

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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PLANT REVIEW

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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BRIEFING ON THE PROGRESS OF G.E. ADVANCED BWR

STANDARD PLANT REVIEW

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PUBLIC MEETING

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Nuclear Regulatory Commission

One White Flint North

Rockville, Maryland

Tuesday, January 24, 1989

The Commission met in open session, pursuant to notice, at 2:30 p.m., the Honorable LANDO W. ZECH, JR., Chairman of the Commission, presiding.

COMMISSIONERS PRESENT:

LANDO W. ZECH, JR., Chairman of the Commission

THOMAS M. ROBERTS, Member of the Commission

KENNETH M. CARR, Member of the Commission

KENNETH C. ROGERS, Member of the Commission

JAMES R. CURTISS, Member of the Commission

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STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

- SAMUEL J. CHILK, Secretary
- JAMES P. MURRAY, General Counsel
- VICTOR STELLO, JR., Executive Director for
Operations
- JAMES SNIEZEK, Deputy Office Director, NRR
- CHARLES MILLER, Director, Standardization and Non-
Power Reactor Project Directorate
- LESTER RUBENSTEIN, Assistant Director for Region IV
and Specifications Project
- DINO SCALETTI, Project Manager

FOR GENERAL ELECTRIC:

- DAN WILKINS, General Manager, ABWR Program
- PATRICK MARRIOTT, Manager, Licensing & Consulting
Services
- JOE QUIRK, Manager, ABWR Certification

P R O C E E D I N G S

(2:30 p.m.)

CHAIRMAN ZECH: Good afternoon, ladies and gentlemen.

This afternoon the Commission will be briefed by representatives of the General Electric Company, and by the NRC staff, on the General Electric Advanced Boiling Water Reactor.

I would like to welcome the representatives of the General Electric Company, Mr. Dan Wilkins, General Manager of the Advanced Boiling Water Reactor Program; Mr. Patrick Marriott, Manager, Licensing and Consulting Services, and Mr. Joe Quirk, Manager of the Certification Program.

General Electric will provide a status report on their progress to develop and certify an advanced boiling water reactor. General Electric has briefed the Commission on three previous occasions, and this is a follow-up to those discussions.

Following the General Electric presentation, the NRC staff will brief the Commission on the progress of the standard plant review. This is an information briefing, and no formal Commission vote is expected today.

I understand that copies of the slides used in

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1 today's presentation are available as you enter the
2 meeting room.

3 Do any of my fellow Commissioners have any
4 opening comments to make?

5 (No response)

6 CHAIRMAN ZECH: If not, then, Mr. Wilkins, you
7 may proceed. Welcome.

8 MR. WILKINS: Thank you very much, Mr.
9 Chairman, and Commissioners.

10 We are very pleased to be here for the fourth
11 progress report on the ABWR Certification Program. Let
12 me say at the outset that Dr. Wolf, who heads our
13 nuclear energy business, had planned to be here for this
14 meeting, but when it got rescheduled, we ran into a
15 conflict, and so he expresses his regrets. But we will
16 proceed without him.

17 Our plan today is to give you a very quick
18 update on the status of the program and highlight some
19 of the key issues that are being dealt with on the
20 program, and where we are in terms of the activity and
21 schedule, and some of the things we have done in
22 response to your comments at the previous briefings.

23 At the previous meetings, we've described the
24 advanced boiling water reactor from a technical point of
25 view in some detail, so I don't propose to repeat that

1 here, but just on the first chart remind you that the
2 advanced BWR is a 1350 megawatt electric plant.

3 (Slide)

4 It incorporates internal forced circulation.
5 It is a world-class team designed by an international
6 team consisting of General Electric and our BWR
7 associates in both Europe and Asia, and we think has
8 pulled together into a single design the best proven
9 features from boiling water reactors around the world,
10 and incorporated them all into a single design.

11 The development program that supports the ABWR
12 is complete. That is a program that is involved in
13 investment of over a quarter of a billion dollars, and
14 is a program that has -- each feature of the ABWR is
15 either proven by field experience, or has been
16 thoroughly tested through this development program.

17 The US certification effort is well underway.
18 This is a program we began in late 1986. We hope to see
19 it become the first US standard plant. The program is a
20 cooperative effort among General Electric, the Electric
21 Power Research Institute's effort to develop
22 requirements for next generation plants, and the
23 Department of Energy, who is supporting us and funding,
24 in fact, part of the certification effort.

25 And we think as one of the products of this

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1 effort, we will not only have the ABWR licensed, but in
2 the process we will have demonstrated a standard plant
3 certification process here in the US, which we think has
4 considerable value. And the effort is intended to be
5 complete in 1991.

6 I would like to give you a brief summary of
7 what is happening in Japan, since there is a parallel
8 side to this program in Japan -- second slide, please.

9 (Slide)

10 The ABWR, as we have mentioned, has been
11 selected as the next generation standard boiling water
12 reactor in Japan. And, in fact, the lead plants are now
13 committed by the Tokyo Electric Power Company. They are
14 what is known as the Kashiwazaki 6 and 7 units, to be
15 built at the Kashiwazaki site on the Japan Sea.
16 Licensing, the formal application, was initiated in
17 1988, and the licensing review is scheduled to be
18 complete by the beginning of 1991, and the first unit is
19 scheduled to go commercial in '96; the second one in
20 mid-'98.

21 The plants will be built by a joint venture of
22 General Electric, Hitachi and Toshiba. And within the
23 joint venture General Electric has been selected by
24 TEPCO to provide the nuclear steam supply system, the
25 fuel and the turbine generators for those units. So the

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1 heart of the plant and the first-of-a-kind, major first-
2 of-a-kind portions of the plant are within the General
3 Electric scope.

4 And we are aware that there is an active dialogue
5 between the regulatory agencies in both the US and in
6 Japan, as this plant moves through licensing in both
7 countries.

8 (Slide)

9 The third chart shows the schedule and scope
10 of the certification program. This chart, the schedule
11 dates on this chart in the Nuclear Island -- area, have
12 not been changed since we initially showed you this
13 chart a couple of years ago. And we are on schedule.
14 We are submitting the standard safety analysis report in
15 modules to phase it to match the effort by Electric
16 Power Research Institute on the requirements program.
17 So, as they are bringing their chapters in, our
18 submittals lag by a few months in order to achieve
19 maximum consistency between their effort and ours.

20 And all of the chapters, or modules that are
21 scheduled to have been submitted to-date are in and, in
22 many cases, we have had active questions and review from
23 the staff. So, things are proceeding on schedule. And
24 you can see the tail end of the program is scheduled to
25 have a final design approval in 1990, and a

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1 certification in 1991.

2 CHAIRMAN ZECH: Does this reflect an expansion
3 of your original plans as regards to Turbine Island and
4 the Radwaste Facility, in trying to come up with a
5 certified program for those?

6 MR. WILKINS: Yes, it does. If you will turn
7 to the next chart, Mr. Chairman.

8 (Slide)

9 The last time we were here, you spoke quite
10 eloquently on the need to expand the scope of this
11 program to include a total plant, and very strongly
12 encouraged us to go back and see if we could find a way
13 to do that. We have done that, and the scope is shown
14 on the chart -- our original scope was what we called a
15 Nuclear Island. It, essentially, included everything in
16 the reactor control and service buildings.

17 In response to the Commission's guidance, we
18 have gone back and recently indicated an expansion of
19 that scope to include the remainder of the plant and, in
20 particular, to include the Turbine Island and the
21 Radwaste Facilities. And we have retained Bechtel to do
22 the work for us on the Turbine Island portion of the
23 plant.

24 So that effort is now underway, and we have
25 taken formal action to expand the docket to include this

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1 essentially total plant scope.

2 CHAIRMAN ZECH: I remember our discussions
3 very well, and I would like to commend GE for expanding
4 the scope in this regard. I think you've taken a very
5 important step forward, including the Turbine Island and
6 the Radwaste Facility in your effort, and I commend you
7 for that.

8 MR. WILKINS: Thank you very much.

9 (Slide)

10 If you look on the next chart we depict the
11 scope of the ABWR standard safety analysis report as it
12 now stands. The cross-hatched areas are all in, and the
13 portions that are remaining at this point are portions
14 that are clearly site-specific. And even in those
15 areas, we intend to establish whatever interface
16 requirements are needed to make sure that those non-
17 safety portions do not impact safety portions which are
18 included in the scope.

19 (Slide)

20 The next chart summarizes where we are in a
21 little more detail on schedule. The licensing review
22 basis was issued by the NRC staff in August of '87. We
23 have found that document to be extremely useful. It has
24 defined the basic process and ground rules for the
25 certification effort, and has enabled us to do our work

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1 with a great deal of confidence and certainty, as to
2 what was needed and when it was needed, and what the
3 steps and the process would be, and even in some cases
4 what the acceptance criteria would be.

5 So we have been able to proceed, I think, very
6 efficiently on our end in terms of preparing our
7 chapters. As indicated on the chart, the four major
8 modules have been submitted already. There are two
9 remaining on the second page of the chart.

10 (Slide)

11 Those are scheduled for January and March of
12 this year, and we intend to meet both of those dates.
13 Our PRA, which is one of the major submittals and which
14 will deal with the severe accident issue, is due in next
15 week and we will make that schedule.

16 So, as I said earlier, the certification
17 effort in terms of getting the information before the
18 staff, is proceeding very well on the schedule we laid
19 out at the beginning of the program.

20 (Slide)

21 We have had an active dialogue with, as we
22 mentioned, the Commission and with the ACRS, both full
23 committee and subcommittee. We have had three full
24 committee meetings with the ACRS to this point, to go
25 over specifics of the design. And we have had three

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1 meetings with the subcommittee that has been assigned to
2 look over this program.

3 Again, we think that that activity is
4 proceeding and is up-to-date with the work we have done
5 to-date.

6 (Slide)

7 Now, I would like to finish with a comparison,
8 from General Electric's perspective, of the ABWR design
9 and our plans, with a letter that we received from the
10 NRC staff, I guess a couple of months ago, that defines
11 the staff's expectations in a number of areas, in the
12 area of what you might call safety enhancements that the
13 staff expects to see in future designs, or in some cases
14 clarification of issues that the staff is considering.

15 One of them is in the area of 60-year life.
16 The ABWR that we are submitting for certification is
17 designed for a 60-year life. We understand that some
18 regulatory action may be needed to permit the
19 certification of a plant that has been designed for
20 longer than a 40-year life, and we certainly support and
21 agree with that activity.

22 In the area of fire protection the staff has
23 indicated a desire to ensure that the plant can survive
24 a complete loss of any fire area. And that's a bolder
25 and perhaps more stringent requirement than just the

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1 separation requirements that we have had in the past.
2 On the other hand, we believe the ABWR will comply with
3 that requirement, due to the physical electrical and
4 mechanical redundancy and separation that is built into
5 the plant.

