

UNITED STATES OF AMERICA NUCLEAR REGULATORY COMMISSION

Title: BRIEFING ON DOE VIEWS ON ADVANCED LIGHT WATER
REACTOR DESIGN AND CERTIFICATION

Location: ROCKVILLE, MARYLAND

Date: NOVEMBER 30, 1989

Pages: 42 PAGES

SECRETARIAT RECORD COPY

NEAL R. GROSS AND CO., INC.

COURT REPORTERS AND TRANSCRIBERS
1323 Rhode Island Avenue, Northwest
Washington, D.C. 20005
(202) 234-4433

DISCLAIMER

This is an unofficial transcript of a meeting of the United States Nuclear Regulatory Commission held on November 30, 1989, in the Commission's office at One White Flint North, Rockville, Maryland. The meeting was open to public attendance and observation. This transcript has not been reviewed, corrected or edited, and it may contain inaccuracies.

The transcript is intended solely for general informational purposes. As provided by 10 CFR 9.103, it is not part of the formal or informal record of decision of the matters discussed. Expressions of opinion in this transcript do not necessarily reflect final determination or beliefs. No pleading or other paper may be filed with the Commission in any proceeding as the result of, or addressed to, any statement or argument contained herein, except as the Commission may authorize.

NEAL R. GROSS
COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVENUE, N.W.
WASHINGTON, D.C. 20005

(202) 234-4433

(202) 232-6600

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

- - - -

BRIEFING ON DOE VIEWS ON ADVANCED LIGHT WATER
REACTOR DESIGN AND CERTIFICATION

- - - -

PUBLIC MEETING

Nuclear Regulatory Commission
One White Flint North
Rockville, Maryland

Thursday, November 30, 1989

The Commission met in open session, pursuant to notice, at 2:00 p.m., Kenneth M. Carr, Chairman, presiding.

COMMISSIONERS PRESENT:

KENNETH M. CARR, Chairman of the Commission
THOMAS M. ROBERTS, Commissioner
KENNETH C. ROGERS, Commissioner
JAMES R. CURTISS, Commissioner

NEAL R. GROSS
1323 Rhode Island Avenue, N.W.
Washington, D.C. 20005
(202) 234-4433

STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

SAMUEL J. CHILK, Secretary

WILLIAM C. PARLER, General Counsel

WILLIAM H. YOUNG, Assistant Secretary, Nuclear Energy,
DOE

DAVID McGOFF, Associate Deputy Assistant Secretary for
Reactor Deployment, DOE

DAN GIESSING, Director, Office of Light Water Reactor,
Safety and Technology, DOE

STEVE SOHINKI, Associate General Counsel for Nuclear
Affairs, DOE

NEAL R. GROSS
1323 Rhode Island Avenue, N.W.
Washington, D.C. 20005
(202) 234-4433

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

2:03 p.m.

CHAIRMAN CARR: Good afternoon, ladies and gentlemen.

The purpose of today's meeting is for the Department of Energy to provide its views on advanced light water reactor design and certification. The priority, methodology and resource allocation to be applied within the Commission to ongoing and anticipated reviews of advanced light water reactors for design certification under 10 CFR Part 52 are issues currently before this Commission.

We have already heard from the NRC staff, the major vendors, EPRI and NUMARC on this subject. We expect that the additional perspective of the Department of Energy will assist us in determining the most effective approach in completing this review process.

I understand that copies of the presentation of slides are available at the entrance to the meeting room.

Do any of my fellow Commissioners have any opening remarks?

If not, Secretary Young, please proceed.

SECRETARY YOUNG: Mr. Chairman and members

1 of the Commission, I am pleased to appear here today
2 to discuss the Department of Energy's views on reactor
3 standardization and certification.

4 Accompanying me today are David McGoff,
5 Associate Deputy Assistant Secretary for Reactor
6 Deployment; Daniel Giessing, Director, Office of Light
7 Water Reactor Safety and Technology; and Steven
8 Sohinki, Assistant General Counsel for Nuclear
9 Affairs.

10 At previous meetings with industry and the
11 NRC staff, you have sought input for your decisions on
12 such topics as the relative roles of the industry
13 requirements documents and individual design
14 certifications, on the value of completing the
15 evolutionary plant requirements document, on the
16 number of standardized plants to be certified, and on
17 the priority that the Commission should place on each
18 of these activities. These are important questions
19 and we hope that our views will be useful in
20 formulating your policies in these areas.

21 The nation will need to add substantial
22 amounts of new generating capacity in the coming
23 decade. Indeed, some regions of the country, notably
24 the Northeast, are even now experiencing shortages in
25 generating capacity. To give some sense of the

NEAL R. GROSS
1323 Rhode Island Avenue, N.W.
Washington, D.C. 20005
(202) 234-4433

1 magnitude of the problem facing us, the Energy
2 Information Administration of the Department of Energy
3 projects that America will need 125 additional
4 gigawatts of new generating capacity by the end of the
5 century, including both plants needed to support
6 economic growth and plants needed to replace those to
7 be retired.

8 President Bush has indicated that nuclear
9 power must play a critical role in assuring a
10 balanced, secure and stable supply of energy. Nuclear
11 power provides electricity without generating carbon
12 dioxide or sulfur emissions which contribute to acid
13 rain and possible global warming. The nuclear option
14 in the United States is clearly necessary to avoid an
15 excessive reliance on coal or other fossil fuels for
16 electricity generation. The significance of achieving
17 an effective program to certify standardized nuclear
18 power plants is underscored by the strategic need for
19 nuclear power.

20 Reform of the regulatory process is
21 important for the future of nuclear power. The
22 Nuclear Regulatory Commission's new rule, effective in
23 May, 1989, providing for issuance of early site
24 permits, standardized design certifications, and
25 combined construction permits and operating licenses,

1 represents a major step in the reform of the nuclear
2 licensing process.

3 For the last several years, the Department
4 has been working with NRC and the industry to define
5 and develop the standardized plants which will be the
6 vehicle for the next plant orders. It is generally
7 agreed that the most promising nuclear plant designs
8 for commercial application in the near future are the
9 advanced light water reactors. The ALWRs will apply
10 three decades of successful operating experience to
11 produce even safer plants.

12 The Department is involved in several key
13 programs to make standardized ALWRs available for
14 deployment in the 1990s, including the utility
15 requirements document, certification of evolutionary
16 plant designs, and development and certification of
17 mid-size passive ALWRs.

18 The utility requirements document,
19 incorporating the lessons learned from operation of
20 over 100 plants in the United States, has value both
21 as a buyer specification and as a vehicle for
22 documentation of resolution of issues with the NRC.
23 Both the evolutionary and passive sections of this
24 document are important since we believe that both of
25 these types of plants may be of interest to utilities

1 in the future.

2 The Department has supported the development
3 of the requirements document by providing its
4 expertise in such areas as resolution of severe
5 accident issues. We strongly endorse a need for
6 timely completion of the review of the document and
7 issuance of an SER by NRC. This will document the
8 generic resolution of issues for future evolutionary
9 plant designs and will be valuable as a starting point
10 for the passive plant requirements document. Even
11 though some of the difficult issues are being resolved
12 on a plant specific basis in individual evolutionary
13 plant certifications, such resolution may not be
14 generic due to unique features of some of these
15 plants.

16 The Department has been sponsoring General
17 Electric and Combustion Engineering in the submittal
18 for certification of the ABWR and the System 80+
19 respectively. The Department's major objective in
20 these programs has been demonstration of the
21 certification process as it is now defined in 10 CFR
22 52. While the rule provides the overall framework for
23 the certification process, a number of very important
24 features need to be demonstrated to show organizations
25 considering orders for nuclear power plants that a

NEAL R. GROSS
1323 Rhode Island Avenue, N.W.
Washington, D.C. 20005
(202) 234-4433

1 viable process does indeed exist.

