 fact, and agreeing on what it is and then living, you

18 know, with certain standards. Now, they also belong

19 to some of these committees.

20 Now, I know that one way in which you get

21 some assurances at the beginning that the

22 interpretations were correct was to go to some vendors

23 that had interactions with this stuff, and had to

24 find, in fact, terms or what this means in terms of,

25 you know, qualifying a computer or piece of software.

1 And then, from that, there was establishment of
2 positions or interpretations, and I think that's
3 pretty much the way it's done.
4 There is almost like a side standard
5 organization that includes a member of the
6 powerplants, everybody actually.
7 MR. AGGARWAL: Well, let me concede that
8 this Reg. Guide is not perfect by any means. This is
9 the best we could do, and this is the first time we
10 are doing it. And we are taking a position that if
11 the industry develops some kind of more concrete
12 guidelines, we will again revise this Reg. Guide to
13 endorse if those requirements are appropriate.
14 But option -- not doing something, that's
15 not acceptable. We want to put some kind of pressure
16 on the industry as staff looks at this thing as a
17 critical factor. And we would like them to develop a
18 standard as fast as they can.
19 Now, it is true that we really don't have
20 a complete story in terms of success, what will be
21 acceptable.
22 MEMBER APOSTOLAKIS: Let me ask you this.
23 MR. AGGARWAL: Yes.
24 MEMBER APOSTOLAKIS: On Section 2.2.2,
25 development activity, says -- oh, you don't have to

1 find it. The development process should ensure the
2 system does not contain undocumented code, malicious
3 code, and other unwanted and undocumented functions or
4 applications.
5 MR. AGGARWAL: Great. Yes, it should.
6 MEMBER APOSTOLAKIS: But if I'm the
7 reviewer now and they come and tell me, "Yes, we did
8 a few things, and we are sure that it does not contain
9 those things," how do I make sure -- how do I satisfy
10 myself that what they have done is actually proper?
11 You see, that's where I get lost, because I'm not used
12 to this kind of fairly high-level guidance.
13 And I'm willing to accept that maybe this
14 is the best we can do right now, but I'm just curious
15 in practice what happens, what actually happens. Does
16 the reviewer come back to you, Matt, and say, "Well,
17 gee, help me."
18 MR. CHIRAMAL: Well, what we do is we take
19 one of the requirements and trace it down to -- down
20 to implementation in the design, and see how -- the
21 V&V people did the same job as part of their package
22 deal that they're supposed to look at every -- every
23 requirement and see that the requirements are met at
24 every stage of the life of the -- every design stage
25 of the product.

1 MEMBER APOSTOLAKIS: Is that stated
2 anywhere? I mean, how does the licensee know that you
3 are going to do that?
4 MR. CHIRAMAL: It's in the SRP, Chapter 7.
5 MEMBER APOSTOLAKIS: Oh, the SRP does say
6 that.
7 MR. CHIRAMAL: Yes.
8 MR. WATERMAN: This is Mike Waterman. I'm
9 with Office of Research. The guidance that you see in
10 Regulatory Position 2 with regard to cyber security
11 was taken out of branch technical position HICB-14 of
12 the Standard Review Plan, Chapter 7, almost word for
13 word if you will. So that's the guidance that
14 currently exists in the standard review plan.
15 And I agree with you, Dr. Apostolakis,
16 that the real devil is in the details about how -- you
17 know, what are they supposed to do, and how do we
18 assess that they actually did enough, and what is
19 enough. And that's a lot of what the research plan
20 was intended to address.
21 I don't want to get off into the research
22 plan right now, but that was the -- that was what I
23 considered to be the shortcoming of our standard
24 review plan is it talks about what we're supposed to
25 look at, but it really doesn't get into how do we

1 actually look at it.

2 And so your comments about the Regulatory

3 Position 2, all of the things the licensee should do,

4 and why didn't we tell them how to do it, well,

5 actually regulatory space-wise we're not supposed to

6 be telling the licensee how to do things. That's

7 their job, to figure out how to do it. It's our job

8 to figure out how to assess that they actually did

9 enough.

10 MEMBER APOSTOLAKIS: But you can suggest

11 a method.

12 MR. WATERMAN: Well, we can suggest it,

13 but, you know, when the regulatory agency makes a

14 suggestion, most of the licensees pretty much consider

15 that de facto requirement and de facto approval if

16 they do it, you know, so we --

17 MEMBER APOSTOLAKIS: Well, anyway, that's

18 not --

19 MR. WATERMAN: -- get away from

20 suggesting --

21 MEMBER APOSTOLAKIS: I think the reason is

22 that the state of the art doesn't allow you to go into

23 more detail, and we have to live with this.

24 MR. WATERMAN: And the --

25 MEMBER APOSTOLAKIS: Which is fine. I

1 mean, if that's the way it is right now, maybe 10
2 years from now it will be different.
3 MR. WATERMAN: Let me get into a question
4 of timing about how it came about that we could come
5 up with -- with cyber security guidelines while we're
6 endorsing a standard that doesn't touch on cyber
7 security guidelines.
8 In November of 2001, the Nuclear Power
9 Engineering Committee, which is part of the IEEE that
10 oversees the creation of IEEE 7-4.3.603, and all of
11 the other nuclear power generating station IEEE
12 standards, had their meeting in San Diego. I was
13 there, and at that time they asked us on the IEEE
14 7-4.3.2 working group -- I was a member of that group
15 -- to come up with some regulatory -- or not
16 regulatory but standards requirements for cyber
17 security.
18 And at that time, we were pretty much done
19 with our draft standard, and we didn't think we could
20 actually take on that issue at that time. That was in
21 November of 2001. And so what NUPEC did was they
22 decided to create a committee that would develop some
23 cyber security guidelines.
24 A couple years later we hadn't heard
25 anything from that committee, NUPEC. As a matter of

1 fact, that committee was never actually formed, from
2 what I understand. It dropped between the cracks.
3 Meanwhile, we still had to do a draft guide, if you
4 will, endorsing the new standard.
5 And it had been decided that if we're
6 going to address cyber security -- mind you, 2001 has
7 a lot of significant, right? This is a couple --
8 November 2001 was a couple of months after 9/11.
9 That's why cyber security became such a good buzz word
10 at that time. We hadn't really tackled it before
11 that.
12 We felt it was important that we have some
13 document that would reflect, you know, what do you
14 need to do about cyber security? So which standard do
15 we endorse and put that into? Do we write a separate
16 Reg. Guide, or what?
17 Well, it seemed that a standard that
18 talked about computers and safety systems at the
19 nuclear power generating stations would probably be a
20 good avenue, if you will, to introduce the idea of
21 cyber security. And that's how it came to be as a
22 regulatory position in this draft guide.
23 Matt and I worked on it together when I
24 was over in NRR, and I was tasked originally to come
25 up with some cyber security guidance. So the first

1 thing I thought about was, "Well, let's take a look at
2 what we did in IEEE 1012, the verification and
3 validation standard which addresses security." And
4 Matt said, "Why don't we take a look at our branch
5 technical position, HICB-14," went to there and there
6 was everything we needed laid out in, if you will, a
7 life cycle type format.
8 What do you think about cyber security
9 when you're talking about concepts? What do you do
10 about cyber security when you're laying out
11 requirements, design, implementation, etcetera? So
12 that's how it came to be.
13 MEMBER APOSTOLAKIS: We are preempting a
14 lot of the things that Satish is trying to tell us.
15 Let me first ask, when would you like us to give you
16 a few detailed comments on the guide? Is it now or
17 after you are done?
18 MR. AGGARWAL: You can do that anytime you
19 please.
20 MEMBER APOSTOLAKIS: Let's do it after you
21 are done.
22 MR. AGGARWAL: Okay. The bottom line is
23 industry is not ready for a standard at this time, and
24 we believe that it will take about five years before
25 such a guidance is developed by the industry.

1 MEMBER APOSTOLAKIS: For security.

2 MR. AGGARWAL: Right. And particularly on

3 the security area.

4 MEMBER APOSTOLAKIS: I noticed that the

5 I&C people do not use modern technology for their

6 slide projector. You still like manual change of --

7 MR. AGGARWAL: Well, that won't happen

8 next time.

9 MEMBER APOSTOLAKIS: You don't trust --

10 you don't trust technology, it looks to me like.

11 MR. AGGARWAL: We are still --

12 (Laughter.)

13 MR. WATERMAN: Satish is not in I&C.

14 MEMBER APOSTOLAKIS: Oh, okay. So now I

15 understand.

16 CHAIRMAN WALLIS: It's a matter of

17 security, George. It's not accessible. Only the

18 person who has the --

19 MR. AGGARWAL: Our type people are still

20 very conservative.

21 MEMBER APOSTOLAKIS: Okay.

22 MR. AGGARWAL: Well, as you are aware,

23 that subsequent to 9/11 the NRC had issued orders that

24 address in part current cyber threats at nuclear

25 powerplants. Other actions, including regulatory

1 improvements to address cyber security, staff is
2 working. We are also aware that nuclear powerplants
3 have implemented announcements. And we believe this
4 regulatory position and the Guide is a step in the
5 right direction.
6 Talking about the improvement, NRC is
7 taking a number of actions, including working with NEI
8 to implement cyber security program at nuclear
9 powerplants. And we will revise the Reg. Guide when
10 industry standards become available.
11 Again, they note that security guidance
12 is, as it is presented in the Reg. Guide, is based on
13 one life cycle approach, but, of course, other
14 approaches are acceptable.
15 Another point I would like to point out,
16 that security functions are part of the overall
17 function performed by the safety systems. And when
18 you talk about security, it applies both for hardware
19 and software. And the staff would not like to see
20 two-way communication between the safety computers and
21 plant-wide area network -- is not acceptable.
22 And let me address the public comments
23 which were received on the Reg. Guide. From my point
24 of view, they fell in three categories. One category
25 was that they were highly complementary, saying the

1 right thing, right time, and they wanted this now
2 guideline as requirements.
3 MEMBER APOSTOLAKIS: Now, if you wanted to
4 make them mandatory, you couldn't go Regulatory Guide
5 draft, right?
6 MR. AGGARWAL: No, we will have to go to
7 rulemaking, and then we have to meet the backfit rule
8 requirement.
9 MEMBER APOSTOLAKIS: Okay. That's too
10 much.
11 MR. AGGARWAL: So that was the one
12 category of comment.
13 CHAIRMAN WALLIS: How big were these
14 categories? You've got two in one and 15 in another
15 or something.
16 MR. AGGARWAL: Well, out of 20 letters,
17 there were at least five letters which say that what
18 we are doing is a right thing. And it is about the
19 time -- not only they wanted to cover safety computer,
20 they wanted to cover all computer.
21 Now, remember, we are living in a world
22 where somebody sitting in Korea or Tokyo or anyplace,
23 he can simply send a comment, and some of those
24 comments came from foreign countries.
25 MEMBER APOSTOLAKIS: I noticed that. You

1 got comments from --

2 MR. AGGARWAL: Right, exactly.

3 MEMBER APOSTOLAKIS: That's very

4 interesting.

5 MR. AGGARWAL: So the world is one now,

6 and we try to --

7 MEMBER APOSTOLAKIS: Are you required to

8 respond to all of these comments, or are you --

9 MR. AGGARWAL: Well, this is --

10 MEMBER APOSTOLAKIS: -- nice people?

11 MR. AGGARWAL: It is the agency policy

12 that anyone who submits a comment, that we will --

13 MEMBER APOSTOLAKIS: Okay. But let me ask

14 you, you said five commenters were complimentary.

15 Were any of those guys industry people?

16 MR. AGGARWAL: They have some industry

17 background, yes.

18 MEMBER APOSTOLAKIS: But they are not

19 industry.

20 MR. AGGARWAL: Well, I will talk to you

21 about NEI in a second.

22 MEMBER APOSTOLAKIS: Okay.

23 MR. AGGARWAL: The adverse comments, the

24 second category, what they were really saying to us

25 was take the cyber security out of this Reg. Guide,

1 and everything hunkydory. The part of the standard --
2 we had one or two very minor comments. We didn't have
3 any comments at all.
4 Ninety-nine percent of the comments
5 address the Position 2 on cyber security. And what
6 the industry took a position -- they gave us a big
7 lecture saying that, hey, how fluid the whole
8 situation is, let us do it when we do it and then you
9 can do it, and all that kind of story.
10 But then, they said, hey, by the way, if
11 you decide to do it, falling out of the technical
12 comments -- so as a technical person, my approach was
13 that I want to have each and every comment.
14 And it is my submission to you, Mr.
15 Chairman, that we have incorporated I can say almost
16 100 percent, but almost near to 100 percent, all the
17 technical comments which were made. It is a summation
18 of the staff that the quality of the Reg. Guide has
19 improved with this input.
20 And often, you know, by getting public
21 comments is a good advantage. You get all the
22 experience at no cost, whether it's from China or
23 Korea, or wherever it is. So, yes, this is the agency
24 policy, that we will respond to each and every
25 comment, no matter where it is coming from.

1 MEMBER APOSTOLAKIS: Good. I think that's
2 a good policy.
3 MR. AGGARWAL: The technical comments
4 which I briefly already addressed, that they were
5 essentially on the Regulatory Position 2 on the cyber
6 security. And I already pointed out that we have an
7 improved document.
8 The Regulatory Position 3 is a
9 boilerplate. We simply say that other standards which
10 are referenced in the IEEE Standard you can use if you
11 so desire, and they contain useful information. And
12 if they are endorsed by a regulation by NRC, or in
13 another Reg. Guide, of course, the Reg. Guide or the
14 regulation is applicable.
15 In the following two viewgraphs, I have
16 some information which is simply telling you that the
17 IEEE Standard -- the current version as opposed to the
18 old version -- what significant changes were made
19 there. And this is a listing essentially, and I will
20 go very quickly. They have added software quality
21 metrics. They have provided guidance on COTS, off-
22 the-shelf computer system. They have added a
23 reference to V&V, 1012.
24 They have another two IEEE standards --
25 828 and 1042. And the software project risk

1 management references are also added, which are listed
2 there. And a clause was added on fault detection and
3 self-diagnostics, identification clause -- namely, the
4 IEEE 60398 was added.
5 Annex C was updated, which is on the
6 dedication of existing commercial computers. And
7 Annex D was also revised.
8 In the conclusion part, it is the position
9 of the staff that it is essential that we should be
10 providing some kind of guidance, and the Reg. Guide
11 should be issued as is. And as I pointed out, that we
12 have incorporated the public comments, and nobody has
13 shown up from the public. I believe that is an
14 indication that there is no technical quarrel with
15 regard to the technical revisions. Given the state of
16 the art, this is the best we can do.
17 Finally, we will -- staff requests that
18 the ACRS concur on the regulatory position.
19 This essentially concludes my
20 presentation, and I will be happy to answer any
21 questions which Mr. Chairman or any other member may
22 have.
23 MEMBER APOSTOLAKIS: I have a few
24 questions. Well -- yes. First of all, in the new
25 stuff, do we have to have all of these motherhood

1 statements? The developer should configure and enable
2 the design security features correctly. I mean, yes.
3 The developer should ensure that a security design
4 configuration item transformations from the system
5 design specification are correct, accurate, and
6 complete. Well, sure.
7 I don't see the need for these statements.
8 They are sort of motherhood. Might as well at the end
9 add, "And we should all love each other very much."
10 It's irrelevant.
11 MR. AGGARWAL: I totally agree with you,
12 they are motherhood, but this is one of the guidance
13 -- that your mother telling you all the time, "Brush
14 your teeth" every day, and sometimes twice.
15 MEMBER APOSTOLAKIS: My mother was right.
16 MR. AGGARWAL: And she's right. And I
17 think on that point of view we have to --
18 MEMBER APOSTOLAKIS: I didn't expect this
19 answer, but maybe that's --
20 (Laughter.)
21 Now, there is another one here that
22 puzzles me. On 2.3.1, page 6, system features, second
23 paragraph. Physical and logical access control should
24 be based on the results of risk analysis. Wow. What
25 results are these? Who produces them? Especially in

