

UNITED STATES OF AMERICA NUCLEAR REGULATORY COMMISSION

Title: BRIEFING ON POLICY PAPER FOR PLANT LIFE EXTENSION

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1 UNITED STATES OF AMERICA
2 NUCLEAR REGULATORY COMMISSION

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4 BRIEFING ON POLICY PAPER FOR PLANT LIFE EXTENSION

5 ***

6 PUBLIC MEETING

7 ***

8 Nuclear Regulatory Commission
9 One White Flint North
10 Rockville, Maryland

11
12 TUESDAY, JULY 12, 1988

13
14 The Commission met in open session, pursuant to
15 notice, at 2:00 p.m., the Honorable LANDO W. ZECH, Chairman of
16 the Commission, presiding.

17 COMMISSIONERS PRESENT:

18 LANDO W. ZECH, Chairman of the Commission
19 THOMAS M. ROBERTS, Member of the Commission
20 KENNETH CARR, Member of the Commission
21 KENNETH ROGERS, Member of the Commission

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23
24
25

1 STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

2 J. HOYLE

3 W. PARKER

4 T. SPEIS

5 B. SHERON

6 D. CLEARY

7 V. STELLO

8 T. MURLEY

9

10 AUDIENCE SPEAKERS:

11 R. BOSNAK

12 G. ARLOTTO

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P R O C E E D I N G S

[2:00 p.m.]

CHAIRMAN ZECH: Good afternoon, ladies and gentlemen. The purpose of the meeting this afternoon is for the NRC staff to brief the Commission on the licensing renewal rule-making, SECY 88-180. This paper requests the Commission approval to publish an advanced notice of proposed rule-making and to solicit public comment on NUREG-1317, Regulatory Options for Nuclear Plant License Renewal.

After a day's meeting, I'd request the Commissioners vote on whether or not to publish the rule and to seek comments on NUREG-317. I understand the copies of slides are available at the entrance of the meeting room. Do any of my fellow Commissioners have opening comments to make?

[No response.]

If not, Mr. Stello, you may proceed.

MR. STELLO: Thank you, Mr. Chairman. Looking at the table today, starting over at my far left is Dr. Murley and to my immediate left, Dr. Speis and Brian Sheron on my immediate right, who will do the briefing and the Project Manager responsible for getting this job done on the far right is Don Cleary from research.

The subject of the briefing is to explain to the Commission something that we see coming into the future which we think has the potential for being a very significant issue

1 for the Agency as well as for the industry.

2 As you are aware, and we will show you in the
3 briefing, the number of operating plants whose license will
4 expire at the turn of this century is a steep curve and hence
5 the question is raised; how many and what number of these
6 plants may wish to extend the operating life beyond the current
7 40-year licensed life of the plant.

8 With today's climate with capital investment for new
9 generating capacity with 100 plus plants in operation at a cost
10 of a replacement plant today in the neighborhood of \$5 billion;
11 it's obviously very, very significant. Increasing the life
12 extension of plants for even a modest period of time of 5 or 10
13 years, has the potential for a very large savings to the
14 American public on behalf of capital investment in new plants
15 and to the rate payers.

16 It is an issue that is an important issue to us and
17 to the industry -- us for planning to be able to do it, which
18 brings us to the subject of this meeting, which is how we are,
19 in fact, going to develop a licensing basis for renewal. It's
20 obviously very closely coupled to the question of plant aging
21 and what are those issue that we have to deal with.

22 It is to me, an important subject that we would best
23 serve to have the Agency issue the proposed rule-making events
24 notice to get comments and get the industry and members of the
25 public to come in early in the process. It sounds like it's a

1 long time away, but what we have been told by the industry is
2 that this is a decision that they will be making in the very
3 near future in plans.

4 If they are not going to be able to renew the
5 license, then they have to get replacement generating capacity
6 so that the time with which they have to make decisions, is
7 well in advance of the time the license expires, in order for
8 them to be able to reasonably plan. In fact, some of them have
9 indicated that they would like to be able to be pretty firm
10 about what the process would be, before they would make that
11 decision, hence the need to resolve this issue.

12 With that introduction, I will ask Brian to take us
13 through the briefing and I think it will become more apparent,
14 with the sense of urgency about it, is as you see, the data
15 that he will present in the briefing. Brian?

16 MR. SHERON: Thank you. The two topics I'll talk
17 about are the staff activities that are underway right now and
18 our schedules and the regulatory options that we are looking at
19 for relicensing. On the second slide, you will see what Vic
20 was just talking about. Most utilities have a 12-year planning
21 horizon for deciding their new generating capacity needs.

22 We have the Department of Energy and EPRI, both
23 heavily interested in this. In fact, DOE is in the process of
24 putting out, I believe, a request for proposals to fund like a
25 demonstration plant for license renewal starting in 1991.

1 The first operating plant that will have its
2 operating license expire is Yankee Rowe. With the extension
3 that was granted, which starts their 40-year life from the CP,
4 moved up to the operating license, their operating license
5 would expire in the year 2000. If we assume that there's a 2-
6 year NRC review required, which is an approximate number right
7 now for a license renewal review, and that there's a 12-year
8 lead time, then if you look at the number of plants that would
9 potentially come in for a renewed license application before
10 the year 2000, it's 35 plants.