2 Examples of such features are the definition
3 of the tests and inspections and analyses which will
4 provide the assurance that the plant has been
5 constructed in accordance with the combined license;
6 the certification rulemaking process itself; the
7 degree of specificity in the certification; the
8 handling of NEPA issues; and the handling of on-site
9 emergency planning features in the certification.

10 In addition to providing a demonstration of
11 the certification process, completion of the
12 certifications in December 1991 will make the
13 evolutionary plant available for future orders. Since
14 we believe the certification of a design will be a
15 prerequisite for any future order, the timing of these
16 certification programs will, in essence, determine the
17 earliest date at which new plants can be placed into
18 operation. Even with an order promptly following a
19 design certification at the end of 1991, we estimate a
20 plant could not become operational until 1999.

21 We urge the Commission to devote the
22 necessary resources to assure that their review is
23 completed on the currently agreed upon schedule in the
24 licensing basis agreement. This will help enable the
25 nation potentially to begin to meet its new generating

1 plant capacity needs by the turn of the century using
2 advanced design nuclear energy plants.

3 The Department has been sponsoring the
4 development of mid-sized passive ALWRs since 1986.
5 Mid-size plants more closely meet the load-growth
6 requirements of many U.S. utilities and reduce the
7 capital formation requirements for a plant. In
8 addition, their smaller size offers opportunities for
9 design simplification by the use of passive safety
10 features employing primarily natural forces such as
11 gravity or natural circulation in place of engineered
12 safety features.

13 Over the last three years, our programs have
14 shown the feasibility of these passive safety features
15 and have demonstrated that the resultant design
16 simplicity can defeat the economy of scale so that
17 unit costs approach those for evolutionary plants. In
18 addition, the use of modular construction will lead to
19 significantly shorter construction times.

20 Recently, the Department selected the
21 General Electric SBWR and the Westinghouse AP600
22 designs for further development and submittal for NRC
23 design certification under a cost-shared program. The
24 program schedule calls for submittal of the SSARs to
25 NRC in 1992 with certification targeted for 1995.

1 These passive plant designs will be
2 developed in conformance with the utility requirements
3 document. The Department is providing assistance to
4 EPRI in the development of the passive plant
5 requirements document similar to that provided on the
6 evolutionary document. The passive plant requirements
7 document will be submitted to the NRC by the end of
8 1990.

9 The Department, EPRI and the reactor
10 designers are developing arrangements to ensure
11 coordination between the passive plant design and the
12 requirements document. This coordination will be
13 carried out on a continuous basis so that each program
14 can benefit from the other. The Department strongly
15 supports the objective of submittal of the
16 requirements document prior to submittal of the
17 passive plant designs to be certified. We do not
18 believe, however, that the relative timing should be
19 made a regulatory requirement. In the remote event
20 that submissions of the requirements document should
21 be delayed beyond 1992, we believe the national
22 interest in having the passive plants certified and
23 available for use should not be compromised.

24 I fully understand the Commission's need to
25 plan priorities on the many certification applications

NEAL R. GROSS
1323 Rhode Island Avenue, N.W.
Washington, D.C. 20005
(202) 234-4433

1 which may be submitted. I personally do not have a
2 precise definition of the right number of plants which
3 should be certified to obtain the benefits of
4 standardization while maintaining the competitive
5 situation traditional to our nation's economic system.
6 I do know the number should be more than one.

7 Whatever number is the right one, I do not
8 believe it is desirable to require that a plant have
9 an order as a prerequisite for obtaining NRC priority
10 on a design certification. Such a procedure would
11 seem inconsistent with 10 CFR 52, a key feature of
12 which is the benefit of having certified standard
13 designs available to prospective purchasers. I
14 suggest that one consideration in developing your
15 priorities be an expression of national interest in
16 that design as manifested by substantial financial
17 support by DOE or by the utility industry. Use of
18 this criterion would ensure that designs being
19 certified have a real probability of being
20 beneficially deployed in the United States.

21 While I have limited my remarks to ALWRs, I
22 would like to thank the Commission for its activities
23 on some other reactor development programs of interest
24 to DOE. The priority you have placed on plant license
25 extension is key to safely retaining the more than 100

1 currently operating plants in our nation's energy
2 supply. The Department is co-sponsoring the two lead
3 plants which will be submitting applications for
4 license extensions in 1991.

5 In addition, the safety reviews you are
6 undertaking of other advanced reactors, the MHTGR and
7 the PRISM, are key to our future decisions on these
8 plants. I look forward to continued interaction with
9 the Commission on these important programs.

10 In summary, I ask NRC support of completion
11 of the review of the evolutionary plant requirements
12 document to resolve open issues, and completion of the
13 evolutionary plant certification to demonstrate the
14 certification process.

15 The passive plant designs coordinated with
16 the requirements document will be submitted to the NRC
17 by 1992 with the objective of 1995 certification.

18 The timely certification of both the
19 evolutionary and passive plant designs can provide a
20 basis for possible orders for nuclear power plants
21 which can be completed by the turn of the century.
22 Given the nation's growing need for added generating
23 capacity by that time, including use of nuclear power,
24 both DOE and NRC can together make an important
25 contribution to securing the nation's energy future by

NEAL R. GROSS
1323 Rhode Island Avenue, N.W.
Washington, D.C. 20005
(202) 234-4433

1 completing the actions I have recommended.

2 I'd like to thank you for the opportunity to
3 provide DOE's views on this important area.

4 I'd like to have Mr. McGoff provide some
5 further details in the areas I have discussed, if
6 that's appropriate.

7 CHAIRMAN CARR: Thank you. Proceed.

8 MR. MCGOFF: Thank you, Mr. Chairman.

9 I'd like to give a little further
10 perspective on the DOE light water reactor program and
11 fill in some of the details.

12 (Slide) Could I have the slide, please?

13 (Slide) Next slide, please.

14 Our overall goal in the light water reactor
15 program is removal of regulatory and technical
16 impediments to nuclear power once again being an
17 option for electrical generation capacity additions by
18 the early to mid-1990s. To meet this goal, our
19 objectives are, first, to make available in the United
20 States reactor designs employing the best technology
21 available worldwide and, second, to demonstrate
22 acceptable licensing and economic regulatory
23 processes.

24 (Slide) Next slide, please.

25 Our strategy has three elements. First,

1 it's very important to us to have a single national
2 coordinated program among DOE, the nation's utilities
3 and the reactor manufacturers. Second of all, we've
4 tried to ensure the relevance of our program by
5 requiring cost-sharing of the industrial sector in it.
6 All of our industry programs require at least 50
7 percent cost-sharing on the industry side. We believe
8 that these two steps together, a single coordinated
9 program and a requirement for cost sharing, ensure the
10 designs that are being developed and certified have a
11 high potential of being of interest to utilities and
12 of being deployed in the United States.

13 In addition, our strategy includes using the
14 light water reactor technology program, the
15 certification programs and the lead license renewal
16 programs, to demonstrate the new regulatory processes.
17 We feel that's of benefit both to us in the sense of
18 making sure that we're meeting your requirements and
19 also to the Commission in the sense of providing
20 concrete examples to exercise new regulations.

21 (Slide) Next slide, please.

22 Our program is focused to specific end
23 points and deliverables. The first is demonstration
24 of the improved certification process by certification
25 of large ALWRs by 1991. We believe this is needed to

1 provide confidence in the process, that a process
2 indeed does exist and has been exercised, and that
3 that confidence is then available to purchasers of
4 future plants.

5 The second deliverable is a demonstration of
6 life extension for existing LWRs by 1993 by obtaining
7 license renewals or license extensions for the two
8 lead plants. Again, we feel this is very important to
9 provide confidence to those utilities who need to
10 consider whether to add new capacity or renew their
11 licenses. We believe the 1993 date is key to the
12 early plant license renewal needs of the utility
13 industry.

14 The third leg is the design, development and
15 certification of standardized mid-sized advanced light
16 water reactors using passive safety features by 1995.
17 This type of plant is of interest to many utilities in
18 the United States and the 1995 date is important to us
19 to make sure that these plants are available for
20 operation around the turn of the century.