1 light of the fact that two pages before, in Annex F,
2 you make it very clear that the NRC does not endorse
3 the concept of quantitative reliability goals as a
4 sole means.
5 The NRC's acceptance of the reliability of
6 computer systems is based on deterministic criteria.
7 Quantitative reliability determination can be an add-
8 on but not the sole basis, which is fine. But this
9 sentence here confuses me. What results -- what kinds
10 of risk analysis are these that will tell you what the
11 physiological access control should be? I don't
12 understand this sentence. I'm not really sure it's
13 needed.
14 Does anybody do risk analysis that help
15 you in this context? And, if so, who are these
16 people? I mean, what kind of analysis are they doing?
17 I mean, we have a whole project trying to understand,
18 you know, software and I&C failures and probabilities,
19 and all that. I mean, if these guys have done it,
20 might as well know about it.
21 MR. CHIRAMAL: Actually, the risk analysis
22 is more of a qualitative type of risk, which says that
23 if you fail -- if the system fails, what's the
24 consequence of it?
25 MEMBER APOSTOLAKIS: As you know, in this

1 agency, when we say "risk analysis," what we really
2 mean is PRA. So if you mean something else, you'd
3 better be explicit.
4 MR. CHIRAMAL: Okay.
5 MEMBER APOSTOLAKIS: Change the words
6 "risk analysis" to, you know --
7 MR. CHIRAMAL: Qualitative --
8 MEMBER APOSTOLAKIS: Failure modes and
9 effects analysis, or evaluating consequences. Then it
10 would be fine, because, you know --
11 VICE CHAIRMAN SHACK: Except there is an
12 IEEE Standard that says risk analysis.
13 MR. WATERMAN: Well, yes. I think in this
14 term here we're talking about susceptibility and
15 consequences.
16 MEMBER APOSTOLAKIS: Yes. So why don't we
17 say that, then?
18 MR. WATERMAN: Person gaining access to
19 it, because at the time that we wrote this, NEI-0404
20 hadn't come out yet. So --
21 MEMBER APOSTOLAKIS: Anyway, do you
22 disagree with me?
23 MR. WATERMAN: The risk analysis here is
24 qualitative risk analysis. What happens if you have
25 a system, and somebody gets into the system? How do

1 we protect that system? Eric Lee is here from NSIR,
2 and he can provide a much more clarifying discussion
3 on that.
4 MR. LEE: Eric Lee from NSIR. I think if
5 I do remember correctly about that particular
6 statement that you are making, the risk that you are
7 talking about there is security risk. And you are
8 trying to semi-qualitatively estimate the -- what the
9 -- I guess risk. You want to look at the -- what are
10 the consequences associated with that, and also look
11 at the -- what might be the susceptibility as he was
12 saying, to see what the -- you know, combine those two
13 to get risk.
14 And as -- I don't know if you are aware or
15 not, we have developed this risk I guess assessment
16 method, where you could use this to semi-qualitatively
17 estimate what the risk might be.
18 MEMBER APOSTOLAKIS: Not quantitatively.
19 MR. LEE: Semi-qualitatively.
20 MEMBER APOSTOLAKIS: Yes, you're not --
21 MR. LEE: Quantitatively.
22 MEMBER APOSTOLAKIS: You're not going to
23 give me a contribution to CDF, are you?
24 MR. LEE: I'm sorry?
25 MEMBER APOSTOLAKIS: You are not going to

1 give me a contribution to CDF.

2 MR. LEE: No. No, no.

3 MEMBER APOSTOLAKIS: Anyways, all I'm

4 saying is that this statement is ambiguous. All you

5 had to do is explain what you mean. What you mean is

6 fine with me.

7 MR. AGGARWAL: We will make appropriate

8 changes.

9 MEMBER APOSTOLAKIS: Yes. I don't dispute

10 that there is something there that is helpful. It's

11 just that when you say "results of risk analysis," my

12 mind goes to, you know, risk analysis.

13 MR. AGGARWAL: Good point. We will make

14 a couple of changes.

15 MEMBER APOSTOLAKIS: Okay. Now, there is

16 -- oh, now I remember. The title, of course, is

17 "Criteria for Use of Computers in Safety Systems." So

18 you are talking -- you are following the traditional

19 safety versus non-safety-related thing. Well, we have

20 all this 50.69 now that allows us to have a two-way

21 categorization.

22 Why don't you allow for this somewhere,

23 that if somebody -- I mean, there may be a safety

24 system that is of very low risk significance, in which

25 case it belongs to Category 3 in 50.69. And maybe

1 that should affect the criteria, too, shouldn't it?

2 MR. CHIRAMAL: Well, for example, if you

3 -- if somebody wants to get a modem connection to

4 safety system equipment to track its failure or

5 something, this -- it will be under access control

6 that that --

7 MEMBER APOSTOLAKIS: But what if that

8 system is safety-significant -- safety-related, but of

9 low safety significance? You know, there is four

10 categories that the agency has approved.

11 MR. CHIRAMAL: Right, right, right, right.

12 MEMBER APOSTOLAKIS: Risk 1, 2, 3, 4.

13 MR. CHIRAMAL: Right.

14 MEMBER APOSTOLAKIS: Then, maybe they

15 don't want to do that. And what you are doing right

16 now is you are telling them, "You must do this, unless

17 you want to submit a request to go on the 50.69 and,

18 you know, go through the whole works." But since

19 50.69 is a rule now, maybe some recognition of that

20 fact should be --

21 MR. CHIRAMAL: Well, the thing is,

22 internal communication within the safety system,

23 there's an internal bus, if it's -- a lot of digital

24 equipment in the design of the plant -- and there will

25 be internal communication buses of safety systems. So

1 if you make one level to -- one access, it can affect
2 the rest of the safety system.
3 MEMBER APOSTOLAKIS: There may be safety
4 systems that are not risk-significant.
5 VICE CHAIRMAN SHACK: No. But he's
6 arguing that if a safety-significant -- a safety
7 system is on the same bus, even though that system
8 itself isn't significant, you've gained access to --
9 MEMBER APOSTOLAKIS: Because it may
10 affect --
11 VICE CHAIRMAN SHACK: Yes.
12 MEMBER APOSTOLAKIS: Oh, really.
13 VICE CHAIRMAN SHACK: Your argument would
14 work if it was, in fact, in isolation.
15 MEMBER APOSTOLAKIS: Are you sure, though,
16 that this is true for all safety-related systems? I
17 mean, in light of 50.69. Because 50.69 was really a
18 major rule. I mean, especially if you look at the
19 percentage of safety-related systems, the overwhelming
20 majority turned out to be of low risk significance.
21 So they are relaxing also some requirements, except
22 for these.
23 MR. CHIRAMAL: That's why Taiwan people
24 came to make a comment, because they have advanced
25 boiling water reactor, which has the communication bus

1 for the safety system, and that has potential
2 vulnerability because of connections to the outside
3 world.
4 MEMBER APOSTOLAKIS: Are you saying, Matt,
5 that 50.69 has no place here? I'd like to understand
6 that better. I mean, I agree with your examples you
7 are giving me, but I'm giving you a more general
8 comment.
9 MR. CHIRAMAL: Yes. Well --
10 MEMBER APOSTOLAKIS: 50.69 is a major
11 rule.
12 MR. AGGARWAL: No, I realize -- but in the
13 electrical and I&C area, I cannot turn it all the way
14 down. When you talk about qualification, they still
15 take the position that all safety-related equipment
16 must be qualified.
17 MEMBER APOSTOLAKIS: I understand the
18 position. The question is whether it's a reasonable
19 position.
20 (Laughter.)
21 I mean, that's why the agency issued
22 50.69, Satish. I mean, it was -- I don't know how
23 much you known about that, but it was a --
24 MR. AGGARWAL: I know, I know.
25 MEMBER APOSTOLAKIS: -- an agonizing time

1 for some people, because safety-related systems and
2 structures and components are safety-related. You
3 shouldn't touch them. And yet, finally, the agency
4 did approve 50.69, and I'm wondering why you are not
5 making any reference to it.
6 MR. WATERMAN: Well, I think within the
7 area of security, 50.69 deals with accidents, things
8 that accidentally happen, accidentally fail, randomly
9 fail. In the area of security, you're not dealing
10 with accidentally happened. You're dealing with
11 intentionally happened.
12 Somebody goes in there, deliberately tries
13 to destroy your system. So if you say, "Well, we'll
14 risk-inform this part of the safety system isn't very
15 important," essentially aren't you saying that, "Well,
16 we'll provide somebody with an avenue to attack
17 everything else that's connected to it?"
18 MEMBER APOSTOLAKIS: Well, I'm not
19 suggesting --
20 MR. WATERMAN: Well, you can't do that on
21 a secure -- in security. You can do that fine when
22 you say, "Well, this is not risk-significant, because
23 a plant can weather an event," if you will.
24 MEMBER APOSTOLAKIS: But your first --
25 MR. WATERMAN: Because that particular

1 system failed. Whereas, in security, what you have to
2 be concerned with is making sure that people do not
3 have avenues of attack that affect --
4 MEMBER APOSTOLAKIS: Well, that's your
5 second part of the Guide. The first part is not
6 security-related.
7 MR. AGGARWAL: Right, right. I understand
8 that you are addressing the first one.
9 MEMBER APOSTOLAKIS: Yes.
10 MR. AGGARWAL: Well, the basic problem is
11 that --
12 MEMBER APOSTOLAKIS: 50.69 has nothing to
13 do with security.
14 MR. CHIRAMAL: See, the thing is, in the
15 electrical and I&C there are two trains and four
16 channels. And each train supplies the train one of
17 all categories of safety systems. So if it's Category
18 1, 2, 3, or 4, since it's connected to 1, that will be
19 the one that will -- it's the one that's most
20 vulnerable to it.
21 MEMBER APOSTOLAKIS: I don't know. So
22 you're saying the concept of low risk significance
23 does not apply here? I don't know. Maybe the guys
24 from Utility can tell us.
25 MR. WATERMAN: The Reg. Guide is written

1 in general terms to apply to any system. It would be
2 impractical for us to single out risk-significant
3 versus non-risk-significant in the Reg. Guide, such
4 that, you know, it's up to the licensee to make a
5 decision what's risk-significant and not risk-
6 significant.
7 MEMBER APOSTOLAKIS: So what you are
8 telling them is that they should --
9 MR. WATERMAN: We have to provide
10 guidance.
11 MEMBER APOSTOLAKIS: -- 50.69 would have
12 to be a separate request from --
13 MR. AGGARWAL: Exactly. They are to make
14 an application and ask for exception. And I might say
15 this is not particularly for this Reg. Guide. That's
16 what we are doing with every Reg. Guide.
17 MEMBER BONACA: You still have the title
18 to the safety systems. I mean, you are making a
19 distinction between --
20 MR. AGGARWAL: Yes.
21 MEMBER BONACA: -- that and others. And
22 I really wonder about, you know, given the fact that
23 so much of the software is interconnected, at least
24 within the plant, and the concern -- one concern also
25 was the one of access or -- but even if you have not

1 -- does it make sense to limit the applicability of
2 this Reg. Guide to just safety systems?
3 MR. WATERMAN: Well, that's all we
4 regulate is safety systems.
5 MEMBER BONACA: I understand.
6 MR. WATERMAN: You know, that's why the
7 standard has words to that effect in the title of the
8 standard also, is because that's the only thing we
9 actually regulate.
10 MEMBER BONACA: I understand that. I'm
11 saying that, however, you know, if you had a way of
12 affecting safety systems by tinkering somewhere, or
13 making it possible with no safety systems, you would
14 want to have some firewall there or some protection
15 that assures that.
16 MR. WATERMAN: Absolutely. Yes. As a
17 matter of fact, NEI has proposed a process whereby you
18 -- it looks sort of like a bull's-eye, where all of
19 your safety systems are on the innermost level of
20 security, very high secure and they only have one-way
21 communication out, which would be like blind transmit
22 if you will.
23 You just dump your data into a dual-port
24 RAM or something like that, and anybody who wants to
25 use it can access that data off of the RAM, but they

1 can't acknowledge or anything back to the safety
2 system.
3 MEMBER BONACA: So you do have --
4 MR. WATERMAN: And then, the next level
5 out would be I think -- you know, anyway, that's one
6 philosophy is you isolate everything with it, behind
7 very rigid barriers. And as things become less
8 important, you isolate them less and less, and you
9 control the path of your communications.
10 We're getting into a security area that I
11 don't want to talk about, if you don't mind.
12 MR. LEE: If I may, I could say that the
13 NRC has developed the cyber security self-assessment
14 method, and they're using that as a base. NEI has
15 developed cyber security program to address the safety
16 and non-safety systems.
17 We are in the process of working with them
18 to do that review and try to implement the cyber
19 security program into the nuclear powerplants. And
20 that will address the systems that could adversely
21 impact safety, security, and the emergency
22 preparedness of the nuclear powerplant. But we are
23 right now working to implement that.
24 MEMBER BONACA: Okay. Yes, thank you.
25 MEMBER DENNING: Let me ask a question

1 about the implementation of this in terms of what did
2 -- obviously, you feel some urgency, particularly in
3 the cyber security area, to get this out, to make it
4 available to the utilities. But, you know, we say
5 that there's no backfitting intended. What's the
6 assumption here as to when -- you know, who is really
7 going to use?
8 I mean, you're not thinking about future
9 plants, obviously. We had an earlier one that was
10 already entered towards future plants, though, that
11 could happen down the line. How is a utility that
12 currently has computers in its safety systems, or is
13 going to put additional computers in the safety
14 systems, how is he -- how is he going to use this? Or
15 is it likely he is going to use this? And are you
16 going to use it in some sense for regulatory
17 enforcement? How do you use it? I guess --
18 MR. AGGARWAL: My expectation is that he
19 should be using it. With regard to the staff, we
20 cannot go back and ask them, why you are not using?
21 But, certainly, when they make some recommendation to
22 us as to what they are doing, we can ask the question
23 that -- do you meet the guidance provided in Reg.
24 Guide 1.152?
25 So what I'm saying that I --

1 MEMBER DENNING: No, I don't. But --

2 MR. AGGARWAL: Okay. Then, so what --

3 then, you know, we'll ask more questions.

4 MEMBER DENNING: What currently -- what

5 does he currently have to comply with with regards to

6 cyber security? Is it -- is there already something

7 established that he has certain requirements based --

8 that -- in his safety basis that he has certain

9 requirements he has to meet relative to cyber

10 security?

11 Or is this all new, and it has all come in

12 after -- after the safety basis has already been

13 established? And so it's a question of, do you

14 actually do a rulemaking and force changes, or do you

15 just hope -- you know, provide guidance and hope that

16 they will do the same thing? What's our current

17 safety --

18 MR. AGGARWAL: Yes. The current position

19 is that some of the information I have pointed out to

20 you earlier came out of the standard review plan, or

21 piece by piece to different licensees, and so on.