6 (Slide)

7 The staff has indicated they want to see the
8 technical specifications included as part of the ABWR
9 certification program. We agree, and that is part of
10 our plan to do that.

11 (Slide)

12 In the area of testing and maintenance the
13 staff has indicated a desire to have a program which
14 will ensure that over the life of the plant the
15 probabilistic -- the level of safety implied in the PRA
16 is maintained. And we certainly agree in principle that
17 that is something that needs to be done, and we are
18 under discussion as to exactly how to do that. That is
19 not a trivial thing to figure out exactly how you do,
20 and we are under discussion right now as to exactly how
21 to carry that out. We certainly agree with the concept.

22 The staff letter included a plan to use its
23 own codes in place of the industry map code, as a means
24 of evaluating the design. We have no problem with that.

25 They've indicated a desire for diverse power

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1 sources to improve the protection against station
2 blackout. Our plan is to require the ABWR diesel-
3 generators to come from at least two manufacturers.
4 There are three diesels, and we would have at least two
5 different manufacturers supply them.

6 (Slide)

7 In the area of leak before break, the staff
8 has expressed some guidance and willingness to consider
9 the leak before break technology, where justified. And
10 we have planned to include in our safety analysis report
11 the methodology and acceptance criteria that we will use
12 in applying leak before break criteria. So we agree.

13 The staff has also indicated a plan to look at
14 more realistic source terms in certain areas. We have,
15 in the ABWR certification effort, used more realistic
16 source terms, particularly in the area of gaining some
17 recognition of the value of water in scrubbing certain
18 of the fission products in the case of a severe
19 accident. And in our PRAs we have used some credit for
20 that. So that's included in our effort.

21 (Slide)

22 The staff has indicated a desire to look very
23 carefully at the physical security area, and we plan to
24 comply in all respects to the staff's objectives in that
25 area. We think the ABWR is going to represent a very

1 good design from that point of view because of the
2 separation barriers and access controls that are
3 inherent in a very redundant design that is laid out
4 basically by quadrants.

5 (Slide)

6 The staff has indicated a desire that the safe
7 shutdown earthquake, rather than the operating basis
8 earthquake, ought to be the one that controls the
9 design. We agree philosophically with that position,
10 but we have a design which will meet the acceptance
11 criteria for either and both of the two earthquakes, as
12 they currently are defined. So, we don't consider this
13 a difficult issue.

14 We agree with the staff's plan to recognize
15 that containment leakage is dependent on containment
16 pressure. One of the conservativisms in the past has
17 been to not recognize that factor, and we certainly
18 agree that that is the way the physics is, and it ought
19 to be recognized.

20 The staff has indicated that they expect to
21 see the design accommodate 100 percent metal-water
22 reaction, and we have designed the ABWR to do that, from
23 the point of view of hydrogen control.

24 So, again, these are all issues that we will
25 be in detailed discussion with the staff over the coming

1 months, as the review proceeds, but our assessment,
2 having seen the staff's positions in writing, is that we
3 basically agree. And we don't see any areas here that
4 represent difficult problems, or obstacles to continuing
5 with the program. That's GE's opinion. We will
6 obviously have to, over the coming months, go into the
7 details with the staff and see if they agree with our
8 opinion. But that's our view right now.

9 (Slide)

10 So my summary on the last chart is very
11 simple. We have responded to what was the major issue
12 at our last review here, namely, the scope issue. We
13 have expanded to include essentially the entire plant.
14 And the program overall is on the track that we set it
15 on three years ago, and is going down through the
16 milestones, basically, on schedule. We have really no
17 issues. We only ask that we continue to get the very
18 strong support from the staff that we have received to-
19 date, and we think that this program will be completed
20 successfully.

21 CHAIRMAN ZECH: Thank you very much.

22 Questions from my fellow Commissioners?
23 Commissioner Roberts?

24 COMMISSIONER ROBERTS: I would just repeat
25 what I think I heard you say, TEPCO has committed to

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1 these Number 6 and 7 plants?

2 MR. WILKINS: Yes.

3 COMMISSIONER ROBERTS: That's all I have.

4 Thank you.

5 CHAIRMAN ZECH: Commissioner Carr.

6 COMMISSIONER CARR: On your 60-year life, did
7 you do some special studies on that? What is the
8 controlling component on the 60-year life?

9 MR. WILKINS: Well, we have to look at many
10 different factors, but certainly fluence levels,
11 corrosion allowances, fatigue usage are the three major
12 ones. And it is just a matter of making sure that you
13 specify and include in the design the necessary
14 allowances for the extra 20 years.

15 COMMISSIONER CARR: And that's ongoing, or
16 that is done?

17 MR. WILKINS: The feasibility of it, I would
18 say, is done. We are convinced it can be done, but it
19 is ongoing in the sense that it has to be implemented
20 into each component one-by-one, as the designs are
21 finalized.

22 COMMISSIONER CARR: On the testing and
23 maintenance issue which is under discussion, what is
24 being discussed?

25 MR. WILKINS: Well, the issue is maintaining

1 the level of safety that is in the PRA. When you look
2 at a PRA, it is a very large document that has, I would
3 say, thousands of numbers and assumptions in it. And
4 the challenge is how do you take that and boil it down
5 to exactly what it is you monitor and check throughout
6 the life of the plant, to maintain that level.

7 And it would be very easy to say, well, just
8 make sure that every assumption and number that is in
9 the PRA is maintained. But there has got to be a more
10 practical way to do that. And that's what we are trying
11 to find.

12 COMMISSIONER CARR: I would assume that if you
13 did that as it is stated, that at the end of the plant
14 life it would still be worth 60 years.

15 MR. WILKINS: Well, I --

16 COMMISSIONER CARR: I mean, you are going to
17 keep it in new condition all that time.

18 MR. WILKINS: Well, I think in terms of the
19 margins that are taken credit for in the PRA, I think in
20 most cases we would have the sufficient margin at the
21 end of life to support the PRA. We probably have more,
22 in some cases, at the beginning of life.

23 COMMISSIONER CARR: I am a little curious that
24 you pick two manufacturers for your diesel generators.
25 Does that make you feel warm, that you have two guys

1 making diesels?

2 MR. WILKINS: Well, it is only in the sense
3 that it eliminates some possibilities of common mode
4 failure that could come from having --

5 COMMISSIONER CARR: Because we are
6 standardization now, you are going to build all of these
7 reactor plants alike.

8 MR. WILKINS: One of the trade-offs is between
9 common mode failure and standardization.

10 COMMISSIONER CARR: Have you also looked at
11 gas turbines as opposed to diesel generators, as for
12 another source?

13 MR. WILKINS: We have looked at that. Our
14 present feeling is that diesel is a more practical way
15 to go.

16 COMMISSIONER CARR: All of these have a common
17 fuel supply.

18 MR. WILKINS: Yes, you don't eliminate them
19 all. We agree.

20 COMMISSIONER CARR: Are you as uncomfortable
21 as I am with potential review subjects, these letters
22 that you get, like two months ago? How do you know what
23 the one you get next month is going to say?

24 MR. WILKINS: I think our dialogue with the
25 staff has been very much real-time and effective, and,

1 no, that letter -- I don't think it contained any
2 surprises, from our point of view.

3 COMMISSIONER CARR: Okay, that's all I have.

4 CHAIRMAN ZECH: Thank you.

5 Commissioner Rogers?

6 MR. WILKINS: Let me say, I would say that is
7 consistent with the licensing review basis, in most
8 respects, that the staff gave us in '87. And so we have
9 no problem with that.

10 CHAIRMAN ZECH: Commissioner Rogers?

11 COMMISSIONER ROGERS: I don't have anything.

12 CHAIRMAN ZECH: Commissioner Curtiss?

13 COMMISSIONER CURTISS: No.

14 CHAIRMAN ZECH: Let me just make a couple of
15 comments. First of all, you mentioned Dr. Wolf, and I
16 would appreciate you giving him my respects, because I
17 remember very well the discussion we had at the last
18 meeting when he was here. And you've mentioned
19 expanding the design, and I recognize that you have done
20 that, to include the turbine and the radwaste parts of
21 the plant.

22 Also, we talked about, at the last meeting,
23 Japan and working with them, so that we would benefit
24 from their experience and their views. And it looks
25 like you have done that very well, and I appreciate that

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1 very much.

2 Are there any significant design differences
3 that you can see regarding the Japanese program and the
4 US program?

5 MR. WILKINS: There are a few, and I would say
6 on both sides of the ocean we are trying to make that as
7 few as possible. The design -- the analysis methods --

8 CHAIRMAN ZECH: I don't mean the regulatory
9 differences. I really mean the design differences.

10 MR. WILKINS: Well, let me just mention a
11 couple to give you a feel for it, because we keep very
12 close track of exactly what they are, and we discuss
13 each one of them in detail with the Japanese, to try to
14 eliminate them, but analysis methods are a little
15 different in Japan than they are here in the US and, so,
16 we are analyzing the plant both ways.

17 Now, in general, that doesn't change the
18 design at all. It just means that they do their seismic
19 analysis one way, we do it a little different, and we
20 check it to make sure that it satisfies both.

21 One difference that will be very noticeable is
22 in Japan, because of the rocky sea coast sites, the
23 turbines are typically oriented -- we orient them in
24 line, they orient them crossways -- L-shaped
25 configuration, transverse configuration. And so we

1 have, because of practice here in the US, turned the
2 turbine.

3 We are licensing a single unit plant here in
4 the US, for the certification, whereas what is being
5 built in Japan is a two-unit plant. And so we have had
6 to basically pick out the portions of the two-unit plant
7 that are needed for one. And that's what we are
8 certifying here.

9 COMMISSIONER CARR: How much common have you
10 got between the two? Have you got a lot of common?

11 MR. WILKINS: Common design, you mean?

12 COMMISSIONER CARR: No, no, I mean the two
13 units will use, common equipment? Shared facilities?

14 MR. WILKINS: Shared facilities, the radwaste
15 facility will be shared among the two units. The
16 control room is physically adjacent but, of course, with
17 different equipment for each unit. That's basically it.
18 All of the safety systems, diesels and so forth, are
19 redundant.

20 CHAIRMAN ZECH: But if we looked at the
21 completed Japanese design and the completed US design as
22 you envision them now, we would see two facilities that
23 looked very much the same, is that what you are telling
24 us?

25 MR. WILKINS: That's right. We hope that

1 anyone who considers using this certification in the
2 future will be able to go to Japan and see it.

3 CHAIRMAN ZECH: Another subject that was
4 talked about at the last meeting was carefully testing
5 the acceptability of the advanced electronic and control
6 systems. And I understand, I've been told that you are
7 in the process of doing this.

8 MR. WILKINS: Yes.

9 CHAIRMAN ZECH: Could you comment any further
10 on that?

11 MR. WILKINS: Well, the advanced control and
12 instrumentation designs that are being used in this
13 plant are digital. They use a lot of fiber optic
14 transmission. They have a very high level of redundancy
15 and self-testing, so that if a failure occurs, you can
16 -- it immediately identifies itself. It announces
17 itself and you have enough redundancy to replace a card
18 and, without taking the plant off-line, get back to the
19 unfailed state.