21 COMMISSIONER ROBERTS: What's your
22 definition of mid-size?

23 MR. McGOFF: About 600 megawatts, sir.

24 Finally, we're involved in the -- the non-
25 technology part of our program deals with assistance

1 and resolution of safety and economic regulatory
2 issues. I will not be discussing that today.

3 (Slide) As mentioned earlier, the ALWR is
4 likely to be the reactor of choice for first orders.
5 It's based on existing commercial technology. It's a
6 direct application of proven technology from three
7 decades. At the same time, it employs improved
8 designs which are greatly simplified, which use the
9 lessons learned from those 100 plants, which utilize
10 passive safety features in some designs, have the
11 potential for smaller size and will be subject to
12 standardization.

13 A key precept in our program, as with EPRI,
14 is that the technology be such that no prototype is
15 required, that the extrapolations from existing
16 technology be modest and be demonstrated on a
17 component or a system scale.

18 Finally, the plant will be designed for
19 utility investment protection by means of reducing the
20 probability of severe accidents and significant core
21 damage. We're also projecting the ALWR to be cost
22 competitive with alternative power generation sources.

23 (Slide) Next slide, please.

24 As also mentioned earlier, the evolutionary
25 ALWRs will be the first new plants available. The

1 program is well along. The requirements document has
2 been proceeding between the industry and NRC for the
3 last several years and we, together with EPRI, are
4 hopeful that this can be completed next spring.

5 Documentation -- completion of the
6 requirements document is very important in that it,
7 number one, provides a documentation of the resolution
8 of issues that have been discussed and agreed upon
9 with the NRC and, second of all, can serve as a
10 jumping off point for those issues on the passive
11 plant requirements document.

12 A second activity, of course, is the
13 development of designs meeting the utility
14 requirements and incorporating the best technology
15 available worldwide. You have several of those
16 designs before you now for review and certification.

17 (Slide) Next slide, please.

18 The result of these activities, the
19 requirements document, the development of designs and
20 submittal for certification, will lead to certified,
21 standardized plants available in 1991. This date is
22 very important, as Mr. Young has indicated, because
23 that's key to having a plant operational before or at
24 the turn of the century.

25 (Slide) Next slide, please.

1 I'd like to say a few words about mid-size
2 plants. The mid-size plants are of great interest.
3 The 600 megawatt size is of interest to many utilities
4 in that it more closely meets their need for load
5 growth additions. The capital formation requirements
6 are lower and the smaller size permits the use of many
7 of the passive safety features that cannot be used in
8 larger plants.

9 For this reason, we feel it's important to
10 try to get these designs available by the turn of the
11 century. That translates back into a 1995
12 certification. We've carried out an R&D program over
13 the last several years. We feel we've demonstrated
14 the basic technical and economic feasibility of these
15 designs, and I'll speak to that in a moment.

16 The Department has selected GE and
17 Westinghouse for further development and
18 certification. These designs will be submitted in
19 1992 for the Commission with a request for
20 certification by 1995.

21 Again, to ensure the relevance of these
22 designs and to increase the probability that they'll
23 be deployed, we have required cost-sharing. In the
24 case of the passive plant designs, we actually have a
25 much greater industry cost share than 50/50. It's

1 more like on the order of 60/40, industry to DOE cost-
2 share development and submittal for certification.

3 (Slide) Could I have the next slide,
4 please?

5 Our ongoing program has answered a couple of
6 troubling questions to us. We were concerned as to
7 whether or not we could indeed defeat the economy of
8 scale and get the costs of these smaller plants to
9 approach the costs of larger plants.

10 COMMISSIONER ROBERTS: Economy of scale
11 needed much defeating. I'm not sure it was ever
12 proven, but excuse me.

13 MR. MCGOFF: Well, it's still a theory
14 there, Commissioner.

15 COMMISSIONER ROBERTS: Yes, I know.

16 MR. MCGOFF: We felt we had to go in and
17 show that we could indeed meet it.

18 I think now we've got some fairly good but
19 preliminary data that shows that the costs of these
20 plants can be brought to the same levels as good
21 evolutionary plants, and I'll underline the good
22 evolutionary plants. The Westinghouse estimate is a
23 \$1,270.00 per kilowatt overnight, which compares very
24 favorably. What this is showing us is that design
25 simplifications brought about by the use of passive

1 safety systems indeed get us to the point where unit
2 costs can be brought into that level.

3 In addition, we've done some preliminary
4 construction studies and modulization studies. These
5 are showing us that we can actually think about three
6 year construction times, which again removes many of
7 the uncertainties associated with these plants.

8 CHAIRMAN CARR: What's that time measured
9 from?

10 MR. McGOFF: That's from first concrete pour
11 to fuel load. It doesn't include any lead time with
12 vessel fabrication, for example, which might add an
13 extra year or 12 months to that.

14 SECRETARY YOUNG: Or site preparation.

15 MR. McGOFF: Or site preparation, yes.

16 Our ongoing program is also actually done
17 semi-scale or partial scale testing of some of the
18 passive safety features to ensure that they're viable.
19 We're getting favorable results there.

20 (Slide). Next slide, please.

21 As an example of the type of improvements we
22 see possible in the mid-size plants, the first two
23 items on this slide relate to areas of increased
24 margin. In other words, for the same power level, we
25 see something like a 20 percent increase in the number

1 of fuel elements, thereby driving the linear heat
2 rating down; a 30 percent larger pressurizer,
3 therefore giving a larger margin in the case of upset
4 conditions. So, we're building in larger margins on
5 the one hand. At the same time we find out that some
6 of the physical features of the plant, number of
7 pipes, valves, seismic buildings, are much smaller
8 than a standard plant.

9 Just for completeness here, what I'm
10 defining a standard plant to be is a 600 megawatt
11 plant similar to the Philippine design, a two loop
12 design.

13 (Slide) Next slide, please.

14 As far as the overall schedule, our schedule
15 has been for completion of the design certification
16 program by the end of 1991 for submittal to the NRC of
17 the SARs for the passive plants by '92, with a request
18 for design certification completion by 1995.

19 In addition, this next item, the early site
20 permit, it has occurred to us that the benefits of
21 demonstrating certification by virtue of putting
22 certified plants before the Commission, might also be
23 matched by the benefits of demonstrating the early
24 site permit process, by going before the Commission
25 with a site to go through this process. We're

1 considering such a cost-shared arrangement with the
2 utility. We have not made a decision. We have no
3 utility identified. We'll make a decision as to
4 whether to proceed on that sometime early next year.

5 CHAIRMAN CARR: Do you pick the site or does
6 the utility pick the site?

7 MR. McGOFF: The utility, sir.

8 (Slide) Could I have the next slide,
9 please.

10 I'd just like to show a few examples of the
11 coordination between the Department's program and the
12 utility programs. We are, first of all, co-sponsoring
13 the license extension lead plant activities with EPRI
14 and with the individual utilities. We have
15 coordinated R&D programs on plant life extension
16 between the industry and DOE. We have supported the
17 EPRI requirements document in the evolutionary plant,
18 as Mr. Young has stated. We plan to continue that on
19 the passive plant. We have developed DOE, EPRI and
20 vendor MOUs on the evolutionary plant designs to
21 ensure coordination between the designs and the
22 requirements document and we plan again to develop a
23 similar vehicle on the passive plants. Finally, both
24 EPRI and DOE are sponsoring the passive ALWR
25 development and certification programs.

1 (Slide) Next slide, please.

2 I'd like to underscore again, if I could,
3 the importance of the timing of the plant
4 certifications. With the benefits of 10 CFR 52, it
5 appears to us that utilities are going to insist upon
6 plants being certified prior to final firm orders.
7 The advantages of having that are just too great to
8 ignore.