22 This is the first formal channel that the agency is

23 telling the licensee that if you do this, this is an

24 acceptable method, and --

25 VICE CHAIRMAN SHACK: What is the branch

1 technical position? Since you said it came from that.
2 What do you do with a branch technical position?
3 MR. AGGARWAL: That branch technical
4 position is for the staff, not for the industry, and
5 that does not receive public comment. This is the
6 first formal document which goes out to the public for
7 public comment. And when the Guide is issued, the
8 expectation of this staff is that industry will use --
9 and our experience is that they essentially use it.
10 Not only that, my expectation is that when
11 the standard is revised again, most of this
12 information will be carried over, and more, in the
13 standard.
14 MEMBER DENNING: So you really don't have
15 much of a stick. You don't have much of a
16 regulatory --
17 MR. AGGARWAL: No, not at all.
18 MEMBER DENNING: -- stick. But by putting
19 out this guidance --
20 MR. AGGARWAL: That was taken away when
21 the backfit rule was published, you know, essentially.
22 In my 25 years, I don't recall that we have made any
23 case of adequate safety and potential requirement.
24 And if we do, we have to go to process of rulemaking.
25 Again, the bottom line is Regulatory

1 Guides are simply guidance. It is one acceptable
2 method to the staff, and in this particular case it is
3 voluntary.
4 MR. CHIRAMAL: Let me clarify that a
5 little bit. 50.54H --
6 MR. AGGARWAL: 50.54H? Are you talking
7 about the 603 endorsement?
8 MR. CHIRAMAL: No, it says -- I think it's
9 50.54H. I'll doublecheck that -- requires that any
10 design after 1985 has to meet the requirements of SRP.
11 They don't need it as guidance, but if they don't meet
12 it, they've got to justify why they don't meet it. So
13 what's in the SRP is part of the -- it's like a Reg.
14 Guide.
15 MEMBER DENNING: As the SRP was at that
16 time.
17 MR. CHIRAMAL: Yes, at that time.
18 CHAIRMAN WALLIS: Well, I think we've
19 touched on this before. This SRP has -- this guidance
20 has the problem that lots of these guidances have,
21 that they say you should do all these things, but they
22 don't tell you how well you should do them. And the
23 reviewer doesn't have guidance about how they have to
24 be done.
25 Just like saying that your house has to

1 have a lock on its door. But it doesn't say anything
2 about how good the lock has to be, and how, you know,
3 difficult it should be to pick it, and should you have
4 two locks, and, you know, how many different
5 interlocked things should you have, and what kinds of
6 forces should it resist. That's not in here at all.
7 So you have to have a lock on your door,
8 but how do we know how good that lock has to be.
9 That's I think the difficulty with this whole
10 guidance.
11 MR. AGGARWAL: Well, at times, we have to
12 take a position when we can only tell of our wishes.
13 And in your example that those should be locked, and
14 if you cannot open it from outside, one would consider
15 that you have implemented that wish. I mean, we
16 cannot tell them that they should have infrared
17 indicators inside, or other protective devices.
18 But, you know, my point is, again, that
19 choice of not doing nothing as opposed to doing
20 something, we have taken that --
21 CHAIRMAN WALLIS: That has stopped.
22 MR. AGGARWAL: Exactly.
23 MEMBER APOSTOLAKIS: When you -- the IEEE
24 Standard, Section 5.4, addresses equipment
25 qualification. At which point -- there are several

1 subsections to this. At which point does one do the
2 environmental qualification?
3 MR. AGGARWAL: It makes a reference to
4 3.23, right?
5 MEMBER APOSTOLAKIS: Yes.
6 MR. AGGARWAL: And 3.23 is addressed by
7 Reg. Guide 1.89.
8 MEMBER APOSTOLAKIS: So it's a different
9 Regulatory Guide.
10 MR. AGGARWAL: And we, as a point of
11 information, will be coming soon with a revision to
12 that Reg. Guide. That Reg. Guide was written by me,
13 if you remember, in '83 timeframe. So it is 20-plus
14 years old, so we want to update that.
15 MEMBER APOSTOLAKIS: So you don't feel
16 that there is a need to be explicit about the --
17 MR. AGGARWAL: Not at this time, because
18 the qualification, as I indicated earlier, that if the
19 staff has some regulatory position in the Reg. Guide,
20 the qualification -- or the environmental
21 qualification, then that is applicable.
22 MEMBER APOSTOLAKIS: Okay. Are there any
23 other comments from the members or the staff? Oh,
24 this one where -- yes, I wanted to -- now that Mr.
25 Sieber is back, there is a statement here that -- on

1 Section 2.1, concepts phase, the last sentence says,
2 "Remote access to the safety system should not be
3 implemented. Computer-based safety systems may
4 transfer data to other systems through one-way
5 communication pathways."
6 Now, Jack, you told us that there isn't
7 such a thing, or there isn't one way. If it's one
8 way, then it's the other way, too. So I wonder
9 whether you agree with the statement. It is on page 5
10 of the Guide --
11 MEMBER SIEBER: Okay.
12 MEMBER APOSTOLAKIS: -- under 2.1,
13 Section 2.1.
14 MEMBER SIEBER: Okay. Let me find it.
15 CHAIRMAN WALLIS: Can I give you this one
16 here?
17 MEMBER SIEBER: Yes, that would be
18 helpful.
19 MEMBER APOSTOLAKIS: Concepts phase, the
20 last paragraph, which is really two lines. So whom do
21 I believe, you or them? It's on page 1.152-5.
22 MEMBER SIEBER: Yes. Yes, I've got it.
23 I'm reading it.
24 MEMBER APOSTOLAKIS: Well, other people
25 are looking.

1 MEMBER SIEBER: I suspect that what they
2 have here is adequate. You know, it satisfies the
3 basic concern. It's just that most protocols require
4 --
5 MR. AGGARWAL: Exactly. Exactly.
6 MR. CHIRAMAL: Normally, when they
7 implement that design, they use a fiber optics
8 communication, and then the -- and then --
9 MEMBER SIEBER: Yes. But basically what
10 you're doing is just dumping data to some other
11 device, without the ability to come back in and send
12 along with it Trojan horses, viruses, worms.
13 MR. WATERMAN: And whatever uses it,
14 assumes the data is good. And if it's not good, well,
15 it --
16 MEMBER SIEBER: That's right.
17 MEMBER APOSTOLAKIS: Just trying to learn
18 here. You said there are reasons for doing it. But
19 if it's --
20 MEMBER SIEBER: I'm not aware of any
21 protocol that's used in commercial systems that's one
22 way. Okay? It's usually a handshake kind of a deal.
23 You ask for something --
24 MEMBER APOSTOLAKIS: It is not worth the
25 paper that --

1 MEMBER SIEBER: -- physically possible for
2 it to be one way, and it, in fact, can serve a
3 purpose. The question is: do you want to rely on it
4 for any -- any purpose?
5 MR. WATERMAN: For any purpose, yes.
6 CHAIRMAN WALLIS: Well, in the event of a
7 major accident at the plant, is there a response
8 center that's here? They would want to get access to
9 what's going on in the plant, presumably. Would they
10 not be able to because of this?
11 MR. WATERMAN: They would probably be
12 gaining access to post-accident monitoring
13 instrumentation, which generally is not out of your
14 safety-related system itself.
15 MEMBER SIEBER: And a lot of plants now
16 have one-way links to the plant data logging.
17 CHAIRMAN WALLIS: And one way would be
18 adequate in this situation?
19 MEMBER SIEBER: Well, you'd get the data.
20 MR. WATERMAN: And you just have to trust
21 it was transmitted clean.
22 MEMBER SIEBER: That's right.
23 MR. WATERMAN: You know, it's just one of
24 those things.
25 MEMBER SIEBER: And it will come in a

1 certain pre-prescribed protocol.

2 MR. AGGARWAL: Yes, exactly.

3 MEMBER SIEBER: You're going to get it in

4 a certain order, and that's --

5 CHAIRMAN WALLIS: You get the data, but

6 you can't do anything with it. You can't operate

7 anything.

8 MEMBER SIEBER: No, you can't, not if it's

9 one way.

10 MR. AGGARWAL: The other communications is

11 in part to be in that scenario, to talk to the plant.

12 MEMBER SIEBER: The question really comes

13 to, what do you do with things like the programmer's

14 console, you know, because there is maintenance that

15 you have to do, there is software adjustments that you

16 have to do. Do you put that in a room that's under

17 lock and key because it has to be two-way?

18 MR. AGGARWAL: Sure, right.

19 CHAIRMAN WALLIS: You may need some

20 customer service. I mean, if the thing isn't working,

21 you may want to get someone who actually installed it

22 from -- to give you some advice about it.

23 MEMBER SIEBER: Yes. And the vendors all

24 seem to want to do it remotely from their shop using

25 PC-Anywhere, or something like that. And I think that

1 that's a -- not a great idea. Some people go to the
2 extent of having an unlisted dial-up number, and use
3 a data modem, you know, an acoustic one, which I think
4 is also a mistake.
5 MEMBER APOSTOLAKIS: Any other comments?
6 DR. WOOD: Actually, I have a comment, if
7 I may.
8 MEMBER APOSTOLAKIS: Sure. I was actually
9 -- I meant members, but -- do the members have any
10 more comments? Okay. Now you can speak.
11 DR. WOOD: Okay. I'm Richard Wood, member
12 of the public who submitted a public comment. And I
13 wanted to ask for a clarification on the resolution of
14 that comment. It's --
15 MEMBER APOSTOLAKIS: Which comment was
16 this? Can you tell us, sir?
17 DR. WOOD: Well, in the resolution of
18 public comments, I think it's Item Number 47.
19 MEMBER APOSTOLAKIS: Okay. Page 11.
20 DR. WOOD: In the response, it states that
21 computers are located in mild environments, and,
22 therefore, the traditional qualification processes
23 cannot be applied. And the clarification I wanted was
24 in the mid '80s and early '90s when Eagle 21 and
25 SpecMicro 200 were licensed, and one of the bits of

1 evidence that was considered were the qualifications
2 under IEEE 323-1974, were those processes that
3 couldn't be applied.
4 And I guess the other question is, in the
5 standard review plan, where it gives guidance to the
6 reviewer, and says for I&C systems in mild
7 environments the reviewer should ensure that the
8 processes of IEEE 323 are followed, is that also
9 asking the reviewer to look for something that cannot
10 be applied?
11 And when the Triconix system, Tricon, and
12 the Common Q system from Westinghouse, and the
13 Telepharm system from Framatone were reviewed for
14 certification, and their qualification, according to
15 IEEE 323 program were reviewed, were those also things
16 that could not be applied?
17 MR. AGGARWAL: The explanation is that
18 George had pointed out earlier, that the topic of
19 qualification will be addressed in Reg. Guide 1.89.
20 MEMBER APOSTOLAKIS: I was wondering why
21 you didn't say that here in your response.
22 MR. AGGARWAL: Well, right now, we are
23 going to make a -- well, we could add that, but that
24 is implicit. We are going for a public meeting on
25 that topic, because we want to define the scope of the

1 Reg. Guide in terms of the harsh environment and mild
2 environment. And also, there were some sound reasons
3 to -- contrary in the Reg. Guide 1.89, which we think
4 do not apply.
5 The issue related to the TID source term
6 as versus the new term, so it is all almost new
7 different topic, and this is the agency position --
8 that the issue related to that will be addressed in
9 the Reg. Guide 1.89, or another Reg. Guide.
10 MEMBER APOSTOLAKIS: It would be nice to
11 say something about that here, because the response is
12 very different. It says that it's a non-issue. Is
13 that what it says?
14 DR. WOOD: Well, if I may -- yes, it says
15 it's a non-issue. But what prompted the comment was
16 there is an existing staff position that's articulated
17 in the standard review plan, and that has been in
18 effect and in practice. And that position is relaxed
19 by the acceptance of this -- of this version of the
20 standard, because of the wording change. It's a
21 subtle wording change, but it effectively relaxes the
22 position.
23 And I've seen no technical justification
24 for relaxing that position. And maybe that will be
25 corrected in a new Reg. Guide, but my question is:

1 why is there no technical justification for relaxing
2 the position with the issuance of this guide?
3 MEMBER APOSTOLAKIS: Is that a conscious
4 decision to --
5 MR. AGGARWAL: No, it is our position that
6 there is no relaxation. Our position will remain as
7 it was, and the standard is not saying anything
8 different. It is how you read on making
9 interpretations of a given sentence.
10 Our position is clear: Reg. Guide 1.89
11 currently covers equipment located in a harsh
12 environment only. But the staff is considering either
13 a new Reg. Guide for mild environment or make it part
14 of the Reg. Guide 1.89. The bottom line is that if
15 their qualification issue is related to computers,
16 that they will be addressed in the Reg. Guide.
17 And all the standard here is saying, that
18 go back and look at 323, which is, you know, with
19 respect to Regulatory Position 3 we are telling that
20 if we start with the position, then you will follow
21 that.
22 MR. KEMPER: My name is -- this is Bill
23 Kemper. If I could interject something here for a
24 moment, Richard. This committee has reviewed Draft
25 Guide 1077 sometime ago, which was specifically

1 designed to cover the qualification -- environmental
2 qualification requirements of computer-based, safety-
3 related systems.
4 The result of that, when it went out for
5 public comment, we got quite a bit of comments back on
6 that, which caused us to reconsider our position, and
7 we have changed it -- revised it dramatically. And,
8 in fact, it's in the process now to come back to this
9 committee for another review assuming that we get
10 complete concurrence from all of our counterparts on
11 this -- this is the approach we want to take.
12 So right now that vehicle is on track to
13 come through this committee and ultimately address
14 your question.
15 MR. AGGARWAL: Well, in summary, my
16 position is that this Standard 7-4.3.2 takes you back
17 to IEEE 323, and it is the staff's position that we do
18 not need any relaxation in this standard. Issues
19 related to mild environment is the subject matter of
20 another Reg. Guide, and if any clarification is needed
21 at that time we'll do so.
22 DR. WOOD: If I may, 7-4.3.2 doesn't
23 mention 323. It's mentioned in 603.
24 MR. AGGARWAL: Yes, that's right.
25 DR. WOOD: But the definition of equipment

1 qualification, which is the topic of this subject,
2 relates to environmental qualification. But the
3 guidance that is now in 323 -- I mean, 7-4.3.2-2003
4 changes the terminology from equipment qualification
5 to computer qualification testing, and gives a
6 definition which is more akin to acceptance testing
7 than qualification testing. And that's the concern.
8 And all I was asking in the public comment
9 is, first, note that there has been a change; and,
10 second, give a technical justification for why that is
11 acceptable. And I didn't see either.
12 MR. AGGARWAL: Well, the statements just
13 made are totally correct. If you look in the
14 Standard 5.4 of the 603, it references 603 and 623,
15 which is also part of our regulation, which is
16 incorporated by reference. So 603 is of our
17 regulation, and a Reg. Guide cannot override the
18 regulation. So the licensee, then -- 50.49 again
19 required qualification.
20 Again, I repeat, and I do not want to go
21 -- we see to go on a tangent -- the staff position is
22 clear. We do not see the standard has a relaxation.
23 And if their issue is pertaining to qualification of
24 computer, we will address it in the Reg. Guide which
25 is coming. So if we are taking a position that there

1 is no relaxation, then I'm not going to give you a
2 technical justification. I will only give -- and I
3 will concede that there is a relaxation.
4 MEMBER SIEBER: It sort of sounds like
5 there is confusion in the definition of terms. Is
6 that correct?
7 MR. AGGARWAL: No. If you go back to the
8 IEEE Standard 7-4.3.2-2003, 5.4, it says in addition
9 to qualification criteria, the requirement listed in
10 5.4.1, 4.2, are necessary. And it is referring to
11 603.98, which dates back to 623.
12 MEMBER SIEBER: Okay.
13 MR. AGGARWAL: So ultimately -- and if you
14 go back to our Position 3, it tells you that if the
15 staff has issued a Reg. Guide on a particular
16 standard, the -- this is expected to meet the
17 requirement. I mean, this way I can sit here and
18 discuss 200 different standards which are mentioned
19 here, but this is not the proper place.
20 MEMBER SIEBER: I'm just thinking of the
21 poor design engineer who has to weed through all of
22 this to find out what he is supposed to do.
23 MR. AGGARWAL: Some of the old-timers are
24 still around, and we are trying to train as many
25 people as we can in terms of the standard development,

1 and so on.

2 MEMBER APOSTOLAKIS: Your response,

3 though, could have been a little clearer -- that you

4 don't believe there is a relaxation. I mean, I would

5 stop that --

6 MR. AGGARWAL: There is --

7 MEMBER APOSTOLAKIS: Yes, there is no

8 relaxation. That would have been that way. Any other

9 comments from the public or the staff?

10 Mr. Chairman, 16 minutes before the

11 allotted time.

12 CHAIRMAN WALLIS: Thank you very much.

13 MEMBER APOSTOLAKIS: Thank you very much,

14 gentlemen.

15 CHAIRMAN WALLIS: Staff and public

16 comments?

17 MR. AGGARWAL: My only observation is that

18 we are only making one change in that one sentence,

19 which, George, you pointed out.

20 MEMBER APOSTOLAKIS: And tell me again

21 what sentence that is.

22 MR. AGGARWAL: Well, you pointed it out in

23 the Reg. Guide, so we will put some clarifying words

24 in there.

25 MEMBER APOSTOLAKIS: Oh, yes, yes, yes.

1 MR. AGGARWAL: 1.152, page 6, right?

2 MEMBER APOSTOLAKIS: It all came back now,

3 yes. And I must note that, as a result of Mr.