20 Now, that product line is something GE is
21 already doing and operating, selling to operating plants
22 around the world. We have developed, in our case what
23 we call a NUMAC product line, which incorporates those
24 features. And it is being used for many instruments in
25 current operating plants.

1 What we are doing with the ABWR, for the first
2 time, is expanding that to encompass the total control
3 and instrumentation. But by the time we get there, I
4 think we will already have done most of it, piece-by-
5 piece in operating plants.

6 CHAIRMAN ZECH: But do most of these state-of-
7 the-art facilities and equipment you are talking about-
8 - are you going to test it, though, the testing part of
9 it --

10 MR. WILKINS: Oh, yes; oh, yes.

11 CHAIRMAN ZECH: -- test it thoroughly, so that
12 the confidence factor will be high?

13 MR. WILKINS: Yes.

14 COMMISSIONER ROGERS: I have a question.

15 CHAIRMAN ZECH: Yes, go ahead.

16 COMMISSIONER ROGERS: As I recall, the
17 Japanese seem to be moving a little bit more towards
18 total computer control than we have customarily had in
19 this country. Do you envision this plant in Japan being
20 operated to a greater or lesser extent under computer
21 control versus manual control, than would be the case
22 for a US plant with the same design?

23 MR. WILKINS: There are a number of control
24 steps in this plant which we will automate, in the sense
25 of a start-up sequence, or turbine roll, or a given step

1 in a sequence. But we do not plan to turn the plant
2 over to a computer. It will be much more of -- where
3 the operator may now have to turn three knobs and do two
4 things to make something happen, he would have a button
5 to push that would make that same thing happen. And it
6 would be less operator-action, but we don't intend to
7 turn the plant over to a computer. It will be manually
8 operated.

9 COMMISSIONER ROGERS: And you would expect
10 that it would probably be the same then for operation in
11 the US and in Japan?

12 MR. WILKINS: Yes.

13 CHAIRMAN ZECH: Well, we mentioned a couple of
14 other things, one was the human factors engineering,
15 factored in early in the design and the development of
16 the systems. And my information is that that is being
17 addressed, also. Could you comment, just very briefly,
18 on that?

19 MR. WILKINS: Yes, let me just describe the
20 approach that we are using in that area. One of the
21 things that we did, after Three Mile Island, was
22 developed for the boiling water reactor, in fact, for
23 the operating plants, what we called the symptom-based
24 emergency operating procedures.

25 CHAIRMAN ZECH: I think we are all familiar

1 with those.

2 MR. WILKINS: Well, what we found is that now
3 that we have those, they provide a very good recipe for
4 how to organize the information that is presented to the
5 operator, because you can now go down through basically
6 the tasks that the operator has to perform. And say,
7 okay, what information does he need to do that task,
8 what does he need to check, and then what is the best
9 way to provide that information.

10 And that has resulted in quite a different
11 approach to the presentation of information to the
12 operator. That has been done partially on operating
13 plants, as part of the safety parameter display systems
14 and other retrofits since Three Mile Island.

15 In the ABWR we are, of course, able to
16 implement that philosophy almost from the beginning.

17 CHAIRMAN ZECH: One other thing we suggested
18 at the last meeting is that you continue to work very
19 closely with the ACRS. And it is obviously apparent you
20 have done that. So, I would encourage you to continue
21 working with the ACRS, also, as well as the staff.

22 Well, let me just say I am encouraged by what
23 I have heard today. I commend you again for expanding
24 the design to include the turbine and radwaste
25 facilities. And I think the suggestions that we have

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1 given you, that you have obviously carried forth, too,
2 deserve recognition on our part that you have been very
3 responsive to the suggestions we've made.

4 So, I commend you for what you are doing. And
5 I ask you to keep up the good work. We think that the
6 standardization and certification process is the future
7 of nuclear energy in our country. And certainly what you
8 have done I think is very responsive to the Commission's
9 suggestions and direction, and, again, I commend you for
10 what you have done.

11 COMMISSIONER ROBERTS: A quick question.

12 CHAIRMAN ZECH: Yes.

13 COMMISSIONER ROBERTS: Is the successful and
14 satisfactory completion of your contract with TEPCO
15 contingent upon US certification?

16 MR. WILKINS: No, it is not.

17 CHAIRMAN ZECH: Any other questions?

18 COMMISSIONER CARR: Yes.

19 CHAIRMAN ZECH: Go ahead.

20 COMMISSIONER CARR: Would you say this plant
21 is going to be less complex, or more complex, or about
22 the same as the current modern BWR?

23 MR. WILKINS: I would say it is going to be
24 considerably less complex. We have had -- first of all,
25 this plant has been 100 percent designed since Three

1 Mile Island. So we have been able to take everything we
2 have learned since Three Mile Island and basically put
3 it into the design from scratch.

4 Second, we have had utility operators and
5 maintenance people on the design team in large numbers,
6 since the beginning. And we have found that they have
7 very strong views about simplicity. And I think we have
8 benefited very greatly from that involvement.

9 CHAIRMAN ZECH: Good, I am glad you have done
10 that. I think we mentioned that last time, too, as far
11 as involving the operators themselves in the design.
12 And of course making it simpler is also important, as
13 much as you can do so and still make it safe and logical
14 to operate.

15 But I think the operators can give you
16 suggestions, and the fact that you have worked with
17 them, I think, also is the proper thing to do.

18 Any other questions from fellow Commissioners?

19 (No response)

20 CHAIRMAN ZECH: All right, thank you very
21 much. We appreciate it. Give Dr. Wolf our respects,
22 and tell him we appreciate very much him listening so
23 carefully to the Commission at the last session.

24 MR. WILKINS: Thank you very much. I am sure
25 he will be glad to hear that.

1 (Whereupon, the first panel was excused)

2 CHAIRMAN ZECH: Will the staff come forward,
3 please?

4 Mr. Stello, please begin.

5 MR. STELLO: Thank you, Mr. Chairman.

6 We are, as you will hear this afternoon,
7 working very hard on dealing with the review of the
8 ABWR, because it is one of the first steps in the
9 Commission's strongly held view of the need for
10 standardization and certification. The schedules that
11 you have heard, and you will hear again in a moment, we
12 believe they are real. We have sufficient resources and
13 are fairly confident that we will be able to abide and
14 meet the schedules, as you had them projected today.

15 We are doing everything we can to make sure
16 that nothing will happen to interfere with that. And I
17 am confident that is the way it will turn out.

18 This is one of several reviews that we have
19 begun in standardization and is, at the moment, probably
20 leading and will be forming the cutting edge. We've got
21 a lot to learn, so there is some reason to be cautious
22 about going through a certification process. But at the
23 moment, I have no reason to believe that there is
24 anything to prevent us from doing this.

25 I will ask Jim Sniezek to give you some

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1 opening comments on where we are, and then we will turn
2 to Charlie Miller to give the briefing.

3 CHAIRMAN ZECH: Thank you.

4 Mr. Sniezek, you may begin.

5 MR. SNIEZEK: Thank you, Mr. Chairman,
6 Commission.

7 First of all, I would like to introduce the
8 people at the table. On my left are Les Rubenstein,
9 he's the responsible Assistant Director in NRR for this
10 program; on Vic's right is Charlie Miller, who is the
11 responsible Branch Chief for this program; and an
12 important individual way down on the far right is Dino
13 Scaletti, he is the Project Manager, who is honchoing
14 the review through, as Vic said, on schedule.

15 Before I turn the briefing over to Charlie
16 Miller, I would like to make a few preliminary remarks.

17 As we perform the ABWR review, it is necessary
18 to use severe accident insights for certain of the
19 chapters. These aspects of the review were closely
20 coordinated with the Office of Research, to make sure
21 that we are using the most current information we have
22 available in-house, the state-of-the-art technology. We
23 believe by doing this we will eliminate, or at least
24 substantially reduce, the potential for any impact on
25 the design of these plants in the future. So, we are

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1 doing it right through the review process as we proceed
2 chapter-by-chapter.

3 In the near future, also, the Commission will
4 receive 10 CFR Part 52 from the Office of the General
5 Counsel. It is anticipated that the ABWR will be the
6 first standardized plant to go through the certification
7 process under Part 52. Therefore, it is important, we
8 recognize, to closely coordinate with OGC, to make sure
9 that the track we are on will track the 10 CFR Part 52
10 process, once it is promulgated.

11 In pursuing the standardization process, the
12 staff, as well as the designers, are using the
13 experience gained from the current operating plants, and
14 we believe that this will enhance the safety of these
15 designs. And I believe that is the will of the
16 Commission.

17 We have identified areas where review goes
18 beyond that specified in the current standard review
19 plan. We have also provided the Commission with this
20 information, as it was identified in the ABWR licensing
21 review basis referred to by GE in August of 1987, and in
22 a recent memorandum to the Commission, which was issued
23 last week, SECY 89-013.

24 From the GE briefing, I believe you have heard
25 that GE and the staff are in general agreement with the

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1 approach being taken on these additional technical
2 issues.

3 I would now like to turn the briefing over to
4 Charlie Miller.

5 CHAIRMAN ZECH: Thank you very much.

6 You may begin, Mr. Miller.

7 MR. MILLER: Mr. Chairman, fellow
8 Commissioners.

9 First slide, please.

10 (Slide)

11 I would like to give you a status report today
12 of how we stand with our review of design certification
13 for the advanced boiling water reactor. I would like to
14 talk about the schedule, I would like to talk about our
15 desire for the safety enhancements, so that we can meet
16 the Commission's severe accident policy and
17 standardization policy.

18 I would also like to talk about severe
19 accident guidance that we feel we need to get to the
20 designers as soon as possible. And finally, I would like
21 to talk about our coordination efforts with the Japanese
22 government.

23 (Slide)

24 In August 1987, Dr. Murley signed a licensing
25 review basis, and in that licensing review bases we

1 tried to set forth the ground rules for the review of
2 this plant. The application for design certification
3 was received in September of 1987. The approach that is
4 being used in the review of this plant is to receive
5 four groups of safety analysis modules. These started
6 coming in in September of 1987, and will proceed to come
7 in through January of 1989.

8 Since the time of the initial receipt, as GE
9 has mentioned, they have expanded the scope of the
10 review to include the balance of plant and the radwaste
11 systems. In December, we received the safety analysis
12 information on the turbine island, which codifies GE's
13 commitment to give us a complete plant. And we
14 anticipate the receipt of the radiological waste system,
15 which we hope to receive in the coming months.

16 As Mr. Sniezek has said, we are proceeding
17 with the review schedule as initially set up, and we
18 have no information that would give us any cause for
19 alarm at this point.

20 Our review strategy is to try to issue a
21 safety evaluation for each module. Our first safety
22 evaluation will go out in March of this year, and we
23 will proceed in modular form until January of 1990. May
24 I have the next slide, please.