9 We further believe that for the evolutionary
10 plant, approximately eight years are required for
11 design, construction and start-up. The NRC
12 evolutionary plant certification current timing,
13 therefore, is really key to having an evolutionary
14 plant operating by 2000. This is consistent then with
15 the agreed upon schedule between the staff and the
16 applicants in the licensing basis agreement for an FDA
17 in 1990 and a certification around 1991.

18 I think another point of urgency is that
19 really the most uncertain part of the certification
20 process still remains. I think the most untested
21 ground of exercising 10 CFR 52 in certification is not
22 so much the FDA, but going through the actual
23 certification process. I think it's important to
24 reach that point as soon as we can.

25 Finally, I think certification of passive

1 plants by 1995 is essential to having these plants
2 available around the turn of the century.

3 (Slide) My summary points, then really I'm
4 just reiterating what Mr. Young has already said. The
5 evolutionary plant requirements documents are needed
6 for documentation of issue resolution, the stopping
7 points for the requirements document for the passive
8 plant and the timing of evolutionary plant
9 certifications is key to new plant orders and the
10 passive plant designs will be coordinated with the
11 EPRI requirements document with a 1995 certification
12 sought from the Commission and being necessary for
13 operation before 2000.

14 CHAIRMAN CARR: What does your view of
15 "coordinated with" mean?

16 MR. McGOFF: I'm sorry, sir?

17 CHAIRMAN CARR: Passive plant designs will
18 be coordinated with the requirements document.

19 MR. McGOFF: I think the process will
20 proceed somewhat in this manner. EPRI will be
21 developing -- is developing, will be developing the
22 requirements document now through 1990, the early
23 conceptual designs of the plants proceeding in that
24 same time frame. The process of developing the
25 requirements document is one that allows for a great

1 deal of cross fertilization input by boiler room
2 sessions and so forth. So, there will be a lot of
3 informal input in the generation of the requirements
4 document.

5 In addition, we plan to enter into
6 agreements with EPRI and the vendors under which the
7 vendors would seek to meet the requirements of the
8 requirements document and provide for consultations in
9 the event that there are difficulties. That's the
10 general nature of the coordination.

11 SECRETARY YOUNG: That concludes our
12 presentation.

13 CHAIRMAN CARR: Thank you.

14 Any questions? Commissioner Roberts?

15 Commissioner Rogers?

16 COMMISSIONER ROGERS: Yes. Coming back to
17 this question on the ALWRs in your slide four, Mr.
18 McGoff, that no prototype is required, and you mention
19 a little bit later on slide six that your R&D program
20 is demonstrating technical and economic feasibility of
21 these designs. I wonder if you could say a little bit
22 about what you're thinking is with respect to full
23 scale or semi-scale demonstrations that are being
24 contemplated for the unique passive safety features of
25 the ALWRs.

1 MR. MCGOFF: We have a program underway
2 right now to look at scale testing of many of the
3 safety features, for the passive cooling system of the
4 ABWR, the depressurization valve of the ABWR. Some
5 are full scale and some are partial scale, depending
6 upon what we think needs to be done in order to verify
7 their adequacy. That's the type of testing that we
8 see providing the confidence that those extrapolations
9 we are making from existing technology are
10 satisfactory.

11 COMMISSIONER ROGERS: Well, when do you
12 think that they will have been completed? How does
13 that fit in with this time table that you're
14 suggesting here?

15 MR. MCGOFF: The test will be completed and
16 the results applied as part of the review of the
17 certification process. They will be submitted to the
18 NRC as evidence for their review of those features.

19 COMMISSIONER ROGERS: Well, where does that
20 stand now? How far along are you with --

21 MR. MCGOFF: We've actually completed some
22 of the tests --

23 Dan, can you identify --

24 MR. GIESSING: For example, the passive
25 containment cooling test for the Westinghouse AP600

1 has been completed and the depressurization valve
2 tests are to be completed by the end of this year
3 coming up. So, there's also one on the high inertia
4 pump that's currently under test at Westinghouse and
5 that will be completed shortly too. Those will be the
6 first phase of tests to show that they're on the right
7 track. In the continued program, there will be some
8 additional testing, but all to be completed by the
9 time the SARs are submitted in '92.

10 COMMISSIONER ROGERS: The passive
11 containment cooling test was -- what scale was that
12 done on? How was that done?

13 MR. GIESSING: It was about -- I'm not sure.
14 One-sixth --

15 Frank, is that a sixth scale?

16 CHAIRMAN CARR: Would you go to a microphone
17 and identify yourself for the recorder, please?

18 MR. ROSS: Frank Ross, the DOE ALWR Program
19 Manager.

20 The containment cooling test took a segment
21 of the surface -- the top surface of the containment
22 vessel with the curvature simulating the curvature of
23 the actual size vessel but a much, much smaller
24 segment, and determined the characteristics of, number
25 one, the heat transfer on the inside surface, the

1 condensation and the steam, and on the outside surface
2 the evaporative cooling provided by the circulating
3 air flow and the counter falling sprayed water. There
4 will be a larger scale test conducted as a part of the
5 subsequent design program.

6 But to add to a comment that was made
7 before, we consider the testing that was done in the
8 GE and the Westinghouse programs over the past three
9 years to have satisfactorily completed the development
10 of testing aspects of all of the new and unique
11 features of those plants, so that the follow-on
12 program, the program will be to do the detail design
13 and additional tests that will be used to test at
14 larger scale and also to optimize. Not to determine
15 whether the feature works, but to optimize it.

16 COMMISSIONER ROGERS: Okay. Another
17 question has to do with the source term issues that
18 have been identified by EPRI and others. There are
19 six of those that are under discussion with the NRC in
20 which we have some difference of opinion. I'm sure
21 you're familiar with what those six are. There's a
22 PWR spray additive and a number of others, including a
23 replacement for TID 14-8-44.

24 Could you comment on what your thoughts are
25 with respect to those issues?

1 SECRETARY YOUNG: Commissioner, we have a
2 representative on the task force, along with EPRI,
3 that's currently addressing those issues. The answers
4 for the NRC are being developed and we are not in the
5 position to comment on those today.

6 COMMISSIONER ROGERS: You're still thinking
7 about them?

8 SECRETARY YOUNG: Still thinking about them
9 in conjunction with the task force.

10 COMMISSIONER ROGERS: Okay. Thank you very
11 much.

12 CHAIRMAN CARR: Commissioner Curtiss?

13 COMMISSIONER CURTISS: I just have three or
14 four questions here.

15 On your schedule on page 9, a couple of
16 points of clarification. On the passive plan, do I
17 read that to say that you will submit the SARs for
18 both the Westinghouse AP600 and the SBWR about what,
19 January of '92, right at the beginning of the calendar
20 year?

21 MR. McGOFF: Yes, sir.

22 COMMISSIONER CURTISS: It looked to me like
23 our schedules might have been six months or a year off
24 on that. We had seen some recent schedules that might
25 have called for those to come in maybe six months

1 later. Is that something that determines the
2 schedules you're coordinating with our people?

3 SECRETARY YOUNG: Can you speak to that,
4 Dave?

5 MR. McGOFF: Well, that's the approximate
6 date. We're in the process of finalizing the
7 contracts with Westinghouse and General Electric at
8 this time which would nail down that specifically.
9 But it'd be in the 1990 time frame, early in the year.

10 COMMISSIONER CURTISS: Okay. On the early
11 site permit program, you indicated that you'll make a
12 decision to pick a site in early '90. Do I understand
13 that to mean that you've decided to proceed with an
14 early site permit program and it's just a question of
15 what the site will be or the decision in early '90
16 will be whether to proceed with this program?

17 SECRETARY YOUNG: We are still in the
18 process of, in conjunction with the fiscal '91 budget
19 deliberations, of deciding whether to proceed with
20 this program. Provided we do proceed with this
21 program, why, the utility would initially select a
22 site they are proposing for a demonstration.