4 Sieber's advice, I read D, implementation, and I --

5 and I guess it's a standard sentence -- no backfitting

6 is intended.

7 MR. AGGARWAL: Which you will find in

8 every Reg. Guide.

9 MEMBER APOSTOLAKIS: But you guys are not

10 saying the other stuff, that this is intended for new

11 reactors.

12 MR. AGGARWAL: No. It does say that, too,

13 that you --

14 MEMBER APOSTOLAKIS: I know, I know.

15 We're not.

16 CHAIRMAN WALLIS: So how many times in our

17 last presentation did you object to backfitting when

18 it's a standard format they always have to use that --

19 MEMBER APOSTOLAKIS: I still object.

20 (Laughter.)

21 I think it's the wrong thing to put in

22 there. The thing about this Committee is that we are

23 not bound by tradition. It's pure logic.

24 (Laughter.)

25 CHAIRMAN WALLIS: Okay. George, are we

1 through with this one?

2 MEMBER APOSTOLAKIS: I said 16 minutes,

3 and I didn't hear any praise.

4 CHAIRMAN WALLIS: It's now 15. Well, I

5 have --

6 MEMBER DENNING: Others were able to do a

7 half an hour or better, George.

8 CHAIRMAN WALLIS: You haven't given the

9 meeting back to me yet.

10 MEMBER APOSTOLAKIS: This guy had only six

11 minutes.

12 CHAIRMAN WALLIS: George, if you'd stop

13 speaking, I will congratulate you. George, are you

14 handing this back to me now?

15 MEMBER APOSTOLAKIS: Yes. I handed it

16 back three times. I am handing it back to you.

17 CHAIRMAN WALLIS: In that case, I

18 congratulate you on finishing before the due time by

19 15 minutes. We no longer need the transcript.

20 MEMBER POWERS: Mr. Chairman, could I

21 object, because it was an insufficient exploration of

22 the issue.

23 (Laughter.)

24 CHAIRMAN WALLIS: Are you serious in your

25 objection?

1 VICE CHAIRMAN SHACK: He can object. Let
2 him object.
3 CHAIRMAN WALLIS: We have finished with
4 the presentations, the formal presentations. We no
5 longer need the transcript. Thank you very much.
6 Since we are ahead of time and we no
7 longer have to meet the agenda time scale, we will
8 take a 15-minute break. We'll come back at 5:00. Not
9 at 5:15, 5:00. What I want to do then is to go
10 through the ACRS reports. We have six reports to
11 write. I'd like to know where we stand on each one of
12 them.
13 I propose to take them in the order in
14 which they are listed on the agenda. If we have
15 drafts, it would be very useful if you would make them
16 available to the members at the time of this --
17 whoever has a draft, maybe some of you have drafts,
18 I'd like to have them available.
19 The purpose is to go through and see if
20 there are major comments that the writer needs to have
21 in order to put them into the letter.
22 Thank you very much, staff. So we will
23 then take a break until 5:00.
24 (Whereupon, at 4:47 p.m., the proceedings
25 in the foregoing matter went off the record.)

CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission in the matter of:

Name of Proceeding: Advisory Committee on Reactor Safeguards 524TH Meeting

Docket Number: n/a

Location: Rockville, MD

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and, thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.

William Click

William Click
Official Reporter
Neal R. Gross & Co., Inc.

Donald C. Cook Nuclear Plant

License Renewal Presentation to ACRS

Richard Grumbir
Indiana Michigan Power Company
July 6, 2005

AEP AMERICAN ELECTRIC POWER
AEP: America's Energy Partner

Introduction

- Description of Cook Nuclear Plant
- Asset Management
- Ice Condenser containment
- System Walkdown
- TLAA
- Implementation
- Commitments

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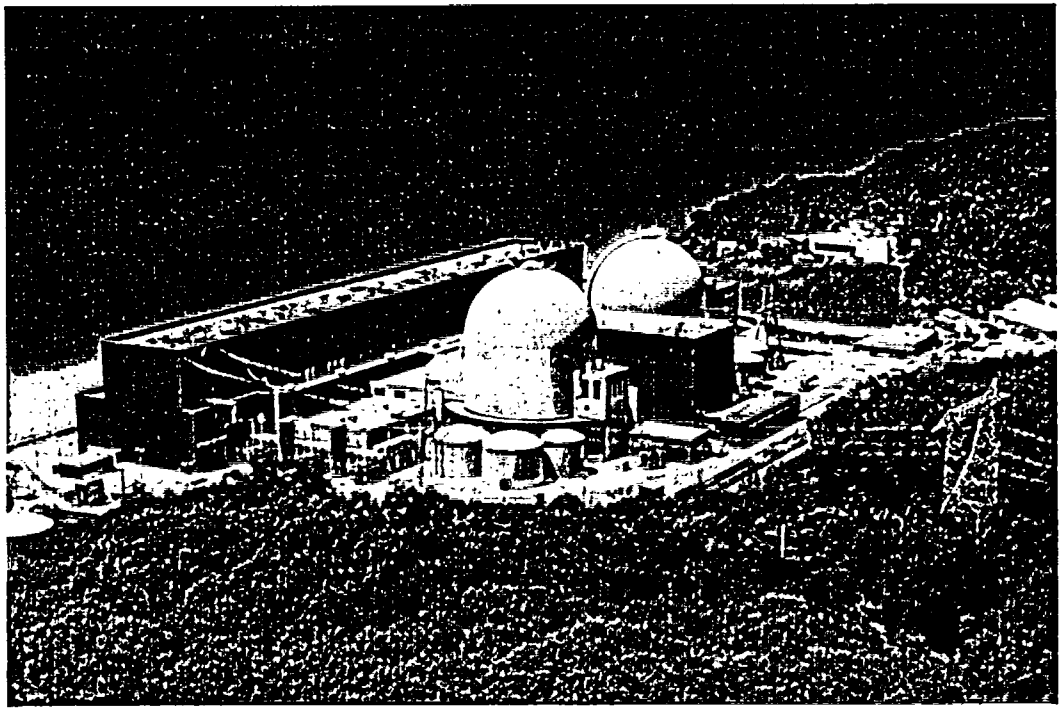
Description of Cook Nuclear Plant

- Located in southwest Michigan
- Westinghouse 4-loop PWR
- Initial operation 1974 (U1) & 1977 (U2)
- A/E AEP
- Ice condenser containment
- Unit capacity (MWt/MWe) –
  - Unit 1 (3304/1044)
  - Unit 2 (3468/1117)
- Four emergency diesel generators (2 per unit)
- Once-through cooling – Lake Michigan ultimate heat sink
- 18M fuel cycle



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Plant Improvements

Nuclear Asset Management plan through 2037

Completed

- Unit 2 S/G replacement – 1988
- Unit 1 S/G replacement – 2000
- Appendix K MUR Uprate – 2002/2003
- Reserve Aux transformers - 2002/2003
- Traveling Water Screens – 2005 (Innovative design – NEI-TIP award)
- Unit 1 Main Transformer - 2005

Future plans (under evaluation)

- Stretch Power Uprate
- Moisture Separator upgrades
- Unit 2 Main Transformer
- Main Generator rewinds

In Progress

- Conversion to ITS – 2005
  (ITS SER May, 2005; Implement Sept 2005)
- Supplemental diesel generators – 2005
- Reactor head replacement – 2006/2007
- GSI-191 Sump Strainers – 2006/2007
- Unit 1 Turbine rotor replacement – 2006
- INDUS Asset Suite - 2006
- Digital turbine controls – 2006/2007

Estimated completion dates – (Unit 1/Unit 2)

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Ice Condenser

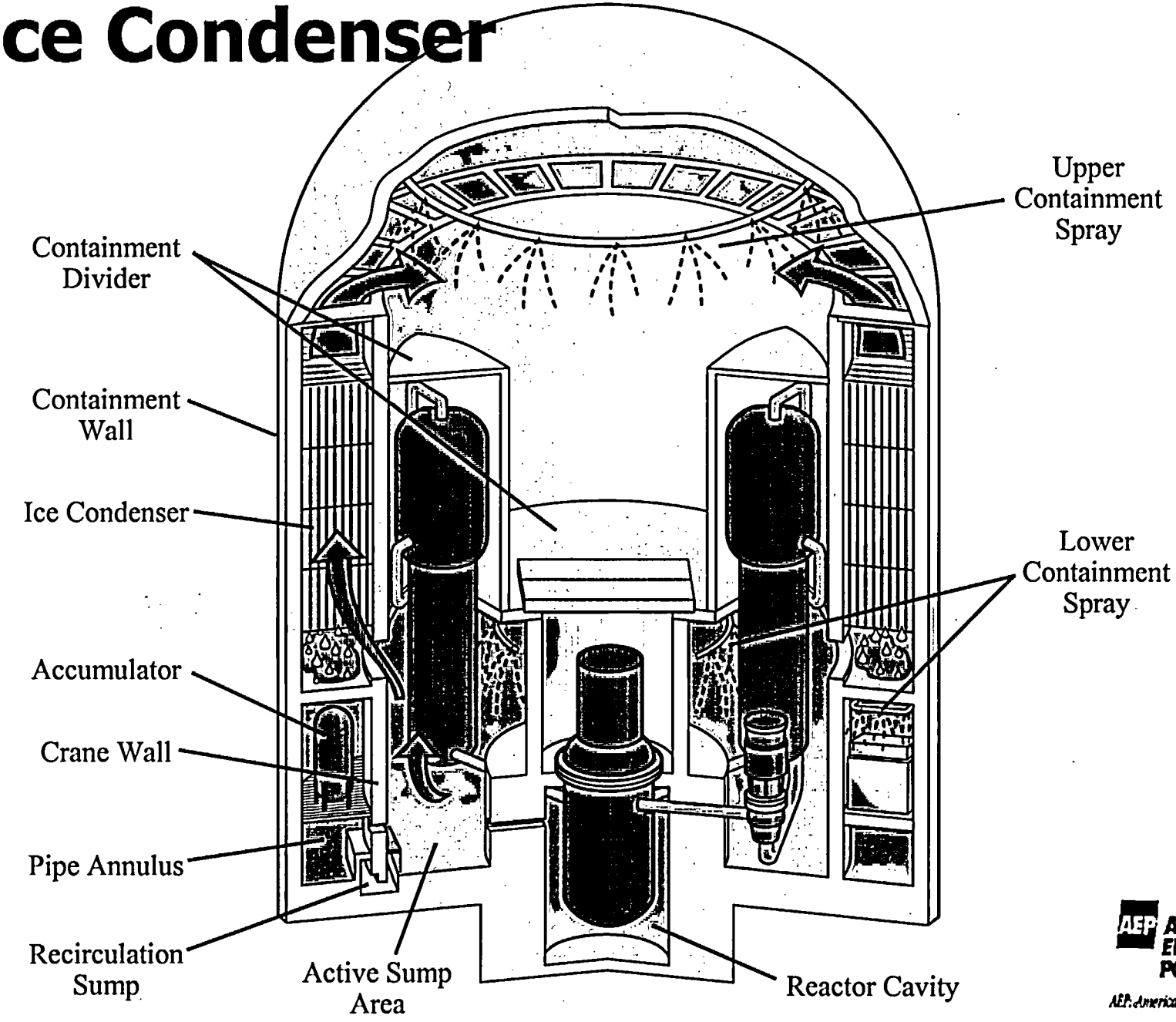
- **Major in Scope components**
  - Various deck doors, including frames
  - Turning vanes
  - Lower support structure
  - Wear slab and support slab
  - Curtains (intermediate & upper decks)
  - Bridge crane and supports
  - Fasteners
  - Ice baskets

Ice Condenser

- **Surveillances**
  - ice weight, boron concentration, pH
  - flow passages
  - doors (top deck, intermediate deck, lower inlet)
  - flapper valves
- **Maintenance activities**
  - ice basket emptying, inspection, refilling
  - flow passage cleaning
  - Doors, door seals, airbox inspections

- All procedurally driven

Ice Condenser



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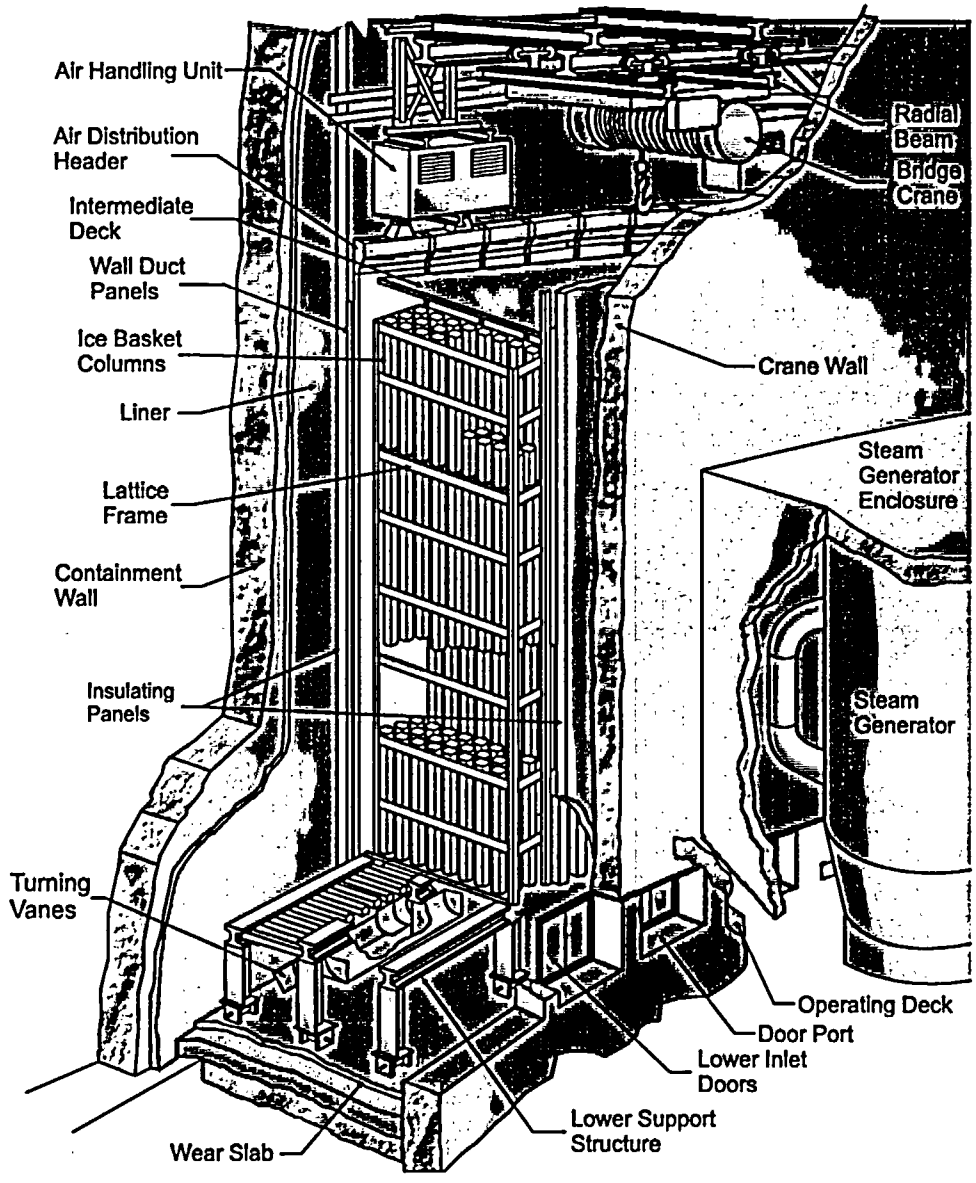
Ice Condenser



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System Walkdown Program

- **Scope and activities credited in LRA consistent with previous applicants**
- **Enhancements include:**
  - Emphasizing scope of walkdowns
    - nonsafety-related affect on safety-related
    - inspections of infrequently accessed areas
  - Changing environment conditions addressed
  - Administrative Controls
- **System Engineering Effectiveness**