25 (Slide)

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1 By January of 1990, we also expect to have the
2 turbine island and radwaste systems reviewed. We plan
3 on taking that information to the ACRS, full committee,
4 in the Spring of 1990, provide an integrated SER by July
5 1990, which will be used as the basis for the final
6 design approval.

7 Once the final design approval has been
8 obtained, our plans are to begin the rulemaking at that
9 time. We anticipate at this point that the rulemaking
10 will take about one year. The rulemaking would end in
11 about October 1991, and it would culminate in a
12 certified design, which would be encompassed into the
13 NRC regulations.

14 (Slide)

15 I would like to say a few more words about the
16 licensing review basis. The licensing review basis, as
17 we previously mentioned, was signed in August of 1987,
18 and at that time the EDO sent a copy to the Commission
19 for your information. What we tried to achieve in this
20 licensing review basis was to try to identify those
21 areas that go beyond the standard review plan, and also
22 try to address those areas where we have had problems in
23 the past, in previous experiences with standard reviews.

24 (Slide)

25 At that point in time our current efforts on

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1 severe accident resolution were at an earlier state. We
2 felt that it was necessary to give General Electric as
3 much information as we possibly could at that point in
4 time, so that the review could proceed on schedule.

5 In addition, the licensing review basis gives
6 our understanding of the General Electric commitments
7 that will be used during this review. I would like to
8 highlight a few of these.

9 Severe accident policy requests that a PRA be
10 done and include both internal and external events.
11 General Electric has committed to do such a PRA, and we
12 are anticipating the receipt of that PRA by the end of
13 this month.

14 10 CFR 50.34(f) also required measures to
15 accommodate hydrogen generation and the reaction of
16 equivalent of 100 percent Zirc-water reaction. As
17 General Electric told you in a briefing earlier today,
18 they have committed to meet that.

19 The licensing review basis also certifies an
20 agreement that they will address USIs and GSIs. The PRA
21 will demonstrate that they have a mean frequency of
22 occurrence.

23 Next slide, please. Excuse me, I'm getting
24 ahead of myself.

25 (Slide)

1 To have a mean frequency of occurrence for
2 off-site doses in excess of 25 rem beyond one-half
3 radius to be less than once per million reactor years,
4 considering both internal and external events, and that
5 a conditional containment probability of less than .1
6 when weighted over credible core damage sequences will
7 be met.

8 COMMISSIONER CARR: Are they picking the
9 external events, or did we pick them?

10 MR. MILLER: They are addressing the external
11 events that they believe can be quantified at this time
12 -- things like internal fire damage, tornadoes, seismic.
13 I think at this point we both are in general agreement
14 that they've tried to pick events that could be
15 quantified as best is possible.

16 CHAIRMAN ZECH: All right. Let's proceed.

17 MR. MILLER: Thank you.

18 Also included in the Appendix on a licensing
19 review basis are some site enveloping parameters. Since
20 no standard plant can identify a particular site for
21 which the plant would be built, General Electric has
22 attempted to try to envelope the sites that would be
23 acceptable, by providing a set of parameters.

24 Next slide, please.

25 (Slide)

1 As General Electric talked about in some
2 detail, the staff had met and developed a list of
3 technical issues that they believe are important to get
4 out to the designer as early as we possibly could and
5 which needed early management attention in order to get
6 that information to them.

7 We met on those issues and provided guidance
8 to the designers in the fall of this year.

9 Next slide, please.

10 (Slide)

11 As Mr. Sniezek mentioned, SECY-89-013 gave the
12 details of the information that we provided to the
13 designers.

14 We believe that this was an important step
15 because with the guidance that we currently are working
16 under, which is the Commission's policy, we want to give
17 the industry as much information as we can so that we
18 can keep the review on schedule.

19 Next slide, please.

20 CHAIRMAN ZECH: Before you go off that point,
21 SECY-89-013 was just issued January 19th, 1989 -- that
22 wasn't very long ago. I appreciate the fact that G.E.
23 said they had been working with the staff and they
24 apparently weren't too surprised by this.

25 I guess my only concern is that a paper as

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1 significant as this, Design Requirements Related to the
2 Evolutionary Advanced Light Water Reactors, it seems to
3 me that as the Commission needs the papers in time to
4 read them and digest them and understand them, so do the
5 vendors.

6 Was there anything in here that you thought
7 should have surprised the suppliers, the people that
8 will be interested in this SECY paper?

9 MR. MILLER: We don't believe that there's
10 anything in there that came as a surprise to the
11 vendors. We meet with the vendors periodically, and we
12 try to give them our thinking on any of those subjects
13 at any given time.

14 In fact, in the case of General Electric, I
15 think you'll see most of the information in that SECY
16 paper was provided in the licensing review basis.

17 CHAIRMAN ZECH: Okay. But if there would be
18 something significant, if there would be anything that
19 might surprise them, they need as much advance notice as
20 they can get, that's my point, and I just want to make
21 sure that you're trying to do that because --

22 MR. MILLER: Yes, we are.

23 CHAIRMAN ZECH: -- if there's anything that
24 you are to expecting to design in this new advanced
25 design, they need to know it as soon as possible.

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1 MR. MILLER: Right. That's the intent of what
2 we did. When I said that it's not a surprise, what I
3 meant was the formal receipt of the letter was not a
4 surprise. We indicated to them --

5 CHAIRMAN ZECH: Fine. And the substance of
6 the letter wasn't surprising to them.

7 MR. RUBENSTEIN: Many of the issues have
8 evolved from the discussions that grew out of the EPRI
9 requirements documents and the experience that we've had
10 in our operating reactors and our review process before.
11 So, these have been issues that we've discussed over a
12 long period of time with both the industry and in an
13 operating reactor sense and in the requirement sense.

14 CHAIRMAN ZECH: My understanding is that's the
15 case, if I understood the G.E. presentation correctly,
16 and I think I did, and what you said, too, I understand
17 that. My only point to the staff is, I hope that you'll
18 get these requirement type papers and design papers of
19 such potential impact out and discuss them as soon as
20 you can because this is the important time to do it,
21 well up front, so that we don't surprise them at the
22 end.

23 COMMISSIONER CARR: They'll be less surprised
24 than the Commission was.

25 CHAIRMAN ZECH: Yes. Well --

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1 COMMISSIONER CARR: I noticed here -- and I
2 haven't read the paper yet, unfortunately -- but what
3 are you going to do when the NRR position doesn't
4 necessarily reflect the Commission's position?

5 MR. STELLO: We will accept the Commission's
6 position.

7 COMMISSIONER CARR: I know, but it's late to
8 do that.

9 MR. STELLO: It's interesting, but what can I
10 do about it?

11 COMMISSIONER CARR: I don't know.

12 MR. STELLO: If the Commission is going to do
13 something, and I would think it would be incumbent to do
14 it as quickly as possible --

15 CHAIRMAN ZECH: Well, that's what I mean. So,
16 we have to get the papers as soon as possible.
17 Commissioner Carr's point is a big point. He
18 understands what we are saying.

19 MR. STELLO: Well, remember in yesterday's
20 briefing -- we're trying to do our best to get them out
21 as quickly as we can. We have to have the discussion,
22 the dialogue, to fully develop and understand it, but
23 these are not new issues, these are issues that have
24 been floating around and were issues raised as long ago
25 as two or three years ago, and it's time to fish or cut

1 bait because the designer has to solidify, you know, on
2 them.

3 CHAIRMAN ZECH: Well, we understand that. I
4 think Commissioner Carr has really hit the point really
5 on the nose when he says that -- you know -- if you're
6 working that closely with the designers -- we didn't get
7 it until just a few days ago. If we have any concerns
8 about it, I recognize that you're going to follow on our
9 guidance, but we want to participate early on, too.

10 I have had a chance to read the paper very
11 quickly. I don't have any problem with the law, but we
12 might have. My only point is, please get it to us as
13 soon as you can, too.

14 MR. STELLO: Mr. Chairman, I assure you, we
15 make every effort to try to get these identified, and as
16 soon as we have them, to get them up to the Commission
17 as quickly as possible. We are on the cutting edge of a
18 new process of trying --

19 CHAIRMAN ZECH: I know, but we need it more
20 than a few days, though, ahead of time, and perhaps if
21 you're talking with the suppliers and the designers,
22 maybe we need to get an earlier briefing on at least
23 what you are thinking about, rather than get the final
24 paper.

25 In any case, you understand what I mean, and

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1 we appreciate the fact that we are trying to be on the
2 cutting edge. We're working closely with new
3 technology. We understand all that. We just want to
4 make sure that we have a chance to participate to the
5 extent that we can make some perhaps useful suggestions.
6 You know that we generally support the staff fully, but
7 there are times when we do have something that might be
8 useful to you, and we just want to be in the process as
9 early as possible. That's my only point. Let's
10 proceed.

11 MR. MILLER: Next slide, please.

12 (Slide)

13 Our basis for the guidance to the designers
14 was a standardization policy statement, plus the
15 anticipation of proposed Part 52.

16 In our letters that we sent to the designers,
17 we asked that the designs be essentially complete in
18 detail. This was our attempt to try to add the NRR
19 position on top of the Commission's position that -- you
20 know, we recognize that the Commission has asked for
21 complete designs and, in a certain sense, it's just the
22 case of trying to hammer that point home again.

23 Next slide, please.

24 (Slide)

25 In addition, we notified the designers that we

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1 would give review priority to those designs which are
2 essentially complete, and that all portions of the
3 design would be subject to staff review against the
4 current SRPs and regulations.

5 Next slide, please.

6 (Slide)

7 CHAIRMAN ZECH: Before we go off that point,
8 let me just make one other point so that the staff won't
9 misunderstand what I'm trying to say.

10 I think this paper you've given us, this SECY-
11 89-013, as far as my understanding of it is, it is,
12 indeed, consistent with the Commission's policy
13 statement on severe accidents, and also I think it is
14 consistent with the Commission's desire to make as many
15 safety enhancements to future plants as we think are
16 feasible and appropriate.

17 So, I recognize that you have tried to do what
18 we have asked you to do. My only point is, it would
19 have been helpful to get it a little sooner. I think
20 you have done exactly what we want to do. I think, as
21 far as I understand it, that it is in line with guidance
22 we've given you, but my only point was that it would
23 have been useful to have it a little sooner.

24 All right, let's proceed.

25 MR. MILLER: In order to enhance the safety of

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1 future designs, the staff expects to go beyond the SRP
2 in our review. We think that there are certain areas
3 where we need to do that. That is probably one of the
4 biggest reasons for trying to get this information out,
5 as you said, Mr. Chairman. We want the designers to
6 know what is expected of them early on.