23 CHAIRMAN CARR: And that's an ALWR site?

24 SECRETARY YOUNG: No, it would be a site for
25 whatever plant that they might want to permit. But I

1 would say not a specific kind of ALWR. It could be
2 the evolutionary, it could be the passive.

3 CHAIRMAN CARR: So, you'd pick a site that
4 we'd have to look at for either product then?

5 SECRETARY YOUNG: Yes.

6 COMMISSIONER CURTISS: Okay. And we'll
7 know, I take it, sometime in --

8 SECRETARY YOUNG: It would depend on the
9 utility. If they had a preference, then --

10 COMMISSIONER CURTISS: We'll know sometime
11 in the context of the budget submittal during the
12 early 1990 time frame on that one.

13 SECRETARY YOUNG: Yes, you will.

14 COMMISSIONER CURTISS: Okay. A couple of
15 quick questions. You've had an opportunity now to
16 take a look at Part 52, the Commission's regulations
17 that were promulgated on -- earlier this year.
18 Vendors were in sometime back and I asked them, after
19 working through that process if they -- having seen
20 what we've put on the books now and had an opportunity
21 to reflect on them, whether they had any thoughts or
22 suggestions on areas where there were particular hard
23 spots that might arise or glitches that we ought to be
24 aware of.

25 From your perspective, do you see anything

1 of that nature that we ought to be especially
2 sensitive to?

3 SECRETARY YOUNG: I would, I guess, make a
4 couple of observations. It seems to me that in the
5 area of emergency planning that the need for
6 adjudicatory hearings at the operating stage is
7 something that should be addressed to permit questions
8 to be addressed, but more along the lines of
9 legislative type hearing.

10 And I would say similarly for other issues
11 of non-compliance, our feeling is that there could be
12 a -- we certainly recognize the potential need for
13 some kind of hearing at that stage that might address
14 non-compliance questions and so forth, but that the
15 hearings should be legislative in nature, perhaps, and
16 should definitely constrain the time that might be
17 involved in resolving issues that might come up at
18 that time.

19 COMMISSIONER CURTISS: Okay. One final
20 question, on your advanced reactor program, the MHTGR
21 containment issue. We've -- I've kind of lost track
22 of where we are on that, but I think our staffs have
23 gone back and forth on the question of --

24 SECRETARY YOUNG: We delivered our reply to
25 you this morning, I believe.

1 COMMISSIONER CURTISS: This morning?

2 SECRETARY YOUNG: Yes.

3 COMMISSIONER CURTISS: I have not seen that
4 yet. So, I'll withhold my question.

5 CHAIRMAN CARR: Hand delivered, right?

6 SECRETARY YOUNG: Right.

7 COMMISSIONER CURTISS: Hand delivered.
8 Could you -- I know we've gone back and forth on
9 differences between a containment for the MPR and for
10 the civilian version of that. Could you give us--
11 since I haven't dug through my paper stack to find
12 that yet, could you give us maybe a brief summary of
13 what you see as the rationale for the approach to
14 those two?

15 SECRETARY YOUNG: Our rationale remains the
16 same. We are proposing not having a containment on
17 the modular high temperature gas cooled reactor, but
18 putting a containment on the new production reactor.
19 The reason for that is basically the need to assure
20 that the new production plant will meet all safety
21 requirements in the event that on the schedule they
22 are trying to meet, which is fairly expeditious, that
23 we feel that the containment is required in that case
24 to make sure that all appropriate safety requirements
25 could be met, even if the R&D programs ultimately do

1 not work out as we contemplate they will.

2 COMMISSIONER CURTISS: I'll read the
3 submittal in more detail and follow up on that. Thank
4 you.

5 CHAIRMAN CARR: Anything else?

6 COMMISSIONER CURTISS: That's it.

7 CHAIRMAN CARR: You indicated that -- I
8 think Mr. McGoff did, indicated that demonstration of
9 the improved regulatory process by certification of
10 standardized ALWRs meeting utility requirements by '91
11 would go a long way to providing confidence in the
12 process. Suppose we certified those plants and nobody
13 buys them. Does that provide confidence or does that
14 kill the process?

15 SECRETARY YOUNG: Well, I think the reason
16 why people don't buy them is not necessarily the
17 process.

18 CHAIRMAN CARR: That's what worries me.

19 SECRETARY YOUNG: Yes.

20 CHAIRMAN CARR: I mean, I can go ahead and
21 certify them and lay them on the table, but if nobody
22 buys them, I haven't approved the process at all.

23 SECRETARY YOUNG: Well, that's true, but --

24 CHAIRMAN CARR: I've spent a lot of
25 manhours.

1 SECRETARY YOUNG: I guess our view is it's a
2 necessary but perhaps not a sufficient condition
3 that -- for a utility to complete a nuclear power
4 plant.

5 MR. McGOFF: If I could add to that,
6 Chairman Carr, it seems to me that going through those
7 rulemaking activities and those procedural steps to
8 show indeed that they work and to show how they work
9 is of great value in addition to whatever value the
10 final product has as a sales vehicle. We think that
11 the utilities may be interested in that plant. But
12 aside from that, we think that the process of going
13 through and demonstrating the process is of great
14 value.

15 CHAIRMAN CARR: Well, I agree, if we took
16 the process all the way to the end --

17 SECRETARY YOUNG: For a specific order.

18 CHAIRMAN CARR: -- and somebody on the line
19 with a license that had gone commercial. I think
20 that's very valuable exercise, but I'm not sure the
21 certification per se.

22 In the cost-sharing of this business, 50
23 percent industry -- and which part of the industry is
24 kicking in the money, the utilities or the vendors?

25 MR. McGOFF: Both.

1 SECRETARY YOUNG: Both.

2 CHAIRMAN CARR: Are the utilities doing an
3 equal share of that? Everywhere I go --

4 MR. McGOFF: This varies on different
5 activities. If I could use the future activity, the
6 passive light water reactor certification program as a
7 reference, my understanding is that each plant is
8 estimated to cost approximately \$100 million to
9 develop and certify. That's a ballpark estimate.
10 It's a round number. They vary from that.

11 But using that number as a round number, the
12 Department of Energy is sponsoring these to the extent
13 of \$50 million. Of the remaining \$50 million, I
14 believe the utilities have a target of sponsoring
15 something in the order of \$30 million of the remaining
16 \$50 million.

17 CHAIRMAN CARR: Well, everywhere I go, of
18 course, the vendors are the ones preaching what great
19 advantages there are to all the reactors and the
20 utilities are more or less silent.

21 From your contacts, is there more industry
22 interest in the mid-size reactor than there is in the
23 ALWR?

24 SECRETARY YOUNG: I think the interest
25 depends on the utility you talk to. I think there's a

1 mixed story that you get. I mean, some of the larger
2 utilities certainly support the evolutionary. Others
3 support the advanced passive plant.

4 CHAIRMAN CARR: Well, you know,
5 standardization is the name of the game. At least,
6 that's what we started out with. And I'm concerned
7 that we're really not going to achieve standardization
8 if we've got two, three ALWRs; two, three passive
9 designs; two or three future designs. We'll end up 10
10 or 12 designs.

11 COMMISSIONER ROBERTS: Better than 110,
12 though, isn't it?

13 CHAIRMAN CARR: Well, I guess if I were
14 confident they were all going to look alike when they
15 were through. But do you have any words of wisdom you
16 want to give us on what the biddable package or what
17 the essentially complete design ought to look like?
18 Should we require that secondary system to be complete
19 in design as well?

20 SECRETARY YOUNG: I guess I'd say my answer
21 is yes, to really define a plant that you can make
22 sure your costs are known with certainty. And I think
23 that what we're supporting is one BWR and one PWR in
24 this process. I think that's the minimum number that
25 should be available to provide a choice of certified

1 designs that utilities could choose from.

2 CHAIRMAN CARR: Well, I'm of the opinion we
3 shouldn't exclude any particular vendor, but we ought
4 to make sure the one he builds is just like the one
5 the other guy built to the same design.