Reactor Vessel Neutron Embrittlement

- TLAA used fluence values at 48 EFPY
- With a capacity factor of ~97% from now through the period of extended operation, Cook units will not exceed 48 EFPY
- 48 EFPY is acceptable for Cook
- Fluence values submitted in the LRA are conservative

Implementation

- **46 Total Aging Management Programs (AMPs)**
  - 18 Programs- No Enhancements
  - 16 Programs Require minor Enhancements
  - 12 New Programs
  - Draft procedures in review by site personnel
- **18 of 28 remaining AMPs ready by end of 2005**
- **Most remaining programs (after 2005) awaiting technology or industry developments**
- **Internal Goal- All AMPs ready by 2009**

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Commitments

- **LR Commitments tracked in both CNP's commitment management system (CMS) and the Corrective Action Program.**
  - Commitment implementation includes annotation in implementing procedures.
- **Commitment management program is consistent with NEI guidance (94-01)**
- **Implementation oversight attributes:**
  - Turnover plans include assignment of a LR program owner
  - Program owners have received LR training, participated in reviews of LRA, and supported NRC regional inspections
  - Closure of actions requires review by LR program owner
  - Most commitments scheduled to be implemented by LR project
  - Annotation of LR attributes being incorporated into procedures

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Closing Remarks

- LR process provided systematic opportunity to refine station processes to account for aging effects
- Implementation activities are on target for internal goal to be completed by 2009, five years prior to period of extended operation
- Commitments adequately being tracked for implementation
- I&M is committed to safe, reliable long-term operation of Donald C. Cook Nuclear Plant

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Advisory Committee on Reactor Safeguards (ACRS) License Renewal Full Committee

Donald C. Cook Nuclear Plant, Units 1 & 2 License Renewal Application

Safety Evaluation Report
July 6, 2005

Jonathan G. Rowley
Safety Project Manager

Overview

- Safety Evaluation Report (SER) with Open Items issued on December 21, 2004
  - Contained two (2) Open Items and two (2) Confirmatory Items
- Final SER issued on May 29, 2005
  - Open and Confirmatory Items resolved
  - Staff concluded that CNP LRA has met the requirements of 10 CFR Part 54

Section 2 Overview

(Structures & Components Subject to an AMR)

- Scoping and screening review results found that the structures, systems, and components within the scope of license renewal, as defined by 10 CFR 54.4(a) and those subject to an AMR, as defined by 10 CFR 54.21(a)(1), have been identified.
- Items brought into scope:
  - Insulation – Pipe and Penetrations
  - Emergency Diesel Generator (EDG) Exhaust Silencers
  - Auxiliary Feed Water (AFW) Suction Strainers
  - EDG Air distributor housings
  - Spent Fuel Pool (SFP) Makeup Supply – Refueling Water Storage Tank (RWST)

Section 3 Overview

(Aging Management Review Results)

Auxiliary System

- Open Item
  - Use of System Walkdown Program to manage aging effects on internal surfaces of 10 CFR 54.4(a)(2) component types.
- Issue resolution
  - The applicant provided information to demonstrate that, in addition to System Walkdown, aging effects on internal surfaces will be effectively managed by a combination of four additional AMPs:
    - Flow-Accelerated Corrosion
    - Service Water System Reliability
    - Water Chemistry Control
    - One-Time Inspection

Section 3 Overview

Flow-Accelerated Corrosion (FAC)

- Open Item
  - FAC Program basis for expansion of testing for wall thinning not consistent with GALL
    - GALL – measured wall thickness less than predicted
    - LRA – measured wall thickness less than threshold criteria
- Issue resolution
  - AMP revised to state consistent with GALL with exception regarding use of threshold value

Section 3 Overview

Service Water System Reliability

- Service Water System Reliability Program to be used to check for selective leaching during visual inspections.
- GALL recommends hardness testing or other acceptable physical test in addition to the visual inspection.
- The applicant committed to enhance the program to include hardness testing or an equivalent physical test.

Section 3 Overview

Buried Piping Inspection

- Multiple excavations of underground piping between Feb. 2001 and Feb. 2003 included carbon steel fire protection water and station drain water.
- CNP anticipates more digs and additional inspections between now and the period of extended operation of the same type of piping.
- Licensee committed to enhance the Buried Piping Inspection Program to require an inspection of in scope buried piping within ten years of entering the PEO, unless an opportunistic inspection has occurred within this ten-year period.

Section 3 Overview

- Below grade soil/water environment non-aggressive

Sample	Aggressive limits	Sample Date	DC Cook Sample Well 1A	DC Cook Sample Well 12
pH	<5.5	03/004/1976	6.4	7.8
		01/015/2002	7.1	7.4
Chloride (ppm)	>500 ppm	03/004/1976	20.3	9.7
		01/015/2002	10	12
Sulfate (ppm)	>1500 ppm	03/04/1976	18.1	310.3
		01/015/2002	134	67

Section 4 Overview

(Time-Limited Aging Analyses (TLAA))

- Applicant and staff calculations demonstrate the Charpy Upper Shelf Energy (USE) acceptance criterion for the limiting beltline material will be met through the end of the period of extended operation.

Limiting Material For USE	USE Acceptance Criterion (ft-lb)	Calculated USE values (ft-lb) 48 EFPY	Conclusion
Intermediate/lower shell circumferential weld (Unit 1)	50	57	Criterion is met for 48 EFPY
Intermediate shell plate (Unit 2)	50	67	Criterion is met for 48 EFPY

Section 4 Overview

- The applicant's and staff's calculations for Reference Temperature Pressurized Thermal Shock (RT_{PTS}) demonstrate the screening criterion for the limiting beltline RV material will be met through the end of the period of extended operation.

Limiting Material for PTS	Screening Criterion	Calculated RT_{PTS} values 48 EFPY	Conclusion
Intermediate/lower shell circumferential weld (Unit 1)	300 °F	283 °F	Screening Criterion is met
Intermediate shell plate (Unit 2)	270 °F	227 °F	Screening Criterion is met

Section 4 Overview

- Confirmatory Items
  - Update the updated final safety analysis report (UFSAR) Supplement to include commitments to evaluate component fatigue analyses
- Issue resolution
  - Applicant provided the updated UFSAR Supplement discussion of commitment to perform additional actions to address fatigue

Staff Conclusions

- Actions have been identified and have been or will be taken such that there is reasonable assurance that activities will continue to be conducted in the renewal term in accordance with the current licensing basis.
- The applicant has met the requirements for license renewal, as required by 10 CFR 54.29(a).

North Anna Early Site Permit Application

Briefing to
Advisory Committee on
Reactor Safeguards
July 6, 2005

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Purpose for Submitting North Anna ESP Application

- Determine site suitability
- Resolve siting issues early
- Defer technology decision until justified by business case
- Test the regulatory process
- Keep nuclear option open

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North Anna Power Station

- Originally a four unit site
- Units 1 and 2 actually built
  - Westinghouse 3-loop PWRs
- Operating licenses issued in 1978 and 1980
- Construction permits issued for Units 3 and 4
- Units 3 and 4 partially constructed, then cancelled and demolished

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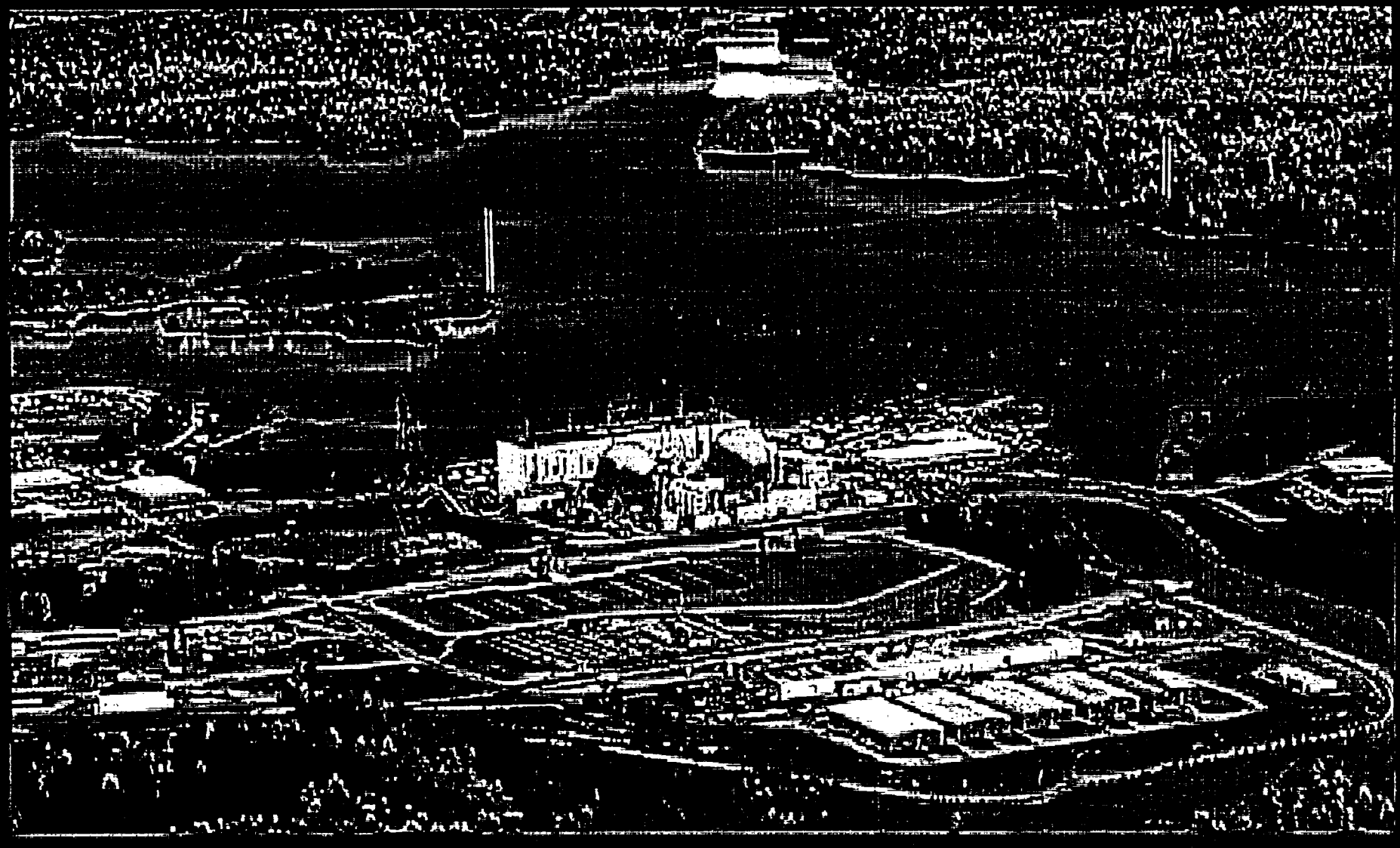

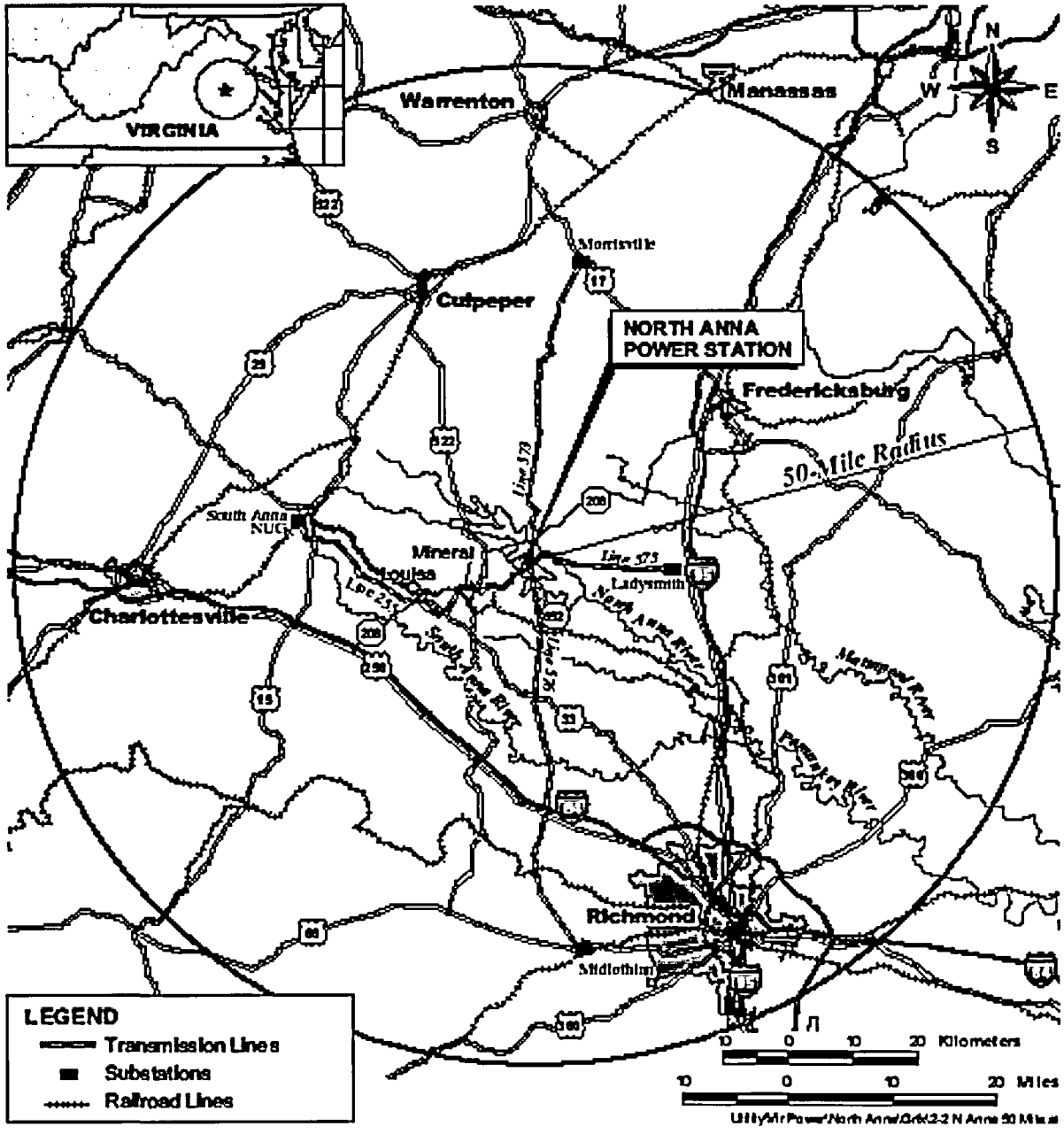
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South Anna
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10 0 10 20 Kilometers
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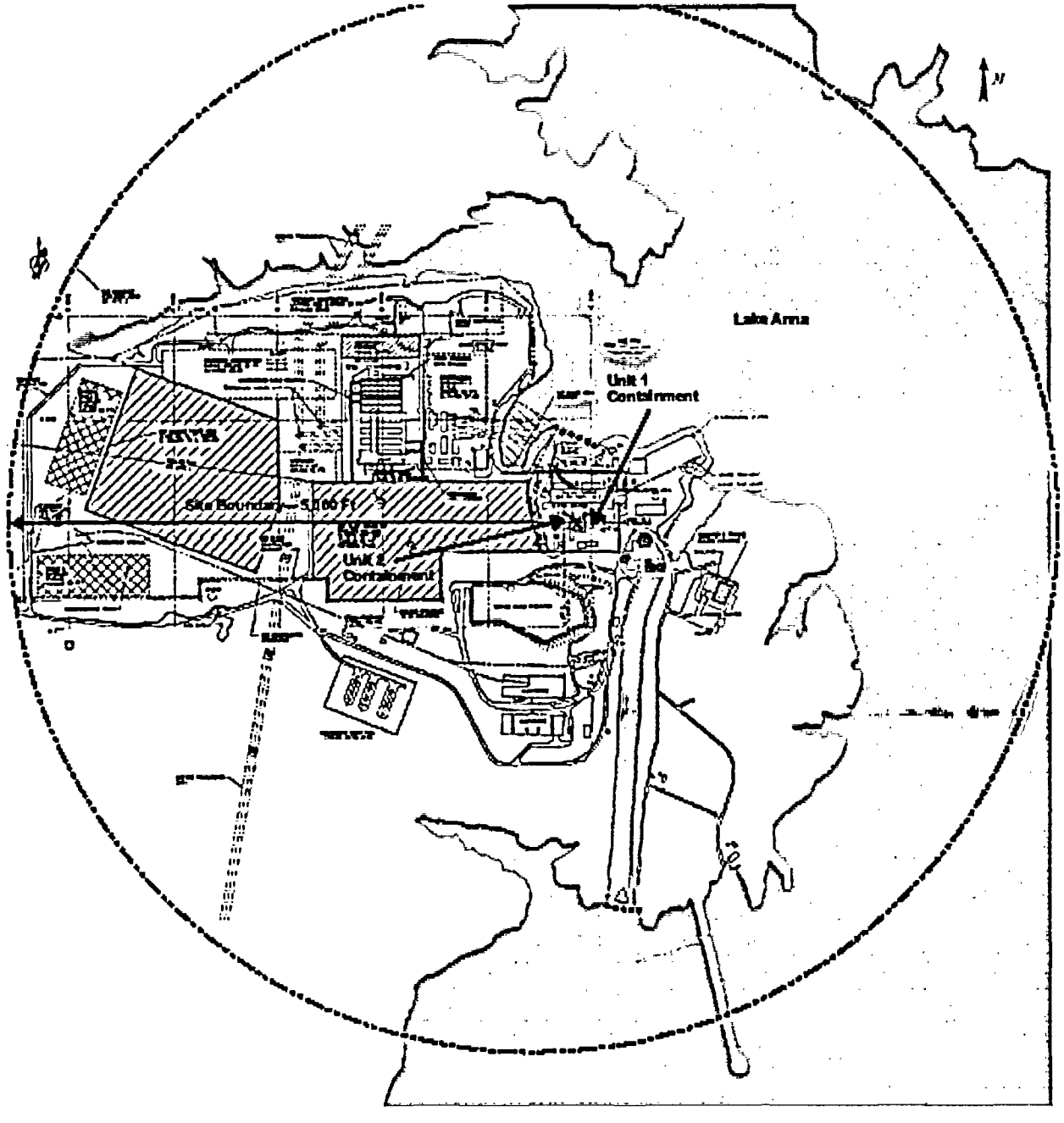
Lake Anna
Unit 1
Containment
Site Boundary
Unit 2
Containment