7 General Electric went through the list of the
8 items that were included in the letter, some of which
9 are fire protection, electrical systems, hydrogen
10 generation. I won't dwell on those unless the
11 Commission --

12 COMMISSIONER ROBERTS: Well, before you leave,
13 what's the staff's objective, and how will the safety
14 goals be taken into consideration? At one point, we had
15 a paper for Commission decision on how far to go with
16 requiring safety improvements. Now you say you are
17 going beyond the standard review plan and beyond our
18 regulations. How far beyond? What's the objective?
19 How does the safety goal factor into this?

20 MR. MILLER: I think the safety goal factors
21 into this, Commissioner Roberts, from the respect that
22 we want to assure that our future designs meet the
23 safety goal.

24 MR. STELLO: Let me say, I think what I
25 believe we've done is to take the advice and the

1 understanding that we have of where the Commission has
2 been on this subject, and having to make decisions in
3 the real world, take those policy guidance and translate
4 them.

5 If you recall the earlier slide that had
6 reference to 25 REM, half-mile, 10 to the minus 6. The
7 Commission has dealt with an issue of significant
8 release not to exceed a frequency of 10 to the minus 6.
9 I mean, that's something the Commission has dealt with,
10 the issue of the containment, less than a 10 percent
11 chance of a containment problem. This is one of the
12 issues the Commission has indicated it wishes to deal
13 with in future designs.

14 We have taken a position to be able to take
15 the next step, 100 percent metal-water reaction. Those
16 were issues that were pending and the Commission dealt
17 with them in its severe accident policy statement, and
18 we are now translating those and they, indeed, go beyond
19 the regulations because I think the current regulation,
20 if my memory serves right, it was a 75 percent metal-
21 water reaction for those plants to which it applies. I
22 believe, if my memory serves me right, that's what is
23 now in the regulation, I think. So, we are beyond it,
24 and what we have done is taken everything that we
25 understand the Commission has promulgated in the way of

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1 documents dealing with the subject -- in its policy
2 statement on safety goals, on severe accidents -- and
3 reduced those to application for this review.

4 So, while they clearly do go beyond the
5 regulations for standard review of plants that are in
6 existence, they are clearly, in my view, consistent with
7 the policy this Commission has given us.

8 CHAIRMAN ZECH: And I think that's correct. I
9 agree with the Executive Director for Operations. I
10 think the Commission has given them that kind of
11 guidance, and I think they are doing what we have asked
12 them to do, in my judgment.

13 COMMISSIONER CARR: So, you could rephrase
14 that as going beyond the SRP and the regulations, but
15 they will stay within the bounds of the policy
16 statement.

17 MR. STELLO: Yes, sir.

18 MR. RUBENSTEIN: Yes, sir.

19 COMMISSIONER ROBERTS: That sounds a little
20 better.

21 MR. STELLO: Yes, sir.

22 COMMISSIONER CARR: I have a little problem
23 with how far beyond is usual. How many areas was what
24 was worrying me.

25 MR. STELLO: Only where the Commission has

1 given us the policy and guidance, and it is consistent
2 with that policy and guidance.

3 COMMISSIONER CARR: Enough said.

4 CHAIRMAN ZECH: All right. Good. Let's
5 proceed. We've settled that. Stay within our guidance,
6 that's what we're saying, and I think you have. That's
7 what I think, you have, and I guess we've agreed that
8 you have. So, proceed.

9 MR. MILLER: Next slide, please.

10 (Slide)

11 With regard to severe accident guidance, we
12 feel that it's necessary to get severe accident guidance
13 solidified as soon as possible in order that we can get
14 this guidance out to the designers, to keep the reviews
15 on schedule.

16 Currently in NRR, we've held preliminary
17 discussions and we're continuing to hold discussions so
18 that we can form our positions and get them up to the
19 EDO. In this respect, Mr. Chairman, we commit that any
20 positions that are taken by the staff with regard to
21 these will be forwarded to the Commission well in
22 advance of any notification given to the designers.

23 CHAIRMAN ZECH: Fine. Thank you.

24 COMMISSIONER CARR: Do you still plan to go
25 with the rule in that area, or do you know yet?

1 MR. STELLO: Don't know yet.

2 MR. MILLER: I think I've covered the
3 information on the next slide. I've made the point that
4 it's important that we get these issues resolved in a
5 fairly --

6 CHAIRMAN ZECH: Let me just ask -- I have a
7 quick question on that issue.

8 MR. MILLER: Yes, sir.

9 CHAIRMAN ZECH: How is research, our research
10 branch, interfacing into this -- their work, in
11 providing guidance to the staff as well as to the
12 vendors?

13 MR. SNIEZEK: Let me address that, Mr.
14 Chairman. We started out our discussions with the
15 Office of Research, to sit down to understand from them
16 where their views are coming from, what they've learned
17 so far. NRR has our own internal meeting to really hash
18 around internally, and we go back and meet with the
19 Office of Research again and come to a joint position,
20 and then address it to the EDO who is going to bring it
21 to the Commission.

22 CHAIRMAN ZECH: Fine. Thank you. Let's
23 proceed.

24 MR. MILLER: Next slide, please.

25 (Slide)

1 I'd like to talk a little bit of our
2 coordination with the Japanese Government. We've been
3 coordinating with the Ministry of International Trade
4 and Industry in Japan, MITI, for the past few years.

5 We've made two visits to Japan, in February
6 and October of this year, and we're continuing to keep
7 in close contact with them.

8 Each party has a contact which we work
9 through. We continue the coordination closely, and we
10 keep each other apprised of our reviews as we proceed.

11 As General Electric mentioned, two units are
12 being -- will be constructed at Kashiwazaki site. For
13 your information, currently there are five BWRs, BWR/5s,
14 at that site. One, I believe, is in operation, and four
15 under construction currently.

16 Next slide, please.

17 (Slide)

18 This is some information that I think General
19 Electric has previously covered. It gives some dates
20 for the Japanese construction of the plant, and one of
21 the things to note is that they plan on building this
22 plant in about five years, from the beginning of
23 construction to commercial operation.

24 Mr. Chairman, you --

25 CHAIRMAN ZECH: Beginning of construction--

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1 that's not counting all the planning time that's gone in
2 ahead of time? Beginning of construction --

3 MR. MILLER: No, sir. This is start of
4 construction to commercial operation.

5 CHAIRMAN ZECH: There's no reason a plant
6 can't be built in five years, is there?

7 MR. MILLER: There's no reason why it can't.

8 MR. STELLO: There is sufficient information
9 and experience to suggest that it, in fact, can be, and
10 has been -- and even in the United States, I might add.
11 We have done it at St. Lucie. I think it was less than
12 60. I think it was 48 months.

13 COMMISSIONER CARR: But that would lead you to
14 believe there's a lot of long-lead orders in front of
15 that 60-month period.

16 MR. STELLO: Oh, yes. Well, this design and
17 review has been going on now for several years.

18 CHAIRMAN ZECH: Planning and design review
19 time is all very important, but once you start building,
20 you ought to be able to build it in five years.

21 MR. STELLO: Yes.

22 CHAIRMAN ZECH: All right. Let's continue.

23 MR. MILLER: The final point I was going to
24 make, Mr. Chairman, you touched on with General
25 Electric, and that's concerning the design differences

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1 between the US and Japanese design. I think General
2 Electric touched on some of these. The L-shaped turbine
3 island as opposed in-line; separate control room versus
4 that we're having a single control room since we're
5 single units in the United States.

6 That information is being supplied to us at
7 your request, by General Electric. We've got some of
8 the information, we're continuing to get more. That
9 concludes my presentation.

10 MR. STELLO: And we are finished, Mr.
11 Chairman.

12 CHAIRMAN ZECH: All right. Thank you very
13 much. Questions from my fellow Commissioners?
14 Commissioner Roberts?

15 COMMISSIONER ROBERTS: No.

16 CHAIRMAN ZECH: Commissioner Carr?

17 COMMISSIONER CARR: I owe you an apology. I
18 did read your paper, I just didn't know what the number
19 was on it.

20 The only -- I had a question on page 2 when
21 you talk about evolutionary ALWRs. Why did you put
22 "evolutionary" in there? I assume you're going to have
23 the same kind of fire protection no matter what kind of
24 ALWR comes along.

25 MR. STELLO: You remember the Commission's

1 advanced reactor policy statement asked designers to sit
2 back with a clean slate and see what you could do.
3 Under those conditions, I believe, for those kinds of
4 advanced reactors, you could really look at some
5 significant changes and innovations, where you have
6 total, complete isolation and separation. And I would
7 think that that would allow an approach for fire
8 protection that would be somewhat, and in many respects,
9 significantly different, and that's the reason for --

10 COMMISSIONER CARR: But you don't mean to
11 prevent them from doing that in this case, if they want
12 to.

13 MR. STELLO: Oh, no, no, but in this case this
14 design is not one that I would put in the category of an
15 advanced reactor such as an advanced HTGR or the reduced
16 PRISM or 600 megawatt designs that are being considered,
17 which are well beyond in terms of the advancing
18 technology with these designers.

19 COMMISSIONER CARR: I thought that the ALWR
20 was the advanced reactor, I guess.

21 MR. STELLO: Well, then, I ask you to find
22 another word for the ones coming beyond that.

23 COMMISSIONER CARR: And your statement says
24 "Other design requirements for future ALWRs may arise
25 during the development of the final acceptance criteria

1 related to this issue", and I worry about giving them a
2 moving target in that area of fire there. You are
3 saying -- you are kind of reserving something there, and
4 I don't know what it is. That's on page 3, at the top
5 of the page, talking about diesels and gas turbines --

6 MR. SNIEZEK: Right. What that refers to is
7 identifies certain issues so far. These are the ones
8 that we had in mind. As we get further into the review,
9 there may be other issues that get identified. We don't
10 know what they are yet.

11 COMMISSIONER CARR: That's what worries me,
12 but it didn't seem to worry them.

13 MR. SNIEZEK: It's a fact of life. If you
14 identify it, you identify it, and we'll have to deal
15 with it when that happens.

16 COMMISSIONER CARR: On page 4 where you have
17 operating bases earthquake. It says "The staff will
18 take this issue under consideration as part of the
19 design certification process". So, you'll have that
20 done in accordance with your schedule then, huh?

21 MR. SNIEZEK: Yes, sir.

22 COMMISSIONER CARR: And at the bottom of the
23 physical security thing it says "This discussion should
24 include an identification of design features that
25 decrease reliance on physical security programs for

1 sabotage protection". And I said "For instance" to
2 that, but I heard him say something about quadrants or
3 --

4 MR. SNIEZEK: Yes.

5 MR. MILLER: We feel that if the plants could
6 be designed up front, some of the features that you are
7 designing for the prevention of fires can also be used
8 in a design prevention of damage due to physical
9 security problems. If it's in a quadrant, you'd have
10 one train knocked out, but you'd have another train in a
11 separate quadrant that wouldn't be affected, and you
12 could safely shut down the plant.