6 SECRETARY YOUNG: I'm not sure I follow you
7 on that.

8 CHAIRMAN CARR: Well, let's take two PWR
9 plans.

10 SECRETARY YOUNG: Yes.

11 CHAIRMAN CARR: Why shouldn't I just have
12 one certified PWR design that anybody can build and
13 sell?

14 COMMISSIONER ROBERTS: Anti-trust.

15 CHAIRMAN CARR: Well, but the government can
16 own the design.

17 SECRETARY YOUNG: We're based on a, you
18 know, private sector development of the designs and
19 competition in that regard. And simply having gone
20 the direction of the government design, I think to get
21 designs that are effective for the market place that
22 competition is still the best answer, provided you
23 don't end up with, you know, many, many designs. I
24 think we have a balance of --

25 CHAIRMAN CARR: Twelve to me is many, many.

1 Maybe it isn't, but --

2 SECRETARY YOUNG: Well, we're only
3 supporting a few, from our standpoint. I think that
4 you need a minimum number of designs for competition
5 and simply don't believe that the government design is
6 the right answer for our system.

7 CHAIRMAN CARR: Well, your proposal and your
8 advice to us on our priorities sounds like everybody
9 else's. "We like what you're doing. Do it all, and
10 get it all done at the same time. Hold to the
11 schedule. Get the ALWRs done. But at the same time,
12 it's important that you get the EPRI design
13 requirements document. And oh, by the way, the
14 passive's important and the EPRI design for passive
15 comes out ahead of the passive designs. But in case
16 it doesn't, don't hold up the passive certification."

17 So that's not giving me a lot of help in
18 deciding where to put my emphasis. Ideally, the
19 reason we went into the EPRI design requirement's
20 document was so the builder could tell the vendor what
21 he wanted, give him a set of specs and say, "Here's
22 the kind."

23 SECRETARY YOUNG: Yes.

24 CHAIRMAN CARR: I agree the process on the
25 ALWR is too far along for that. But it's not too far

1 along in the passive design. And so are you giving me
2 encouragement to go ahead and get that passive design
3 requirements document in place before I worry about
4 certification of the designs?

5 SECRETARY YOUNG: I would say yes. I mean,
6 that's our definite plan is to get it in place first.

7 I think on the evolutionary design we're
8 recognizing where we are today and urging you to
9 complete both actions as being separate ways of giving
10 a complete answer.

11 Our intention is clearly, on the passive
12 plant design, to get the design requirement document
13 in first and have a shot at that. I guess we're
14 hedging our bets to say that, you know, if something
15 unforeseen come along why we're not saying that's the
16 sole way to go, but that is certainly the plan at this
17 time to give that orderly sequence.

18 CHAIRMAN CARR: Okay.

19 COMMISSIONER ROGERS: Well, just on this
20 point, it is the tough one for the Commission to deal
21 with, because everybody more or less is saying, as the
22 Chairman has just indicated, "Do everything and do it
23 all together and do it well." And we have a
24 significant resource problem in trying to do that.

25 In listening to the presentations to us, I

1 think we haven't really had much of a demonstration
2 from anybody as to the serious interest of a U.S.
3 utility in the evolutionary designs, the ones that
4 just are a few steps away from the current designs.
5 The more passive ones, everybody seems to say, "Well,
6 you know, that's later." We seem to get the feeling
7 that the market for the evolutionary designs is
8 largely overseas, and that the possible market for the
9 passive modular advanced light water reactor designs
10 might be domestic. And yet, nobody really is willing
11 to come out and say that.

12 And in trying to assess where we really
13 ought to put our efforts to try to move things along
14 as quickly as possible, that certainly is a question
15 that's certainly in the back of my mind. I wonder if
16 you would be willing to stick your necks out a little
17 bit on that.

18 SECRETARY YOUNG: I guess I would say this.
19 Given the impending demand for additional electricity
20 supply, given the developments on the environmental
21 side of increasing concern about emissions and so
22 forth, I don't think we know in the next few years
23 just how this thing is going to go and what is going
24 to emerge in terms of utilities meeting their
25 requirements. Should there be significant constraints

1 that emerge on their ability to use fossil fuels, I
2 think you could see a translation of this picture
3 domestically. And I think it's very important to have
4 the most definitive technology in place in a certified
5 manner, such that our utilities are able to pick up on
6 that and use it under the circumstances that prevail
7 at the time.

8 COMMISSIONER ROGERS: Okay.

9 CHAIRMAN CARR: Any other questions?

10 Well, I'd like to thank you, Secretary
11 Young, and your representatives of the Department of
12 Energy for sharing your perspectives with regard to
13 advanced light water reactor designs and the
14 certification process. We value your input and we'll
15 take it into consideration as we address the issue of
16 prioritization, methodology, and the schedule for our
17 reviews of these classes of reactor designs.

18 If there are no additional remarks from my
19 fellow Commissioners, we stand adjourned.

20 (Whereupon, at 2:54 p.m., the above-entitled
21 matter was concluded.)
22
23
24
25

CERTIFICATE OF TRANSCRIBER

This is to certify that the attached events of a meeting
of the United States Nuclear Regulatory Commission entitled:

TITLE OF MEETING: BRIEFING ON DOE VIEWS ON ADVANCED LIGHT WATER
REACTOR DESIGN AND CERTIFICATION

PLACE OF MEETING: ROCKVILLE, MARYLAND

DATE OF MEETING: NOVEMBER 30, 1989

were 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.



Reporter's name: Peter Lynch

11/30/89

SCHEDULING NOTES

Title: Briefing by DOE Views on Advanced Light Water
Reactor Design and Certification

Scheduled: 2:00 p.m., Thursday, November 30, 1989 (OPEN)

Duration: Approx 1-1/2 hrs

Participants: Department of Energy (DOE)

- William H. Young
Assistant Secretary
Nuclear Energy
- David McGoff
Associate Deputy Assistant
Secretary for Reactor
Deployment
- Dan Giessing, Director
Office of Light Water Reactor
Safety and Technology
- Steve Sohinki
Assistant General Counsel for
Nuclear Affairs
- Discussion on DOE views
on advanced standard plant
design
- Relationship and priorities
- Standardization implementation
- EPRI design requirements
document
- Certification program

ADVANCED LIGHT WATER REACTOR PROGRAM

PRESENTATION TO THE NUCLEAR REGULATORY COMMISSION



David J. McGoff
Associate Deputy Assistant Secretary for Reactor Deployment
U.S. Department of Energy

November 30, 1989

LIGHT WATER REACTOR PROGRAM DOE PROGRAM OBJECTIVES

Overall Goal

- Removal of Regulatory and Technical Impediments to Nuclear Power Once Again being an Option by the Early to Mid-1990's

Objectives

- Reactor Designs Employing Best Technology Available Worldwide
- Demonstration of Acceptable Licensing and Economic Regulatory Processes

LIGHT WATER REACTOR PROGRAM DOE PROGRAM OBJECTIVES (CONT'D)

Strategy

- Single Coordinated National Program Among DOE, Utility Industry, and Reactor Manufacturers
- Ensure Relevance of Program by Requiring Cost-Sharing
- Use LWR Technology Program to Demonstrate Regulatory Reform

DOE LWR PROGRAM HIGHLIGHTS

- Demonstrate Improved Regulatory Process by Certification of Standardized ALWRs Meeting Utility Requirements by 1991 (Large Plants)
- Demonstrate Plant Life Extension for Existing LWRs by 1993
- Design, Develop, and Certify Standardized Simpler, More Passively Safe ALWR Plants by 1995 (Mid-Size Plants)
- Assist in Resolution of Safety and Economic Regulatory Issues

EXPECTED BENEFITS OF THE ALWR

- Based on Existing Commercialized Design -- Direct Application of Proven Technology
- Improved Designs
 - Greatly simplified
 - Incorporate lessons learned
 - Passive safety
 - Potential for smaller size
 - Potential for standardization
 - Potential for extended plant life
- No Prototype Required
- Protection of Utility Investment -- Licensability
- Cost Competitive with Other Power Generation Options

**NATIONAL LIGHT WATER REACTOR STRATEGY
FOR LARGE ALWRs IS IN AN ADVANCED STAGE
OF IMPLEMENTATION**

- Definition of Required Technical Attributes by the Utility Industry Completed in the Next Few Months
- ALWR Designs Meeting Utility Requirements and Incorporating Best Technology Available Worldwide Being Developed by Reactor Manufacturers
- ALWR Design(s) have been Submitted for Certification to Demonstrate that Regulatory Process is Working
- Result will be Standardized, Certified Plant(s) Meeting Utility Requirements, and Availability of Demonstrated Certification Process by 1991
- Utility Industry, Reactor Vendors, DOE, and NRC Have Coordinated Programs

NATIONAL LIGHT WATER REACTOR STRATEGY
ON MID-SIZE ALWR'S SHOULD RESULT IN
AVAILABILITY OF PASSIVE ALWR'S BY 1995

Why Mid-Size Plants?