ESP Application Milestones

Submitted ESP Application	Sept. 2003
Revision 1	Oct. 2003
Revision 2	July 2004
Revision 3	Sept. 2004
NRC Issued Draft SER	Dec. 2004
ACRS Meeting on Draft SER	March 2005
Response to DSER Open Items	March 2005
Revision 4	May 2005
NRC Issued Final SER	June 2005

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North Anna SER

	Draft SER December 2004	Final SER June 2005
Permit Conditions	**18**	**8**
Action Items	**19**	**30**
Confirmatory Items	**1**	**0**
Open Items		
Introduction	1	0
Geology	4	0
Hydrology	11	0
Seismic	2	0
Emerg. Prep.	10*	0
TOTAL	**28**	**0**

* Eight of the open items previously addressed

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Most Open Items Resolved by Providing Additional Information

- 2.3-1 Wind speed
- 2.3-2 Snow pack
- 2.3-3 UHS water freezing
- 2.3-4 Unit 4 atmospheric impacts
- 2.4-1 Coordinate system
- 2.4-3 Low-flow lake conditions
- 2.4-4 Ice jams and ice dams
- 2.4-7 Long-term ground water level measurements
- 2.4-8 Hydraulic conductivity
- 2.4-9 Hydraulic gradients
- 2.4-10 Hydraulic gradient seasonal variation
- 2.5-1 Seismic modeling
- 13.3-1, -2, and 4-10 Emergency preparedness

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Other Open Item Resolution

2.1-1 Exclusion Area Control

- Resolved via proposed license condition

2.4-2 Minimum Distance

- Existing units' and new construction processes ensure no adverse interactions

2.4-5 Minimum Lake Water Temperature

- Resolved via new site characteristic

2.4-11 Adsorption/Retention Coefficient

- Resolved via proposed license condition

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Other Open Item Resolution

2.4-6 UHS Reliability and Stability

- The UHS would be designed to resist uplift pressure, including an appropriate factor of safety
- COL action item assigned

2.5-2 SSE Shear Wave Factors

- Resolved via new site characteristic

13.3-3 Emergency Facilities

- Major feature withdrawn

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SER Accomplishments

- Site characteristics established
  - Based on site investigation, exploration, analysis and testing
  - Defined in FSER Appendix A.3
- Summary of characteristics
  - Defines site boundaries [EAB, LPZ, Low Population]
  - Site Meteorology including characteristics important to plant design and to calculation of radiological impacts
  - Hydrology, geology, seismology, and geotechnical engineering characteristics for plant design
- Compared at COL to demonstrate that the selected plant design is acceptable

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SER Accomplishments

- Bounding Plant Parameter Values Defined
  - Initially selected to bound a variety of technologies
  - Compared at COL to the actual selected technology
  - Additional justification and NRC review required to show that regulatory requirements are satisfied if actual design parameter is greater than ESP bounding assumption
- Criteria for selection of ESP permit conditions discussed in FSER Section 1.8
  - Clear basis for NRC permit conditions/action items
  - ESP permit conditions not necessary when an existing regulation requires future review and approval

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Observations

- Met schedules
  - Hard work
  - Good communications
- EP "Major Features" Option
  - Value uncertain
  - Good "warm-up" for COL
- PPE approach worked
  - Specify fewer parameters to describe plant
- Lessons learned for future applications

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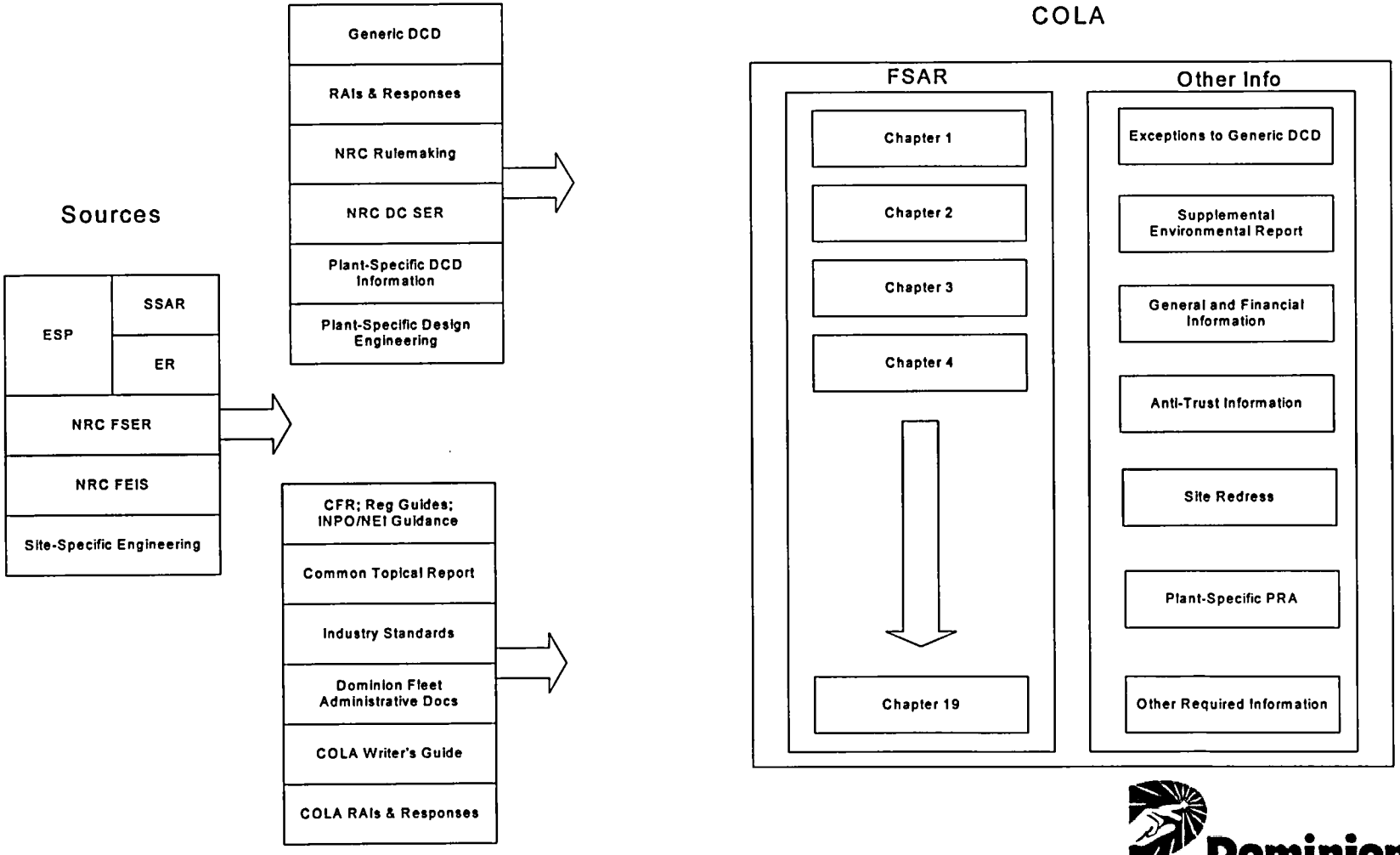
Next Step...More Complex



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Presentation to the Advisory Committee on Reactor Safeguards on the Early Site Permit Application for the North Anna Site

U.S. Nuclear Regulatory Commission

July 6, 2005

Presented by: Belkys Sosa

RNRP/DRIP/NRR

Purpose / Success

- To provide the ACRS an overview of the North Anna early site permit (ESP) safety review's conclusions, the permit conditions recommended by the staff, the combined license (COL) action items, and the bounding parameters listed in the final safety evaluation report (SER)

- Success
  - The ACRS gains an understanding of the conditions and limitations recommended by the staff for inclusion in any ESP that might be issued in connection with the North Anna site ESP application and the COL action items identified in the SER

Meeting Agenda

AGENDA

North Anna ESP Safety Review / Conclusions	5 min
Key Review Areas / Resolution of Open Items	5 min
Permit Conditions	5 min
COL Action Items and Bounding Parameters	5 min
Summary / Next Steps / Questions	5 min

North Anna ESP Safety Review

- The Final SER documents the staff's technical review of the site safety analysis report and emergency planning information submitted by the applicant for the North Anna ESP site
- The staff's review verified the applicant's compliance with the requirements of Subpart A of 10 CFR Part 52 and 10 CFR Part 100
- The applicant's exclusion area is acceptable and meets the requirements of Part 100, subject to the limitations and conditions identified in the final SER
- The proposed site is acceptable for constructing a plant falling within the plant parameter envelope (PPE) with respect to radiological effluent release dose consequences from normal operation

North Anna ESP Safety Review

- With respect to aircraft hazards the proposed site is acceptable for constructing new units falling within the applicant's PPE
- Physical characteristics of the site are such that adequate security plans and measures can be developed
- The applicant demonstrated that no physical characteristics unique to the proposed ESP site could pose a significant impediment to the development of emergency plans and the staff finds the proposed major features of the emergency plan acceptable
- Based on the applicant's request, major feature H was not evaluated and the staff reached no conclusion regarding the acceptability of major feature H

North Anna ESP Safety Review

- The applicant provided an acceptable description of current and projected population densities in and around the site and properly specified the low population zone (LPZ) and population center distance
- The staff's review verified the radiological consequences of bounding design-basis accidents at the exclusion area boundary (EAB) and outer boundary of the LPZ meet the requirements of 10 CFR 52.17
- The staff concludes that the applicant's proposed site characteristics related to climatology and the methodologies used to determine the severity of the weather phenomena reflected in these site characteristics are acceptable and contain margin sufficient for the limited accuracy, quantity, and period of time in which the data have been accumulated

North Anna ESP Safety Review

- The applicant has made conservative assessments of post-accident atmospheric dispersion conditions using its meteorological data and appropriate diffusion models and the staff concludes that the short-term atmospheric dispersion estimates are acceptable and meet the requirements of 10 CFR Part 100
- The staff will address atmospheric dispersion estimates used to evaluate radiological doses for the control room in its review of any COL or construction permit (CP) application that references this ESP
- The staff concludes that the applicant's characterization of long-term atmospheric transport and diffusion conditions is appropriate for use in demonstrating compliance with dose requirements in Appendix I to Part 50

North Anna ESP Safety Review

- The staff concludes that the applicant's proposed site characteristics related to hydrology are acceptable with the noted conditions
- The staff concludes that the proposed ESP site is acceptable from a geology and seismology standpoint and meets the requirements of 10 CFR 100.23
- The applicant has provided appropriate quality assurance measures equivalent to those required by 10 CFR Part 50 Appendix B

Key Review Areas

- The staff completed its review in the following areas:
  - **Exclusion Area Authority and Control (1)**
  - Nearby Industrial, Transportation, and Military Facilities
  - **Meteorology (4)**
  - **Hydrology (11)**
  - **Seismology and Geology (2)**
  - Radiological Effluent Release Dose Consequences from Normal Operations
  - Aircraft Hazards
  - **Emergency Planning (10)**
  - Industrial Security
  - Accident Analyses
  - Quality Assurance
- There were 28 Open Items in the Draft SER **(Bold)**
- Resolution of all Open Items discussed in the Final SER

Permit Conditions

- There are 8 proposed Permit Conditions in the Final SER from 18 in the Draft SER
- Permit Conditions included under 3 circumstances
  - Staff's evaluation rests on an assumption that is practical to support only after ESP issuance
  - A site physical attribute exists that is not acceptable for the design of Systems, Structures, and Components important to safety
  - Staff's evaluation requires a future act

Proposed Permit Conditions

1. Obtain and execute agreements providing for shared control of the North Anna ESP exclusion area, including State approvals before construction begins under a CP or COL referencing the ESP
2. ESP holder obtain the right to implement the site redress plan before undertaking limited work activities
3. Requires the fourth unit use a dry cooling tower system during normal operation
4. Requires the new units radwaste systems be designed with features to preclude any and all accidental releases of radionuclides into any potential liquid pathway

Proposed Permit Conditions

5. Replace fractured/weathered rock at the foundation level with lean concrete before initiation of foundation construction.
6. Prohibits the use of an engineering fill with high compressibility and low maximum density, such as saprolite
7. Perform geologic mapping of future excavations for safety-related facilities
8. Improve Zone II saprolitic soils to reduce any liquefaction potential if safety-related structures are to be founded on them

COL Action Items

- There are 30 COL Action Items in the Final SER from 19 COL Action Items in the Draft SER
- COL Action Items included to
  - Ensures that significant issues are tracked and considered during the COL phase
  - Identify issues that shall be addressed by an applicant who submits an application referencing the North Anna ESP

Bounding Parameters / PPE

- Controlling PPE value that necessarily depends on a site characteristic
- Review the design selected in COL or CP application to ensure the design fits within the bounding parameter values
- Otherwise, the COL or CP applicant would need to demonstrate that the design, given the site characteristics in the ESP, complies with the Commission's regulations
    - Maximum Cooling Water Flow Rate – Unit 3 = 2540 cfs
    - Maximum Cooling Water Temperature Rise = 18 F
    - Maximum Inlet Temperature = 95 F
    - Minimum Site Grade = 271 ft MSL

Project Milestones

- Receive North Anna ESP application – September 25, 2003
- FRN published announcing acceptance – October 30, 2003
- FRN published for mandatory hearing – December 2, 2003
- Draft SER issued – December 20, 2004
- Open Items Resolution January 2005 – May 2005
- ACRS Meeting on Draft SER – March 3, 2005
- ACRS Interim letter to the EDO – March 11, 2005
- Receive Revision 4 of Application – May 16, 2005

Project Milestones

- Green ticket Response to ACRS – June 3, 2005
- Final SER Issued – June 16, 2005
- ACRS Meeting on Final SER – July 6, 2005
- ACRS Letter to the EDO – July 25, 2005
- Final SER Issued as NUREG – August 29, 2005

North Anna ESP Summary

- On June 16, 2005, NRC issued a first-of-a-kind Final SER for the North Anna ESP application
- The North Anna ESP site characteristics with the limitations and conditions proposed by the staff comply with Part 100 requirements
- Reactor(s) having characteristics that fall within the parameters identified in the ESP, and which meet the terms and conditions proposed in the final SER, can be constructed and operated without undue risk to the health and safety of the public
- Issuance of the North Anna ESP will not be inimical to the common defense and security or to the health and safety of the public
- Questions or comments?