13 MR. SNIEZEK: We envision that -- simplicity
14 was a question before -- there could be probably fewer
15 doors, fewer locks, fewer guards, fewer keys. If it's
16 designed to consider its physical security at the front
17 end of the process.

18 MR. RUBENSTEIN: In principle, the fire area
19 and a vital area have a certain symmetry. Both would--
20 one could be violated and still have the capability in
21 another fire area or another vital area bringing the
22 plant to a safe shutdown.

23 COMMISSIONER CARR: So, the thrust is not so
24 much against protection from sabotage as it is continued
25 safety with sabotage occurring. I had some -- you're

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1 going to design this thing so that people couldn't
2 sabotage it.

3 MR. STELLO: No, it clearly does -- it is--
4 it is a feature which makes sabotage less likely. It is
5 a mission --

6 COMMISSIONER CARR: It is less effective.

7 MR. STELLO: Well, successful sabotage less
8 likely.

9 COMMISSIONER CARR: Okay.

10 MR. STELLO: They may be able to damage a
11 piece of equipment, but not inflict damage on the plant.

12 COMMISSIONER CARR: Okay.

13 CHAIRMAN ZECH: Commissioner Rogers?

14 COMMISSIONER ROGERS: Yes. At the very end of
15 this process, you have left 14 months for issuing the
16 final design approval. Do you expect, and I imagine you
17 do, public hearings on this matter? Since there are a
18 number of new technical details here, what is -- have
19 you asked GC their opinion as to how realistic that 14-
20 month period is in terms of being able to move
21 expeditiously through it, with public hearings and all
22 the possibilities that open up when you are in that
23 process?

24 MR. MILLER: Acknowledge the fact,
25 Commissioner, that there are a lot of uncertainties in

1 this. The 14 months is our best estimate at this time.
2 Some people are more optimistic, some people are more
3 pessimistic.

4 MR. STELLO: It can be done within that time
5 frame, following our procedures, using some allowance
6 that it will take more time -- I think a hearing from
7 beginning to end, from start to finish, 11 months?

8 MR. MURRAY: Well, Mr. Chairman, it depends on
9 the issues that are -- that may be raised, and we can't
10 always predict with any certainty what those issues
11 might be, looking down the road.

12 COMMISSIONER CARR: The quicker you complete
13 the designs, the less likely there are to be issues.

14 MR. SNIEZEK: I think what's very important is
15 the Part 52 process that's to be coming forward. It
16 depends on what type of hearing is conducted and the
17 recommendation coming from OGC to the Commission, Part
18 52 and how it's structured, what type of hearing it
19 requires will be very important in the timing process at
20 the end.

21 CHAIRMAN ZECH: Well, that's coming to the
22 Commission very soon, I believe, is it not?

23 MR. MURRAY: Yes, it is, and it's on schedule.
24 I think the schedule is for next month.

25 CHAIRMAN ZECH: All right.

1 COMMISSIONER ROGERS: Well, it would just seem
2 that with everything else going along well, if it is all
3 going on schedule -- certainly, GE says their
4 submissions are on schedule -- if we can keep our
5 responses on schedule and we hit that 14-month period,
6 it would be very well to have anticipated as much as
7 possible, of what might happen and to see that we can
8 also complete it within the 14 months.

9 COMMISSIONER CARR: It's probably going to
10 need you to certify the design without a site. Sites
11 are what bring people to court.

12 CHAIRMAN ZECH: Commissioner Curtiss?

13 COMMISSIONER CURTISS: I just have one quick
14 question on the SECY paper. I haven't reviewed it
15 thoroughly, but over on page 4, the reference at the
16 very tail end to source terms. Could you expand a
17 little bit on what the current knowledge is and why, in
18 your judgment, at this point it appears that the TID
19 that we use is not consistent with current knowledge?

20 MR. STELLO: Go ahead.

21 MR. RUBENSTEIN: It goes to the same kind of a
22 thing that GE spoke of before about giving them credit
23 for decontamination factor, and looking at a non--
24 looking a little more mechanistically at the source
25 term. And this is one of the optimization subjects that

1 EPRI has proposed. We do have members of the staff
2 available who could talk details.

3 COMMISSIONER CURTISS: Is that a function of
4 the changes in the design, or is that a function of our
5 more recent knowledge of --

6 MR. RUBENSTEIN: Knowledge.

7 MR. STELLO: TID 14844. That document is
8 dated I think 1950s, and we have clearly, over the years
9 now, through our experience in research, gained an
10 enormous amount of knowledge about source term and
11 fission product behavior, and it's applying that
12 knowledge, that information, to really understanding
13 rather than this arbitrary mechanistic way of evaluating
14 the fission product release.

15 COMMISSIONER CURTISS: If the knowledge is
16 independent of the design question, or largely
17 independent, would it also be true that the TID that we
18 use is overly conservative? I assume that's what we're
19 talking about here, or not just the ALWRs before the
20 existing plants as well?

21 MR. STELLO: Yes, and NUREG 1150, and when we
22 -- and there go schedules it again -- but whenever we
23 get to finishing that and bringing that to the
24 Commission, NUREG 1150 represents the simulation of all
25 of that knowledge and various accident environments and

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1 what their consequences might be. If you will, 1150
2 represents today's understanding and application of
3 source term as we now know it.

4 COMMISSIONER CURTISS: That was my next
5 question. Does 1150 provide essentially the database
6 for this statement?

7 MR. STELLO: Well, the data that was used in
8 1150 is what provides a basis for this statement.

9 COMMISSIONER CURTISS: All right. And then--

10 MR. STELLO: The source term data itself.

11 COMMISSIONER CURTISS: All right. Finally,
12 would it be fair to conclude from this that based upon
13 this more current knowledge that we have, that the--
14 that knowledge -- and in large part it's 1150 -- is such
15 that we could draw generic conclusions from that as
16 opposed to plant-specific conclusions, and perhaps based
17 upon that knowledge, address the source term issue not
18 just for the ALWRs but for existing plants, in a generic
19 way, or is that reading too much into what this
20 statement says?

21 MR. STELLO: Well, forgetting this statement,
22 that's generally consistent with the approach that we
23 provided you -- and I forgot the SECY paper that dealt
24 with 1150 that outlined what the kinds of uses of 1150
25 ought to be, and it deals with that very question.

1 COMMISSIONER CURTISS: We talked at that
2 meeting, as I recall, about the extent to which we'd
3 rely on the absolute values that come out of 1150, and
4 what I'm trying to get at here is --

5 MR. STELLO: You're talking about the
6 fundamental technology and understanding, and that's
7 what we talked about in terms of uses of 1150 technology
8 as well as its application.

9 MR. SNIEZEK: I think, Commissioner Curtiss,
10 though, you raise a good point, and that is the
11 important role that research plays, our interface with
12 research on these issues, to make sure we have the
13 current knowledge of what's going on in reactor
14 technology, as we go forward with the ABWR program.

15 COMMISSIONER CURTISS: It seemed to me that
16 just from this reference, it was somewhat cryptic. It
17 wasn't clear whether it was the advance in the design
18 that permitted you to reach a conclusion with respect to
19 the existing TID we use, or whether it was the data that
20 we've acquired independent of the design.

21 MR. SNIEZEK: It's the data.

22 COMMISSIONER CURTISS: All right. Thank you.

23 CHAIRMAN ZECH: Well, we know that the OGC
24 work on Part 52 is coming, concerning standardization
25 and pre-selected sites and taking the combined

1 construction permit and operating license as far as we
2 can go within our own authority. That's what we have
3 coming to us, I think, in the end of February, and that
4 will be very important because, as we hear today, we're
5 talking about certification. General Electric Company
6 and others are working towards standardized design,
7 making what would appear to be significant progress.

8 The other part of the action if we're ever
9 going to build plants in five years, though, is, in my
10 judgment, to be able to have the licensing process such
11 that it's more stable and more predictable. A very
12 important part of that is, in my view, to combine the
13 operating license and construction permit, and that's
14 what we're trying to do within our own authority.

15 We also know that -- at least I'm told -- that
16 we can only go so far, and that means that Congressional
17 action may be necessary in order to go all the way, so
18 that we can do it all up front.

19 If we have a good standardized design that we
20 can certify and all be confident in, and it's an
21 essentially complete design up front, and then if we can
22 have a licensing process such that the site and the
23 design can be brought together up front again, before
24 construction begins, and have all those discussions,
25 hearings, whatever has to be done in accordance with the

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1 law, up front, then when we start constructing you can
2 construct the plant in five years -- there's no question
3 in my mind that that can be done -- but those things are
4 very important actions.

5 So, what we're talking about here today, in my
6 judgment, is very important in the sense we're talking
7 about the future of nuclear power in our country, and
8 will it be feasible? Will it be something that
9 utilities will feel they can invest in? And if we have
10 a completed design that they can have confidence in, and
11 if we have a licensing process such that they can see
12 predictability and stability into it, then you can make
13 cost estimates and planning estimates for construction
14 work that should be able to be meaningful, and you
15 should be able to do it, in my view, in five years.

16 We don't have such a program at present. I
17 think what we're taking -- the action we're taking here
18 with industry and with Nuclear Regulatory Commission is
19 very important. We may need -- and I think most of us
20 believe we do need -- to get the final support, we need
21 Congressional action on that combined operating license
22 and construction permit, but we're going to go as far as
23 we can with Part 52 so, OGC, we look forward to your
24 paper coming to us.

25 And let me just say today, thank you to the GE

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1 representatives for a very fine presentation. We
2 commend you for the work you've taken. I'd also like to
3 commend the staff for the action they're taking and the
4 very important endeavor that crosses all of our
5 disciplines, not only the regulatory work but research
6 and other areas.

7 And, so, I think that the staff has done an
8 excellent job in also bringing together the severe
9 accident policy statement that overrides some of the
10 things we've talked about, and using the Commission
11 guidance as we've given the staff. So, I think this is
12 a very important initiative, and I hope that we can
13 continue to see the progress. We'd all like to see it
14 happen before 1991, I guess, but the realism of the
15 process is that it probably can't happen much before
16 that, but I hope we can make steady, continuous progress
17 in that direction.

18 So, again, I commend GE and the staff for the
19 work they are taking in this direction, and I ask you to
20 continue, march on. We're making some progress. It's
21 slow, perhaps, but it's progress, in my view, and it's
22 very important progress for the future of nuclear energy
23 in our country.

24 Any other comments from my fellow
25 Commissioners?

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1 COMMISSIONER CURTISS: I guess I have maybe
2 one request. I'm kind of in the process of getting
3 educated on this, and maybe it would be helpful for me
4 -- and that's in response to a couple of comments here
5 -- if, as the discussion of various issues evolves, I
6 think it would be helpful to have a periodic status
7 report from the staff as issues that are in this paper
8 that continue to be discussed and progress is being
9 made, just a status report on that activity would be
10 helpful for me.