- Mid-Size Plants Incorporate Increased Passive Safety, Simplicity, Constructibility, and Operability
- Increased Simplicity and Constructibility Lead to Shorter Construction Times
- Mid-Size Plants Better Match Utility Load Growth and Reduce Capital Outlays

Status

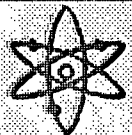
- R&D Program is Demonstrating Technical and Economic Feasibility of these Designs
- General Electric SBWR and Westinghouse AP600 Selected for Further Development and Certification by 1995
- 50/50 Cost Share by Government and Industry

PHASE I ACCOMPLISHMENTS IN PASSIVE ALWR PROGRAM

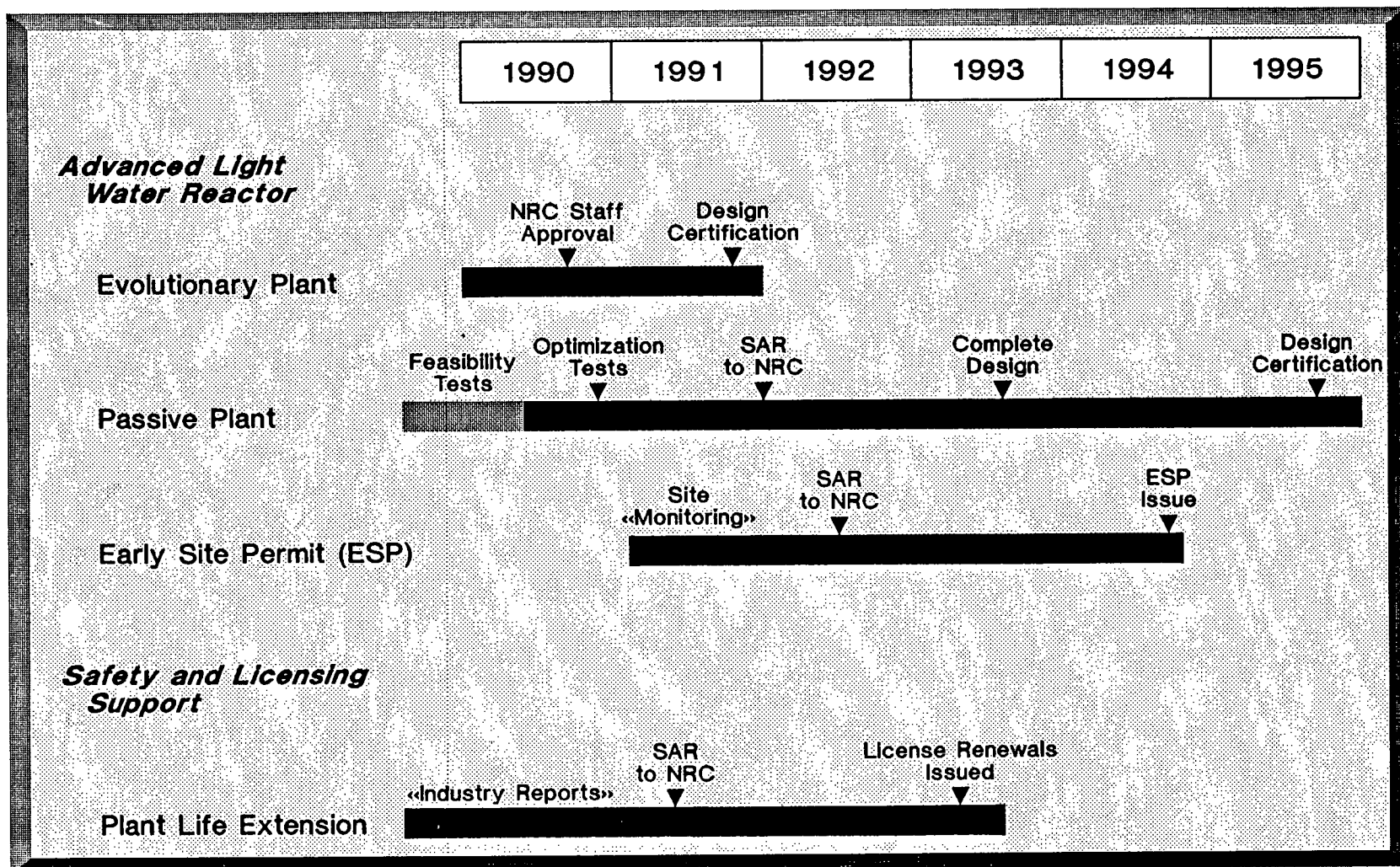
- Cost Estimate Shows that Design Simplicity Will Defeat "Economy of Scale" (Westinghouse Capital Cost Estimate of \$1270/KWE)
- Modularization and Construction Planning Estimates 36-Month Construction
- Tests to Demonstrate Passive Safety Features Are Being Successfully Completed

EXAMPLES OF INCREASED DESIGN MARGIN
AND SIMPLIFICATION RELATIVE TO STANDARD
TWO LOOP PLANT

<u>Plant Features</u>	<u>Advanced vs. Standard</u>
Fuel Assemblies	20% More
Pressurizer	30% Larger
Valves	60% Less
Pipe	60% Less
Building Vol.	
- Containment	Same
- Seismic	60% Smaller
- Non-Nuclear System	More
- Total	40% Smaller



LIGHT WATER REACTOR TECHNOLOGY SCHEDULE



THE DEPARTMENT'S LIGHT WATER PROGRAM
IS CLOSELY COORDINATED WITH THE
ELECTRIC POWER RESEARCH INSTITUTE

- Co-Sponsorship of PLEX Lead Plants
- Coordinated PLEX R&D Programs
- DOE Support for EPRI Requirements Program
- DOE-EPRI-Vendor MOU's on Evolutionary Plant Designs
- Co-Sponsorship of Passive ALWR Development Designs

IMPORTANCE OF TIMING OF PLANT CERTIFICATIONS

- No Firm Orders without a Certified Design
- Approximately Eight Years Required for Evolutionary Plant Design, Construction, and Start-Up
- NRC Evolutionary Plant Certification Current Timing Key to New Plants Operating By 2000
- Agreed-Upon Schedule Calls for FDA in 1990 and Certification in 1991
- Most Uncertain Part of Certification Still Remains
- Certification of Passive Plants by 1995 Also Essential to Operation of these Plants Around 2000

SUMMARY

- Evolutionary Plant Requirements Document Needed.
 - Documentation of Issue Resolution.
- Timing of Evolutionary Plant Certifications is Key to New Plant Orders.
- Passive Plant Designs will be Coordinated with EPRI Requirements Document. 1995 Certification Needed for Operation Around 2000.