Overview of DG-1137 — *Guidelines for Lightning Protection of Nuclear Power Plants*

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Presented to
Advisory Committee on Reactor Safeguards
Rockville, Maryland
July 6, 2005

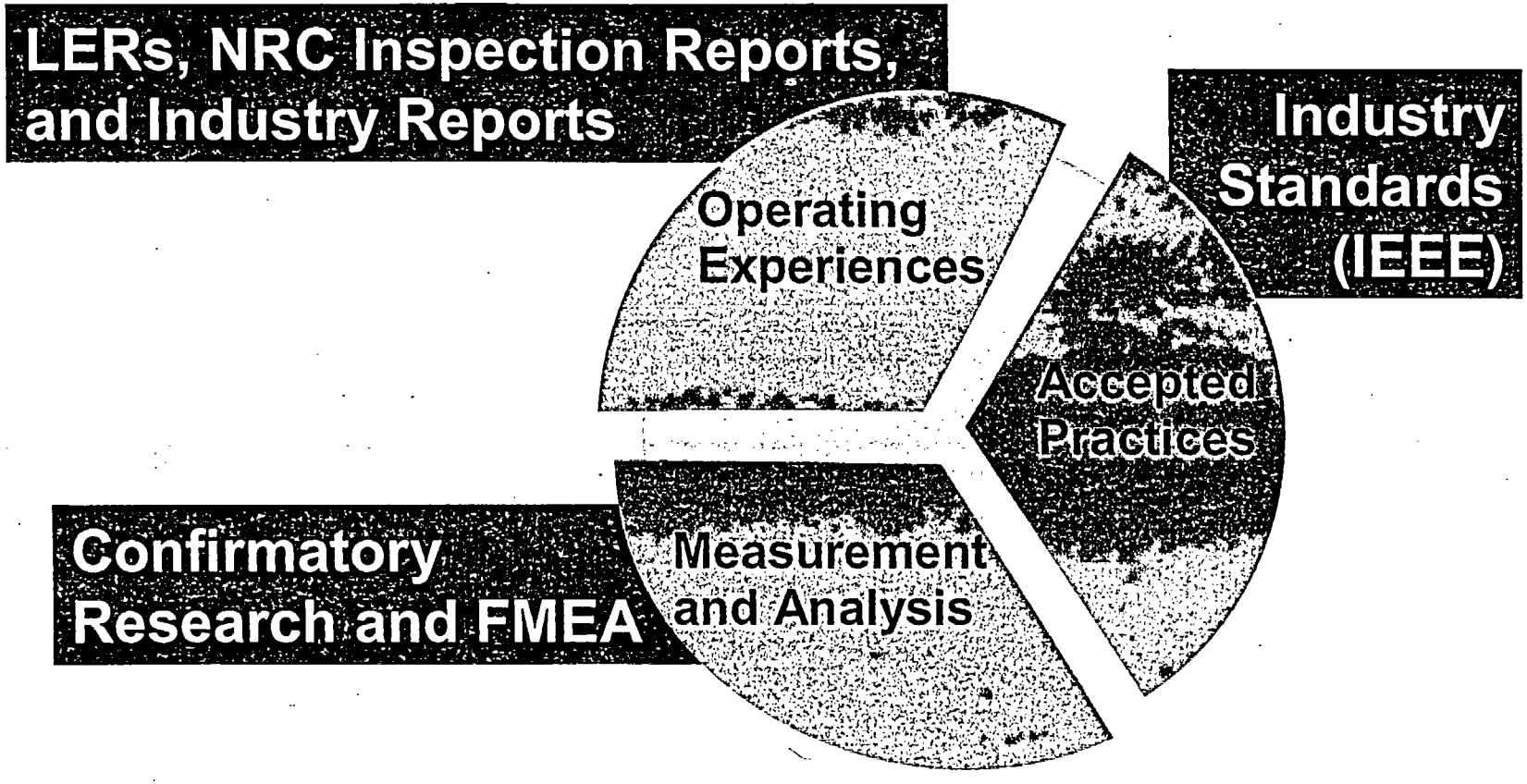
Purpose of Briefing

- Discuss draft regulatory guide with ACRS
  - Motivation
  - Approach
  - Technical need for guidance
  - Overview of draft guide DG-1137
  - Responses to public comments
- Request concurrence to issue the draft guide

DG-1137 Provides Needed Guidance for New Plant License Applicants

- Responds to NRR User Need Request 2002-017
- Consensus lightning protection practices have evolved since NFPA-78 was issued [referenced by NUREG-0800, Chapter 7.1]
- No regulatory guidance on lightning protection exists
- Comprehensive guidance can ensure adequacy and consistency of lightning protection approaches employed for new plants

Development of Technical Basis Involved a Systematic Approach

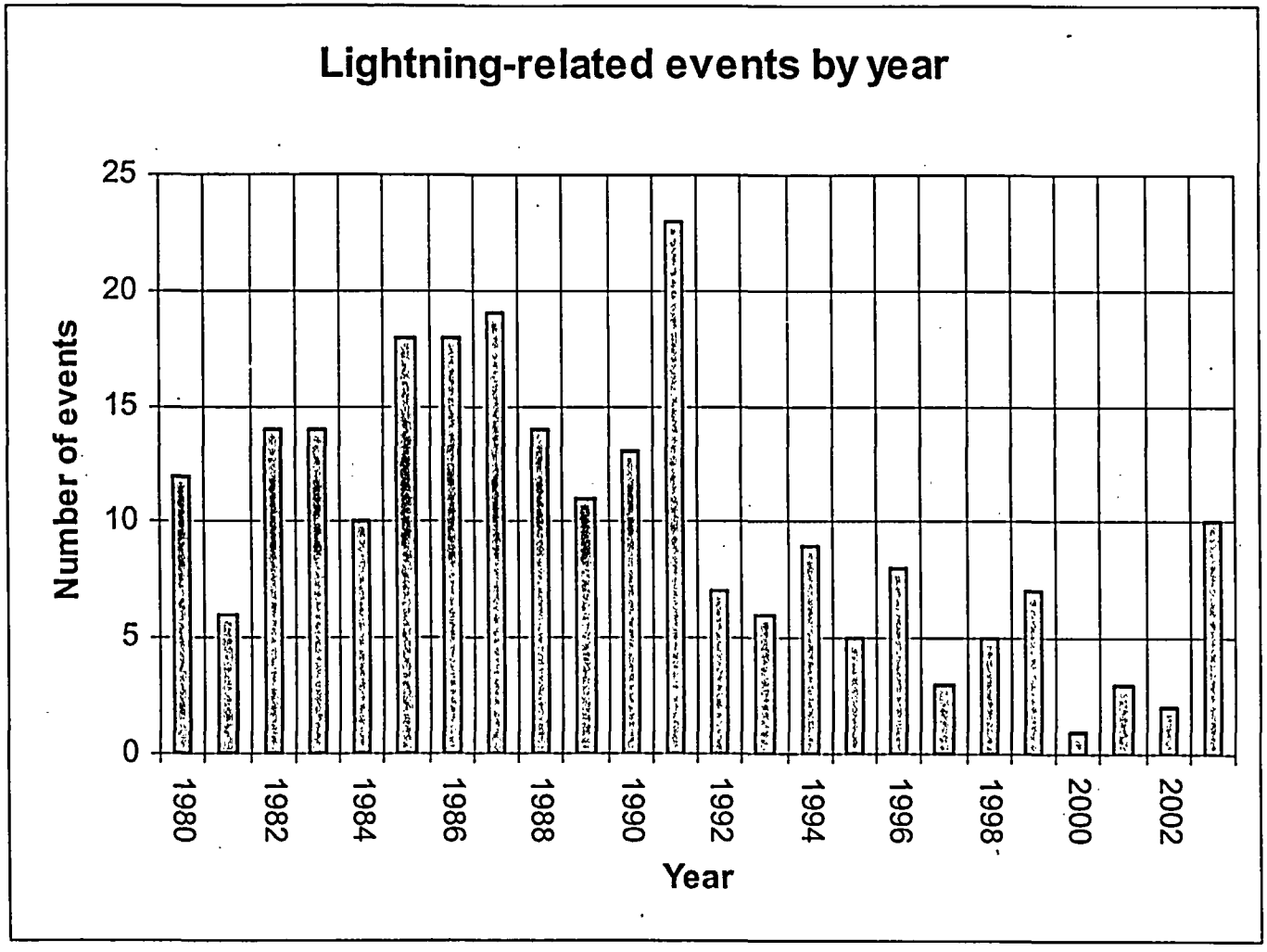


NUREG/CR-6866 "Technical Basis for Regulatory Guidance on Lightning Protection in Nuclear Power Plants"

LER Data Related to Lightning Events Were Reviewed

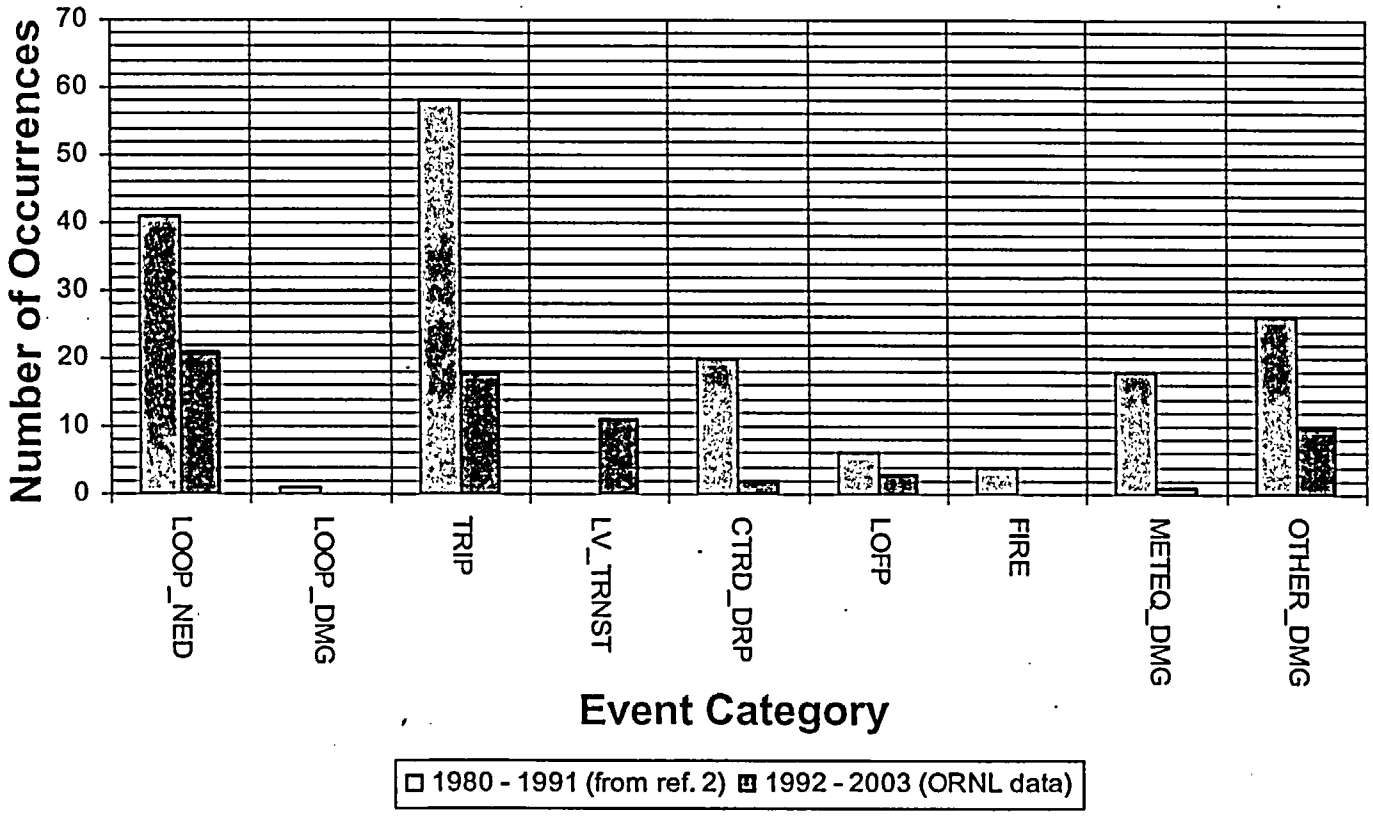
- Two Studies (240 events over 24 years)
  - NRC (Rourk 1980-1991), 174 events
  - ORNL 1992-2003, 66 events
- Significant findings
  - Local strikes are the source of most events
  - Transients from transmission lines typically do not propagate directly into plant (have resulted in LOOP)
  - 32% resulted in a reactor trip
  - 27% resulted in loss of offsite power
  - 60% resulted in equipment malfunction
  - Results show lightning occurrences impact plant availability and can challenge plant safety systems

Merged Data from Two Studies Shows Overall Decline in Lightning-Related LER Events from 1990 to 2003



Reactor Trip and LOOP Are Dominant Events

Lightning-related events for two 12-year periods (1980-1991, 1992-2003)



Review of Operating Experience Shows That Lightning Can Pose a Risk to NPP Facilities

- Lightning contributes to a significant number of loss of off-site power events
- Lightning can result in loss of fire protection and may initiate a fire
- Lightning can cause a reactor trip, accompanied by random system and component misoperation (inadvertent system actuations) and failures
- NUREG/CR-6866 documents operating experience

Possible Consequences of a Lightning Strike

PRIMARY EFFECT	RESULT	SIGNIFICANT ACTION
Damage to Electrical Distribution Systems	Isolation of System	Reactor Trip
Damage to Electric Motors	Circuit Breaker Trip	Actuation of Safety Systems
Injection of Power Transients	Failure of Power Supplies	Blockage of Safety Systems Actuation
Generation of Spurious Signals	Loss of Function	
Loss of Electrical Power	Loss of Equipment	
Fire	Loss of Fire Protection	
	False Information	
	Shortened Operating Life	

Additional Considerations for Guidance on Lightning Protection

- Nuclear power plants see widespread use of digital and low-voltage analog electronic systems
- Electrical/electronic components can fail due to transients
- Current electronic devices are more vulnerable than earlier vintages
- Current NRC regulatory guidance on electromagnetic compatibility presumes a normal surge environment

Lightning-Related Activities Over Last 20 Years

NFPA 78-1968

MIL-STD-464 1997

NFPA 780-2004

IEEE 666-1991 (R1996)

IEEE 665-1995 (R2001)

UL 96A-2001

1992 Rourk report

IEEE C62.23-1995 (R2001)

1986 Engineering Evaluation Report AEOD/E605

1991 Special Inspection 50-29/91-09

IEEE 1050-1996

User Need 2002-017

1981 NSAC 41

2/1995 RES/DET Technical Basis for Eval. of Lightning Protection at NPPs

5/2005 NUREG

1991 Petition for Rulemaking 50-56

1979 Draft Reg Guide

11/1985 Information Notice No. 85-86

2/1995 RES/DET Reg Analysis for Proposed RG on Lightning Protection at NPPs

5/2005 Draft Reg Guide

1980 1990 2000

Industrial Guidance on Lightning Protection Comes from NFPA and UL

- NFPA 780-2004, Standard for the Installation of Lightning Protection Systems
  - Facility protection guidance and philosophy
  - Virtually all lightning protection standards reference it
  - ***Excludes*** electric generation facilities
- Underwriters Laboratories UL 96A-2001, Installation Requirements for Lightning Protection Systems
  - Facility protection installation practice
  - ***Excludes*** electrical generating, distribution, and transmission systems
- Focus is on fire prevention and personnel protection

Overview of DG-1137 — Guidelines for Lightning Protection of Nuclear Power Plants