11 CHAIRMAN ZECH: Well, I'll take that aboard,
12 and I think we have had, but perhaps we can discuss it,
13 but you're right. The things that we see in the paper
14 perhaps can be broken down and made separate briefings,
15 in separate briefings for the Commission, and I'll talk
16 with Mr. Stello about that. I think we've done that,
17 but there -- maybe we can do better. We'll take a look
18 at it.

19 All right. Anything else, anybody?

20 (No response.)

21 Thank you very much. We stand adjourned.

22 (Whereupon, at 3:55 p.m., the meeting was
23 adjourned.)

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CERTIFICATE OF TRANSCRIBER

This is to certify that the attached events of a meeting of the U.S. Nuclear Regulatory Commission entitled:

TITLE OF MEETING: BRIEFING ON THE PROGRESS OF GE ADVANCED BWR STANDARD PLANT REVIEW
PLACE OF MEETING: ROCKVILLE, MARYLAND
DATE OF MEETING: JANUARY 24, 1989

was transcribed by me. I further certify that said transcription is accurate and complete, to the best of my ability, and that the transcript is a true and accurate record of the foregoing events.

Phyllis Young

PHYLLIS YOUNG

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1/24/89

SCHEDULING NOTES

TITLE: BRIEFING ON THE PROGRESS OF GE ADVANCED BWR STANDARD
PLANT REVIEW

SCHEDULED: 2:30 P.M., TUESDAY, JANUARY 24, 1989 (OPEN)

DURATION: APPROX 1-1/2 HRS

PARTICIPANTS: GE 30 MINS

- DAN WILKINS
GENERAL MANAGER ABWR PROGRAM
- PATRICK MARRIOTT, MANAGER
LICENSING AND CONSULTING SERVICES
- JOE QUIRK, MANAGER
ABWR CERTIFICATION

NRC 30 MINS

- JAMES SNIEZEK
- CHARLES MILLER
- LESTER RUBENSTEIN
- DINO SCALETTI

**ABWR Certification Program
Progress Report**

**Presented to
Nuclear Regulatory Commission**

January 24, 1989

Rockville, Maryland

GE Nuclear Energy

Advanced BWR (ABWR)

- **1350 MWe**
- **Internal forced circulation**
- **World-class design by International Team**
 - **Best proven features**
- **Development complete - \$ 250 M**
- **U. S. certification underway**
 - **First U. S. standard plant**
 - **Cooperative DOE/EPRI/GE effort**
 - **Demonstrate standard plant licensing process**
 - **Complete 1991**

ABWR In Japan

- **ABWR is next generation standard BWR for Japan**
- **Lead plants committed by Tokyo Electric Power Co.**
 - **Kashiwazaki 6 & 7**
 - **Licensing application** **1988**
 - **K-6 commercial operation** **1996**
 - **K-7 commercial operation** **1998**
- **GE/Hitachi/Toshiba joint venture**
 - **GE to supply nuclear steam supply, fuel, and turbine generators**
- **U. S./Japanese regulatory interaction**

ABWR Certification Program Scope and Schedule

Nuclear Island

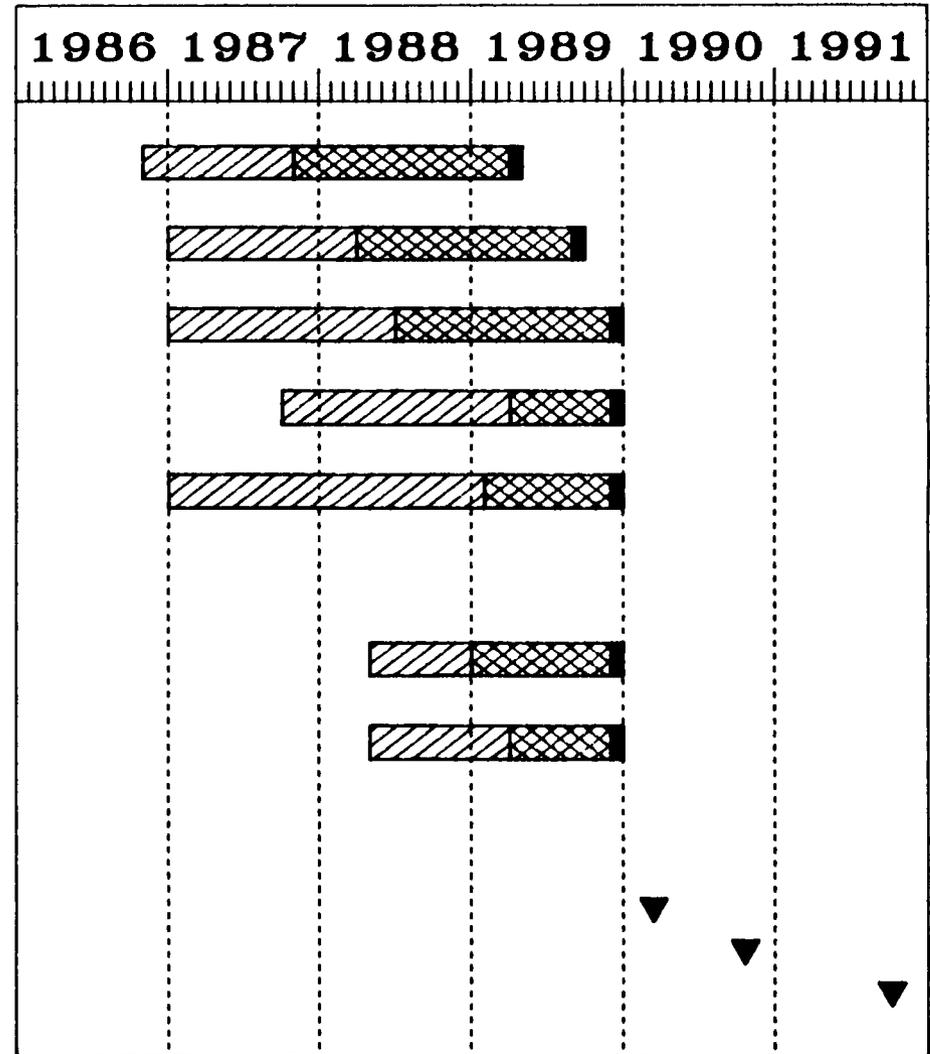
- Reactor & Safety Systems
- Chapters 4, 5, 6 & 15
- Plant Arrangement
- Chapters 1, 2 & 3
- I&C, Auxiliary Systems & QA
- Ch's 7-9, 11-14, 17
- Tech Specs & Emerg. Proc.
- Chapters 16 & 18
- Severe Accidents
- Chapter 19

Remainder of Plant

- Turbine Island
- Ch. 10, Parts of other Chs
- Radwaste Facility
- Ch. 11, Parts of other Chs

Key Milestones

- Final SER Issued
- FDA Issued
- Certification Issued



SSAR Prep.



NRC/ACRS Rev.



Draft SER

Scope of ABWR SSAR

- **Nuclear Island (original scope)**

Reactor building

- Nuclear steam supply sys.
- Primary containment
- Secondary containment
- Emer. core cooling sys.
- Res. heat removal sys.
- Emer. diesel generators
- Fuel handling equipment

Control building

- Control room
- Control building HVAC
- Essential batteries and power supply
- Reactor building closed cooling water

Service building

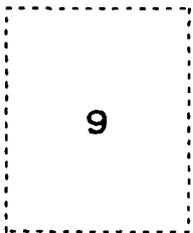
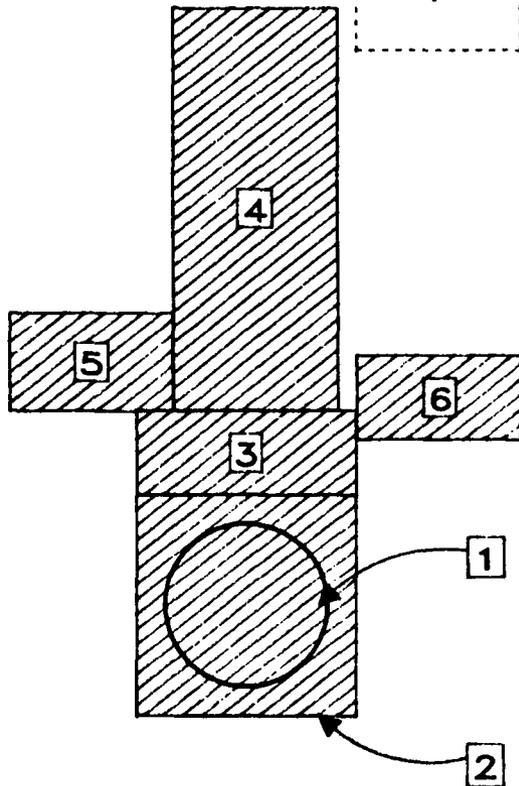
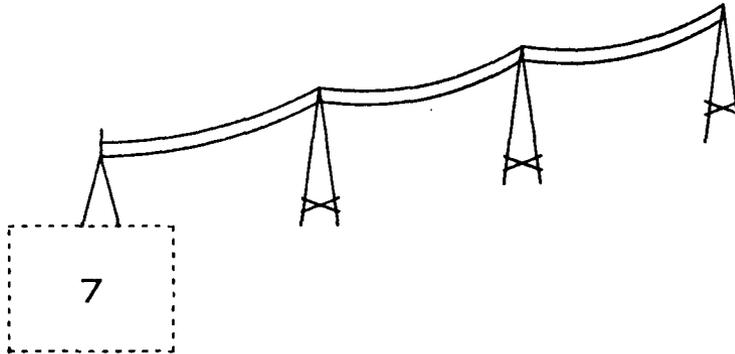
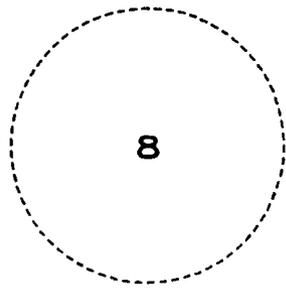
- Access control
- Technical support center
- Service building HVAC

- **Remainder of plant (recent scope addition)**

- Turbine island
- Radwaste facility

Essentially total plant

SCOPE OF ABWR SSAR



1. Reactor containment
2. Reactor building
3. Control building
4. Turbine building
5. Radwaste building
6. Service building
7. Switchyard
8. Cooling tower
9. Ultimate heat sink

Status of Certification Program

Licensing Review Bases

- Issued by NRC Staff 8/7/87

SSAR Status

- SSAR chapters submitted
 - Reactor and safety systems:
Chapters 4, 5, 6 and 15 9/29/87
 - Plant arrangement and criteria:
Chapters 1, 2 and 3 3/29/88
 - I & C, auxiliary system and QA:
Chapters 7-9, 11-14, and 17 6/29/88
 - Turbine island:
Chapter 10 12/30/88

Status of Certification Program (continued)

- **Next scheduled SSAR chapter submittals**
 - **Severe accidents, PRA:
Chapter 19** **1/31/89**
 - **Tech. Specs., radwaste facility
Chapters 11, 16 and 18** **3/31/89**