**STATEMENT OF WILLIAM H. YOUNG
ASSISTANT SECRETARY FOR NUCLEAR ENERGY
ON REACTOR STANDARDIZATION AND CERTIFICATION
BEFORE THE
NUCLEAR REGULATORY COMMISSION
NOVEMBER 30, 1989**

Mr. Chairman and Members of the Commission, I am pleased to appear here today to discuss the Department of Energy's views on reactor standardization and certification. In previous meetings with industry and the NRC staff, you have sought input for your decisions on such topics as the relative roles of the industry Requirements Documents and individual design certifications, on the value of completing the evolutionary plant Requirements Document, on the number of standardized plants to be certified, and on the priority that the Commission should place on each of these activities. These are important questions, and we hope that our views will be useful in formulating your policies in these areas.

The Nation will need to add substantial amounts of new generating capacity in the coming decade. Indeed, some regions of the country, notably the Northeast, are even now experiencing shortages in generating capacity. To give some sense of the magnitude of the problem facing us, the Energy Information Administration of the Department of Energy projects that America will need 125 gigawatts of new generating capacity by the end of the century, including both plants needed to support economic growth and plants needed to replace those to be retired.

President Bush has indicated that nuclear power must play a critical role in assuring a balanced, secure, and stable supply of energy. Nuclear power provides electricity without generating carbon dioxide or sulfur emissions which contribute to acid rain and possible global warming. The nuclear option in the United States is clearly necessary to avoid an excessive reliance on coal or other fossil fuels for electricity generation. The significance of achieving an effective program to certify standardized nuclear power plants is underscored by the strategic need for nuclear power.

Reform of the regulatory process is important for the future of nuclear power. The Nuclear Regulatory Commission's new rule, effective in May, 1989, providing for issuance of Early Site Permits, standardized design certifications, and combined construction permits and operating licenses, represents a major step in the reform of the nuclear licensing processes.

For the last several years, the Department has been working with NRC and the industry to define and develop the standardized plants which will be the vehicle for the next plant orders. It is generally agreed that the most promising nuclear plant designs for commercial application in the near future are the Advanced Light Water Reactors (ALWR). The ALWRs will apply three decades of successful operating experience to produce even safer plants. The Department is involved in several key programs to make standardized ALWR's available for deployment in the 1990s, including:

- o The Utility Requirements Document
- o Certification of Evolutionary Plant Designs
- o Development and Certification of Mid-Size Passive ALWRs.

Utility Requirements Document

The Utility Requirements Document, incorporating the lessons learned from operation of the over 100 plants in the United States, has value both as a "buyers specification" and as a vehicle for documentation of resolution of issues with the NRC. Both the evolutionary and passive sections of this document are important since we believe that both of these types of plants may be of interest to utilities in the future. The Department has supported the development of the Requirements Document by providing its expertise in such areas as resolution of severe accident issues. We strongly endorse the need for timely completion of the review of the Document and issuance of an SER by NRC. This will document the generic resolution of issues for future evolutionary plant designs and will be valuable as a starting point for the passive plant Requirements Document. Even though some of the difficult issues are being resolved on a plant specific basis in individual evolutionary plant certifications, such resolution may not be generic due to unique features of some of these plants.

Certification of Evolutionary Plant Designs

The Department has been sponsoring General Electric and Combustion Engineering in the submittal for certification of the ABWR and the System 80+, respectively. The Department's major objective in these programs has been demonstration of the certification process as is now defined in 10CFR52. While the rule provides the overall framework for the certification process, a number of very important features need to be demonstrated to show organizations considering orders for nuclear power plants that a viable process does indeed exist. Examples of such features are the definition of the tests, inspections, and analyses which will provide the assurance that the plant has been constructed in accordance with the combined license; the certification rulemaking process itself; the degree of specificity in the certification; the handling of NEPA issues; and the handling of onsite emergency planning features in the certification.

In addition to providing a demonstration of the certification process, completion of the certifications in December 1991 will make the evolutionary plant available for future orders. Since we believe that certification of a design will be a prerequisite for any future order, the timing of these certification programs will in essence determine the earliest date at which new plants can be placed into operation. Even with an order promptly following a design certification at the end of 1991, we estimate a plant could not become operational until 1999. We urge the Commission to devote the necessary resources to assure that their review is completed on the currently agreed upon schedule in the Licensing Basis Agreement. This will help enable the Nation potentially to begin to meet its new generating plant capacity needs by the turn of the century using advanced-design nuclear energy plants.

Design and Development of Passive Plants

The Department has been sponsoring the development of mid-size passive ALWR's since 1986. Mid-size plants more closely meet the load-growth requirements of many U.S. utilities and reduce the capital formation requirements for a plant. In addition, their smaller size offers opportunities for design simplification by the use of passive safety features employing primarily natural forces such as gravity or natural circulation in place of engineered safety systems. Over the last 3 years, our programs have shown the feasibility of these passive safety features and have demonstrated that the resultant design simplicity can defeat the "economy of scale" so that unit costs approach those for evolutionary plants. In addition, the use of modular construction will lead to significantly shorter construction times.

Recently the Department selected the general Electric SBWR and the Westinghouse AP600 designs for further development and submittal for NRC design certification under a cost-shared program. The program schedule calls for submittal of the SSARs to NRC in 1992 with certification targeted for 1995.

These passive plant designs will be developed in conformance with the Utility Requirements Document. The Department is providing assistance to EPRI in the development of the Passive Plant Requirements Document similar to that provided on the evolutionary document. The Passive Plant Requirements Document will be submitted to the NRC by the end of 1990.

The Department, EPRI, and the reactor designers are developing arrangements to ensure coordination between the passive plant design and the Requirements Document. This coordination will be carried out on a continuous basis so that each program can benefit from the other. The Department strongly supports the objective of submittal of the Requirements Document prior to submittal of the passive plant designs to be certified. We do not believe, however, that the relative timing should be made a regulatory requirement. In the remote event that submissions of the requirements document should be delayed beyond 1992, we believe the national interest in having the passive plants certified and available for use should not be compromised.

NRC Priorities

I fully understand the Commission's need to plan priorities on the many certification applications which may be submitted. I personally do not have a precise definition of the "right" number of plants which should be certified to obtain the benefits of standardization while maintaining the competitive situation traditional to our Nation's economic system. I do know the number should be more than one.

Whatever number is the "right" one, I understand your need to develop priorities. I do not believe it is desirable to require that a plant have an order as a prerequisite for obtaining NRC priority on a design certification. Such a procedure would seem inconsistent with 10CFR52, a key feature of which

is the benefit having certified standard designs available to prospective purchasers. I suggest that one consideration in developing your priorities be an expression of national interest in that design as manifested by substantial financial support by DOE or by the utility industry. Use of this criterion would ensure that designs being certified have a real probability of being beneficially deployed in the United States.

Other DOE Programs

While I have limited my remarks to ALWRs, I would like to thank the Commission for its activities on some other reactor development programs of interest to DOE. The priority you have placed on Plant License Extension is key to safely retaining the more than 100 currently operating plants in our Nation's energy supply. The Department is co-sponsoring the two lead plants which will be submitting applications for license extensions in 1991.

In addition, the safety reviews you are undertaking of other advanced reactors--the MHTGR and the PRISM--are key to our future decisions on these plants. I look forward to continued interaction with the Commission on these important programs.

Summary

In summary, I ask NRC support of:

- o completion of the review of the Evolutionary Plant Requirements Document to resolve open issues, and
- o completion of the evolutionary plant certification to demonstrate the certification process.

The passive plant designs coordinated with the requirements document will be submitted to the NRC by 1992 with the objective of 1995 certification.

The timely certification of both the evolutionary and passive plant designs can provide a basis for possible orders for nuclear power plants which can be completed by the turn of the century. Given the Nation's growing need for added generating capacity by that time, including use of nuclear power, both DOE and NRC can together make an important contribution to securing the Nation's energy future by completing the actions I have recommended.

I would like to thank you for the opportunity to provide DOE's views in this important area. Mr. McGoff will provide some further details in the areas I have discussed.