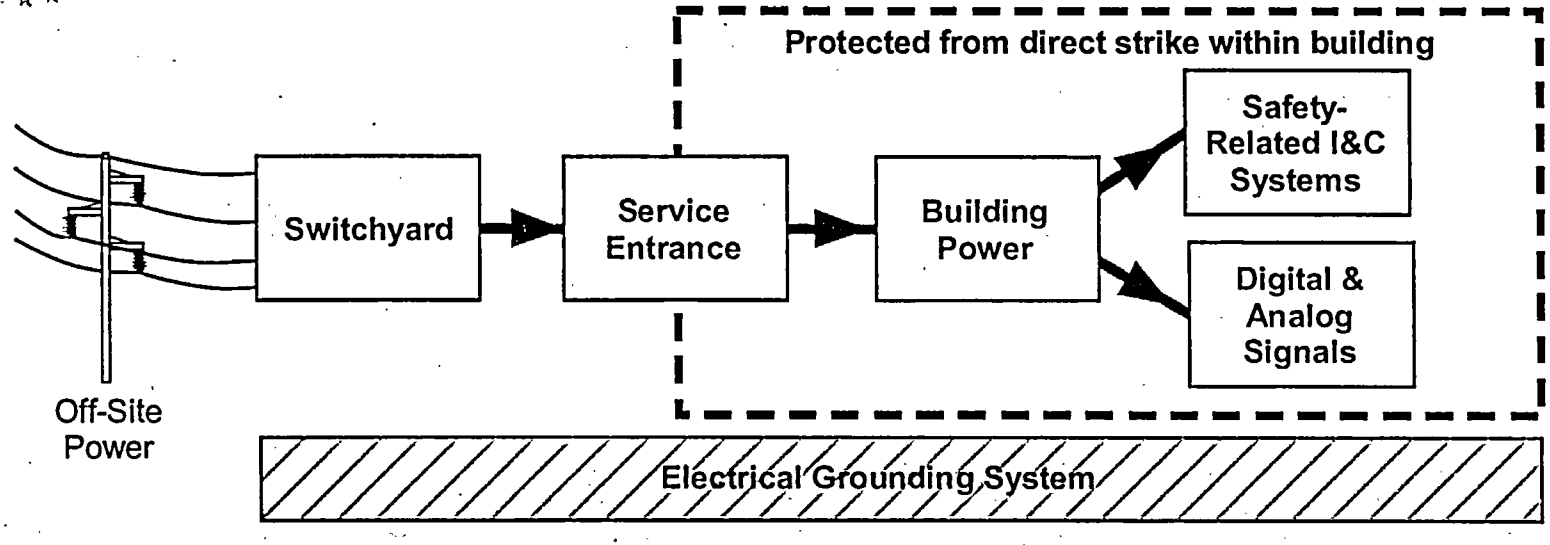
DG-1137 Describes Acceptable Practices for Design and Qualification Related Requirements in 10 CFR Part 50

- General Design Criterion 2: Protection against natural phenomena
- General Design Criterion 3: Protection against fire
- General Design Criterion 17: Electric power system requirement

DG-1137 Provides Guidance on Lightning Protection that is Acceptable to NRC Staff

- Supplies guidance on design and installation practices for lightning protection systems
- Recommends general defense against lightning strikes (direct and indirect)
- Provides reasonable assurance that a lightning event will not challenge, compromise, or cause spurious operation of safety-related systems at NPPs
- Establishes the foundation for updating review guidance on lightning protection at NPPs in the Standard Review Plan
- Guidance complementary to RG-1.180, "Guidelines for Evaluating EMI/RFI in Safety-Related I&C Systems"

Scope of DG-1137 Lightning Protection Coverage Is Plant Wide



- Plant switchyard components related to plant power systems
- Power plant buildings
- Electrical distribution, safety-related systems
- Relevant ancillary facilities

DG-1137 Provides Guidelines in Specific Areas Relevant to Lightning Protection

- ☐ Grounding and air terminals
- ☐ Down-conductors and bonding
- ☐ Cable (signal and power) routing
- ☐ Protection of low- to medium-voltage equipment
  - Low voltage — 120 - 480 volts
  - Medium voltage — 2.4KV - 13.8KV
- ☐ Surge protection devices
- ☐ Maintenance and testing

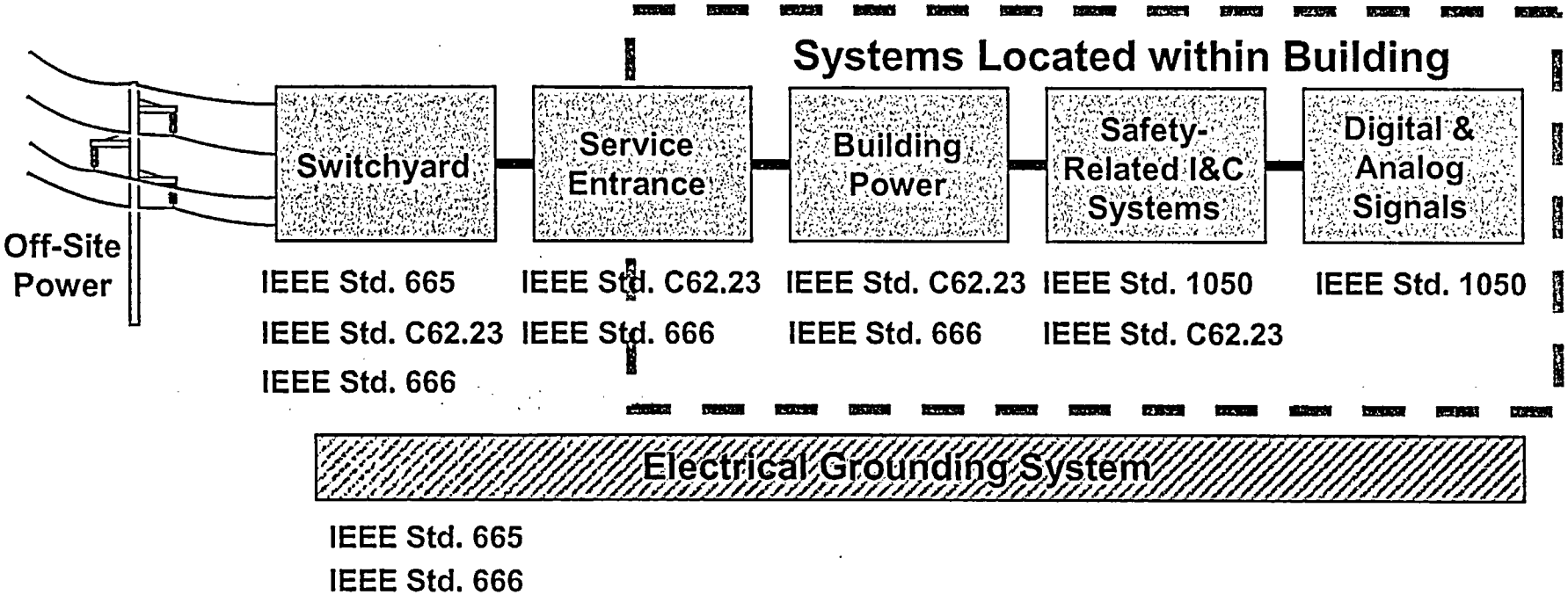
Proposed DG-1137 Implementation

- Applies to new plants
- No backfitting is intended
- For use in evaluating licensee submittals for design certifications and combined licenses
- For use in evaluating submittals regarding system modifications relevant to lightning protection where the licensee voluntarily adopts this guidance

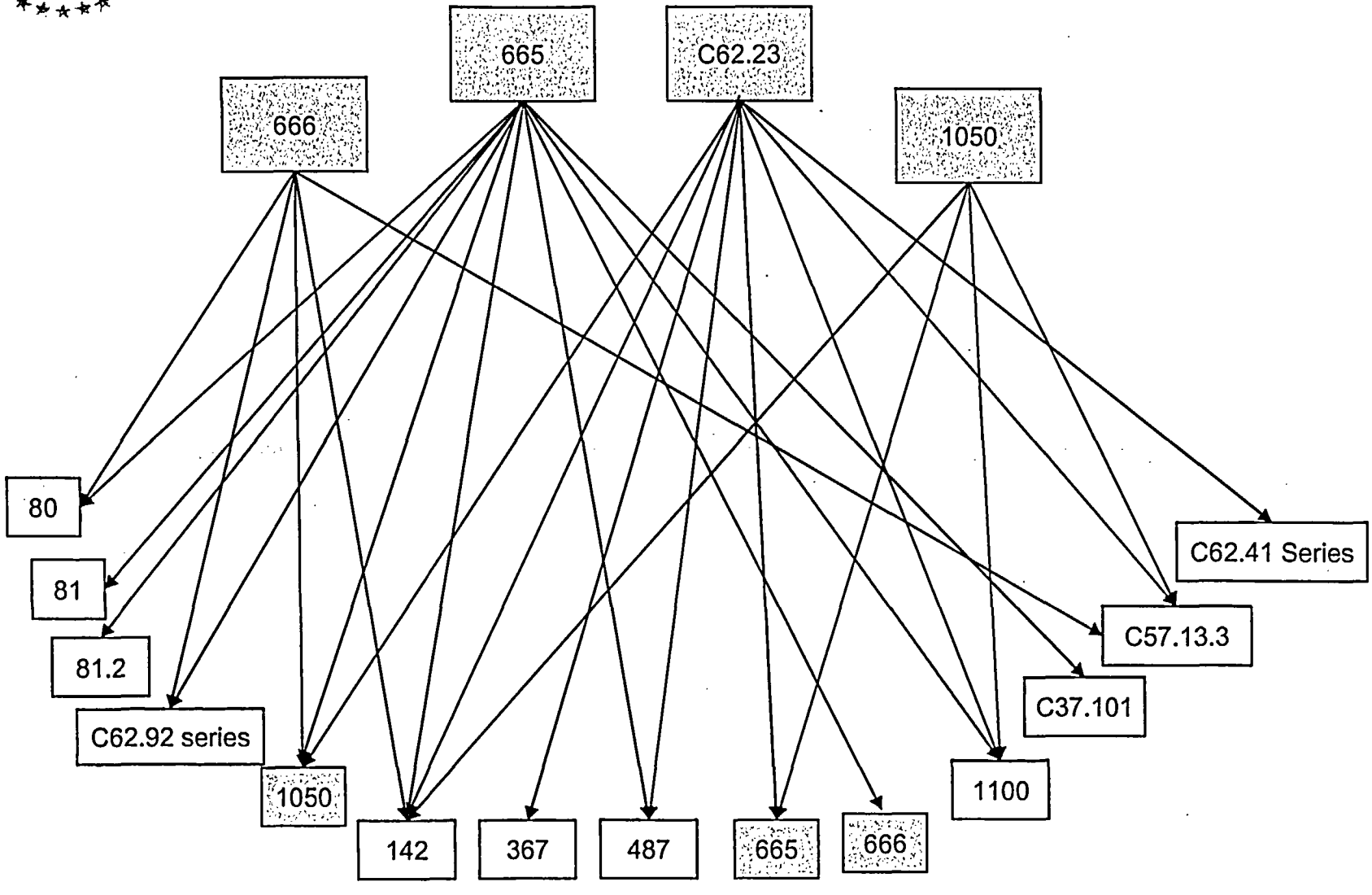
Regulatory Position 1 Endorses Design and Installation Practices in Four Primary IEEE Standards

- **IEEE Std 665-1995** (Reaffirmed 2001), IEEE Guide for Generating Station Grounding
- **IEEE Std 666-1991** (Reaffirmed 1996), IEEE Design Guide for Electrical Power Service Systems for Generating Stations
- **IEEE Std 1050-1996**, IEEE Guide for Instrumentation and Control Equipment Grounding in Generating Stations
- **IEEE Std C62.23-1995** (Reaffirmed 2001), IEEE Application Guide for Surge Protection of Electric Generating Plants

Coverage of Plant Systems by Applicable IEEE Standards



Four Primary IEEE Standards Refer to Several Other Standards



Regulatory Position 2 Identifies Relevant Practices for Inspection, Testing, and Maintenance

- Inspection Guidelines
  - Inspect all conductors and system components
  - Inspect or test surge protection devices to assess effectiveness
  - Inspect and test LPS when altered
- Testing and Maintenance Guidelines
  - Tighten all clamps and splices
  - Measure earth grounding resistance
  - Measure resistance of ground terminals
  - Periodically test and maintain earth grounding systems
  - Refasten and tighten components and conductors
- Comprehensive Records

Resolution of Public Comments

- Two correspondents submitted a total of five comments on DG-1137
- Public comments can be grouped into general categories
  - Lightning protection for non-safety-related equipment whose failure can impact safety
  - Alternate methods of lightning protection
  - Testing and maintenance practices
- DG-1137 reflects the resolution of these comments

Conclusion

DG-1137 Is Ready for Issuance

- Provides regulatory guidance on lightning protection
- Based on NUREG/CR-6866, which documents the technical basis derived from standards and industry experience
- Incorporates public comments
- Seeking ACRS concurrence to publish final effective guide

REGULATORY GUIDE 1.152
REVISION 2
CRITERIA FOR USE OF COMPUTERS IN SAFETY SYSTEMS OF NUCLEAR POWER PLANTS

Satish Aggarwal
Office of Nuclear Regulatory Research
301-415-6005

July 6, 2005

BACKGROUND

- Revision 1 was issued in January 1996
  - Endorsed IEEE Std 7-4.3.2-1993
- Current version of IEEE Std 7-4.3.2 was issued in 2003
  - Revision 2 endorses this version
- Provides guidance on cyber security
  - Not addressed in the standard

DRAFT REGULATORY GUIDE

- DG-1130 was issued in December 2004 for public comment
- Initial comment period expired on February 11, 2005
  - Extended to March 14, 2005
  - Received 20 comment letters

REGULATORY POSITION 1 FUNCTIONAL AND DESIGN REQUIREMENTS

- Endorses IEEE Std 7-4.3.2-2003 requirements as a method for satisfying NRC regulations with respect to computer-based safety system design requirements and high functional reliability

REGULATORY POSITION 2
CYBER SECURITY

- Subsequent to 9/11, the NRC issued Orders that address, in part, current cyber threats at nuclear power plants
- Other actions including regulatory improvements to address cyber security
- Nuclear power plants have implemented enhancements
- This regulatory position is a step in the right direction

REGULATORY POSITION 2
CYBER SECURITY
(cont)

- NRC is taking number of actions, including working with NEI to implement cyber security programs at nuclear power plants
- Will revise guidance when an industry standard becomes available
- Security guidance is based on one life cycle approach
  - Other approaches may be acceptable

REGULATORY POSITION 2
CYBER SECURITY
(cont)

- Security functions are part of overall functions performed by safety systems
- Topic of security applies to both hardware and software
- Two way communication between safety computers and plant wide area network is not acceptable

ANALYSIS OF PUBLIC COMMENTS

- Comments in 3 categories
  - Complimentary
    - Recommended guidelines should be mandatory
  - Adverse comments
    - Remove the guidance on cyber security
    - Let the industry develop guidance
  - Technical comments

TECHNICAL COMMENTS

- Most of these comments addressed Regulatory Position 2 on cyber security
- The staff has incorporated these comments and believes that this has resulted in improved technical guidance

SIGNIFICANT CHANGES

- "Software Quality Metrics" clause
- Additional guidance for use of COTS hardware and software
- V&V references
  - IEEE Std 1012-1998
- Configuration Management
  - IEEE Std 828-1998
  - IEEE Std 1042-1987

SIGNIFICANT CHANGES
(cont)

- "Software Project Risk Management" references
  - IEEE Std 1540-2001 on risk management
  - IEEE Std 12207.0-1996 on software lifecycle processes
- "Fault Detection and Self-Diagnostics" clause added
- "Identification" clause added
  - IEEE Std 603-1998

SIGNIFICANT CHANGES
(cont)

- Annex C, "Dedication of Existing Commercial Computers" updated
- Annex D, "Identification and Resolution of Hazards" revised

SUMMARY

- RG 1.152 endorses IEEE Std 7-4.3.2-2003
- Adds guidance regarding cyber security
- Incorporates public comments

- Request ACRS concur on the Regulatory Positions