Commission Briefings and ACRS Meetings

- **Commission Briefings**
 - **September 1986**
 - **April 1987**
 - **January 1988**
- **ACRS Full Committee meetings**
 - **January 1987**
 - **March 1987**
 - **January 1988**

Commission Briefings and ACRS Meetings (continued)

- **ACRS Subcommittee meetings**
 - **January 1987**
 - **June 1988**
 - **November 1988**

Comparison of ABWR Design With Potential Review Subjects for Standard Plant Designs

<u>Subject</u>	<u>ABWR Status</u>
1. 60 year plant life	
● Applicant responsibility to identify components and systems affected	● ABWR will comply
● Information and programs to support design life	● ABWR will comply
● Current regulation limits license term to 40 year life	● GE agrees with need for regulatory change
2. Fire protection	
● Replace 20 foot separation with safe shutdown capability given a complete loss of any fire area	● ABWR will comply

Comparison (continued)

<u>Subject</u>	<u>ABWR Status</u>
3. Technical Specifications	
<ul style="list-style-type: none">● Proposed technical specifications submitted no later than FDA application	<ul style="list-style-type: none">● ABWR will comply
<ul style="list-style-type: none">● Proposed Tech Specs representative of design will be included in certification process	<ul style="list-style-type: none">● GE agrees
<ul style="list-style-type: none">● Applicants identify design features necessary for testing and maintenance during operation without challenging safety systems	<ul style="list-style-type: none">● ABWR will comply

Comparison (continued)

<u>Subject</u>	<u>ABWR Status</u>
4. Testing and Maintenance	
<ul style="list-style-type: none">● Provide a program to assure design reliability consistent with the PRA	<ul style="list-style-type: none">● Under discussion
5. Industry use of MAAP	
<ul style="list-style-type: none">● Review of MAAP code is unnecessary since staff can apply its STCP codes	<ul style="list-style-type: none">● GE accepts
6. Station blackout and electrical system	
<ul style="list-style-type: none">● Diverse power sources to ensure safe shutdown of the reactor	<ul style="list-style-type: none">● ABWR requires diesel-generators of at least two manufactures

Comparison (continued)

Subject

ABWR Status

7. Leak Before Break

- Leak before break can be considered where justified
 - Address issues of material embrittlement of vessel and vessel supports
- Methodology and acceptance criteria provided in SSAR
 - Addressed in SSAR

8. Source Terms

- Establish realistic source terms, with EPRI input, to be uniformly applied to future ALWRs
- ABWR based on more realistic source terms

Comparison (continued)

<u>Subject</u>	<u>ABWR Status</u>
9. Physical Security	
● Address sabotage in all future ALWR applications	● ABWR will comply
● Provide information to demonstrate the existence of adequate physical barriers to protect vital areas per 10 CFR 75.55(d)	● ABWR will comply
● Identify access control points to all vital areas per 10 CFR 75.55(d)	● ABWR will comply

Comparison (continued)

<u>Subject</u>	<u>ABWR Status</u>
10. OBE/Dynamic Analysis Methods	
<ul style="list-style-type: none">● NRC staff agrees OBE should not control the design of safety systems● NRC staff will take this issue under consideration as part of certification process	<ul style="list-style-type: none">● GE agrees● GE encourages this action
11. Type C Containment Leakage	
<ul style="list-style-type: none">● Containment leakage is acknowledged by NRC staff as being a function of containment pressure	<ul style="list-style-type: none">● ABWR will comply
12. Hydrogen Generation	
<ul style="list-style-type: none">● 10 CFR 50.34(f) related to issue of 100% metal-water reaction will be invoked	<ul style="list-style-type: none">● ABWR will comply

ABWR Summary

- **Scope expanded to essentially total plant**
- **ABWR certification on track**

BRIEFING
ADVANCED BOILING WATER REACTOR
(ABWR)

- ° ABWR DESIGN CERTIFICATION SCHEDULE
- ° LICENSING REVIEW BASES
- ° ALWR SAFETY ENHANCEMENTS
- ° GUIDANCE FOR ALWR DESIGNERS FOR
DESIGN CERTIFICATION
- ° ALWR SEVERE ACCIDENT GUIDANCE
- ° COORDINATION WITH THE JAPANESE
GOVERNMENT

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VG-1

ABWR DESIGN CERTIFICATION SCHEDULE

- ° LICENSING REVIEW BASES - AUGUST 1987
- ° APPLICATION FOR DESIGN CERTIFICATION
 - ° FOUR GROUPS SSAR MODULES -
SEPTEMBER 1987/JANUARY 1989
 - ° TURBINE ISLAND - DECEMBER 1988 (BOP)
 - ° RADIOLOGICAL WASTE SYSTEM -
MARCH 1989 (BOP)
- ° STAFF'S REVIEW SCHEDULE
 - ° ONE SER FOR EACH GROUP OF SSAR
MODULES - MARCH 1989/JANUARY 1990

(CONTINUED)

- °TURBINE ISLAND AND RADWASTE SYSTEM
SER - JANUARY 1990
- °FINAL ACRS FC MEETING - APRIL 1990
- °INTEGRATED SER - JULY 1990
- °FINAL DESIGN APPROVAL - JULY 1990
- °RULEMAKING BEGINS - AUGUST 1990
- °RULEMAKING ENDS - OCTOBER 1991

VG-3

LICENSING REVIEW BASES
(LRB)

° AN AGREEMENT BETWEEN NRC AND GENERAL ELECTRIC COMPANY WHICH PROVIDES SUPPLEMENTARY GUIDANCE ON REGULATORY ISSUES AND IN AREAS WHICH ARE EITHER NOT ADDRESSED, OR NOT ADDRESSED IN DETAIL, BY THE STANDARD REVIEW PLAN (SRP) AUGUST 19, 1987 MEMO EDO TO COMMISSION

VG-4

(CONTINUED)

- °EXAMPLES:
- °SEVERE ACCIDENT ACCEPTANCE CRITERIA
REQUIRES INTERNAL AND EXTERNAL
EVENTS PRA
- °MEASURES TO ACCOMMODATE HYDROGEN
GENERATED FROM THE REACTION OF
THE EQUIVALENT OF 100% OF THE
ZIRCONIUM IN THE ACTIVE FUEL
CLAD

VG-5

(CONTINUED)

- ° MEAN FREQUENCY OF OCCURRENCE OF OFFSITE DOSES IN EXCESS OF 25 REM BEYOND A ONE HALF MILE RADIUS IS TO BE LESS THAN ONCE PER MILLION REACTOR YEARS CONSIDERING BOTH INTERNAL AND EXTERNAL EVENTS
- ° A CONTAINMENT CONDITIONAL FAILURE PROBABILITY OF LESS THAN ONE IN TEN WHEN WEIGHTED OVER CREDIBLE CORE DAMAGE SEQUENCES

VG-6

ALWR SAFETY ENHANCEMENTS

- °NRR STAFF DEVELOPED A LIST OF TECHNICAL ISSUES THEY BELIEVED IMPORTANT TO THE REVIEWS OF ALWRs AND WHICH NEEDED EARLY MANAGEMENT ATTENTION
- °NRR HAS MET TO DISCUSS THE CONSEQUENCE AND RESOLUTION OF THOSE ISSUES

(CONTINUED)

° FOLLOWING THOSE MEETINGS LETTERS WERE SENT TO WESTINGHOUSE, COMBUSTION ENGINEERING, GENERAL ELECTRIC AND THE ELECTRIC POWER RESEARCH INSTITUTE TO INFORM THEM OF STAFF POSITIONS ON A NUMBER OF ISSUES WHERE AN NRR POSITION HAS BEEN REACHED. THESE ISSUES HAVE BEEN IDENTIFIED TO THE COMMISSION

VG-8

GUIDANCE FOR ALWR DESIGNERS
FOR DESIGN CERTIFICATION

- °BASIS FOR GUIDANCE
 - °STANDARDIZATION POLICY STATEMENT
 - °PROPOSED 10 CFR PART 52
- °SCOPE OF DESIGN
 - °THE STAFF EXPECTS ALL DESIGNS TO BE
ESSENTIALLY COMPLETE IN LEVEL OF
DESIGN AND DESIGN DETAIL

(CONTINUED)

- ° STAFF RESOURCE PRIORITY GIVEN TO APPLICATIONS FOR CERTIFICATION OF ESSENTIALLY COMPLETE DESIGNS
- ° SCOPE OF STAFF REVIEW
- ° ALL PORTIONS OF THE DESIGN WILL BE SUBJECT TO STAFF REVIEW AGAINST THE CURRENT SRP AND REGULATIONS

VG-10

(CONTINUED)

- ° IN ORDER TO ENHANCE SAFETY OF FUTURE DESIGNS THE STAFF EXPECTS TO GO BEYOND THE SRP AND REGULATIONS DURING THE COURSE OF THE DESIGN CERTIFICATION REVIEWS
- ° STAFF HAS INFORMED DESIGNERS THAT AREAS SUCH AS FIRE PROTECTION, ELECTRICAL SYSTEMS, AND HYDROGEN GENERATION WOULD REQUIRE GREATER CONSIDERATION THAN IN PAST DESIGNS

VG-11

ALWR SEVERE ACCIDENT GUIDANCE

- ° NECESSARY TO COMPLETE DESIGN CERTIFICATION REVIEWS
- ° NRR HAS HELD PRELIMINARY DISCUSSIONS ON CERTAIN ISSUES RELATING TO THE CONSIDERATION OF SEVERE ACCIDENTS FACING THE EVOLUTIONARY ALWRs. NRR WILL BE MEETING AGAIN IN THE NEAR FUTURE TO ESTABLISH ITS POSITION ON THESE ISSUES

(CONTINUED)

°IT IS IMPORTANT THAT THESE ISSUES BE
RESOLVED ON A SCHEDULE THAT WILL
ALLOW THE DESIGN CERTIFICATION
REVIEWS TO PROCEED ON SCHEDULE

VG-13

COORDINATION WITH JAPANESE GOVERNMENT

- ° MINISTRY OF INTERNATIONAL TRADE AND
INDUSTRY (MITI)
- ° TWO VISIT - FEBRUARY AND
OCTOBER 1988
- ° TWO UNITS OF THE ABWR DESIGN TO BE
CONSTRUCTED IN JAPAN
- ° KASHIWAZAKI/KARIWA SITE
- ° FIVE BWR/5S IN OPERATION OR UNDER
CONSTRUCTION

(CONTINUED)

- ° CONSTRUCTION PERMIT - LATE 1990/
EARLY 1991
- ° UNIT 1 OPERATION MID 1996
- ° UNIT 2 OPERATION MID 1998
- ° SCHEDULE CONSTRUCTION TIME
APPROXIMATELY 60 MONTHS EACH
- ° THE U.S. DESIGN WILL BE THE SAME AS
JAPAN'S DESIGN EXCEPT WHERE U.S.
REGULATIONS REQUIRE DIFFERENCES

VG-15