11 On Slide 3, this a graphical illustration of the
12 number of plants that will have their OL's within 12 years of
13 expiration, versus the calendar year as shown. You can see, as
14 Vic said, that starting around the year 2000, a very, very
15 steep rise in the number of applications which represents the
16 number of plants that were licensed around 1980 and right after
17 TMI, 1983 and so forth. We expect to see the first application
18 in very soon and we expect to see a number of them coming in
19 within the next several years.

20 CHAIRMAN ZECH: Is the staff in place to accommodate
21 these requests?

22 MR. STELLO: No, sir.

23 CHAIRMAN ZECH: When are we going to do that?

24 MR. STELLO: We will need to answer the question in
25 terms of budget space, probably starting in next year's budget

1 cycle, to really accommodate it. We can handle a modest number
2 of licenses. I'd ask Tom is you could speculate within the
3 next three or four years, the number of applications you think
4 you could accommodate within what we already have.

5 MR. MURLEY: Probably -- we expect to get one or two
6 or three lead applications. We could do that with what we've
7 got, but we'd soon -- I think it would take more than the
8 resources that we have, watching operating reactors.

9 CHAIRMAN ZECH: How long do you think it will take to
10 accomplish license renewal? Do you have an estimate? How many
11 people are involved here.

12 MR. MURLEY: I think once, Mr. Chairman, once we get
13 through the first plant or two and have a prototype under our
14 belts, it shouldn't take too long. I would be guessing, but my
15 feeling is maybe a couple of years. The first plant -- we have
16 to frame the issues, and that's why I think it's important that
17 this rule be settled as quickly as we can so we can frame the
18 issues and how we're going to go about it.

19 MR. STELLO: It probably depend a great deal upon
20 what the final rule is on this subject, as to what the scope of
21 the licensing renewal review process is. If you recall, as
22 Brian just said a moment ago, we are assuming that we will use
23 two years to do the review in terms of planning. It will take
24 us two years to get through the review and then the 12 years
25 for the planning horizon is how you could get the number to 35.

1 I don't think any of us could tell you that we know
2 that two years is a bad guess, but based on prior experience,
3 it's not unreasonable. That is, we get toward the tail end of
4 the process, I'm sure we'll be doing a lot better with it. We
5 really need to plan for a very steep curve which is toward the
6 end of the century.

7 CHAIRMAN ZECH: General Counsel has a question.

8 MR. PARLER: Mr. Chairman, I realize that my time
9 will come later, but I think it's very important to learn some
10 lessons from the past, the lessons that were learned during the
11 initial licenses of these plants. I don't think you want to
12 wait or the Commission would want to wait or it would be sound
13 policy to wait until the applications get here; then to decide
14 what the issue will be.

15 I thought that the very heart of this policy
16 discussion, that perhaps eventually will come on the scene as a
17 rule, would be to decide, among other things, what the
18 licensing basis -- that is, what the technical requirements for
19 licensing the renewal of these plants are. That's the point
20 that I wanted to make.

21 CHAIRMAN ZECH: Okay, fine. I agree. Well, along
22 the same line, on the first slide you mentioned DOE's
23 participation in the lead plant?

24 MR. SHERON: Yes.

25 CHAIRMAN ZECH: Could you explain that just a little

1 bit more? What is their role? Are they going to sponsor it?
2 How are they involved?

3 MR. SHERON: My understanding is that they are
4 planning to sponsor a lead plant financially, by, I think,
5 basically providing them so many dollars. I don't know what
6 the number is -- over a certain amount of time -- to support
7 their license renewal activities. Primarily, it's a
8 demonstration type of a plant.

9 CHAIRMAN ZECH: Is that their plant or one of our's?

10 MR. SHERON: It would be a commercial plant.

11 CHAIRMAN ZECH: A commercial plant -- well, getting
12 back to the General Counsel's question, it seems to me we do
13 need to lay in place a pretty solid foundation, rather than
14 wait for applications. We have a fair amount to do, it seems
15 to me. That's, I guess, what you're going to tell us. It is
16 important that we be well prepared for this. I would imagine
17 that this is a rather significant task and certainly, we should
18 be preparing for it now. I presume --

19 COMMISSIONER CARR: We're behind in our work already.
20 Twelve years and there's plant coming up in 12 years from
21 today.

22 MR. STELLO: Well, the first one is, in fact, 12
23 years from today -- that's Yankee Rowe.

24 COMMISSIONER CARR: I visited them last week and they
25 said, what are we going to do about renewing our license? It's

1 a timely meeting.

2 MR. STELLO: And one for which we're trying to
3 suggest to the Commission that what we'd like to do is quickly
4 and crisply get on with developing the rule. That's the
5 purpose of this meeting and that was the reason for my opening
6 comment, to suggest that if you look at when the large number
7 of plants are going to be looking for license renewal. If you
8 look at the curve, it looks like it's a long way off, but it
9 really isn't. I think that's the point you're making. It's
10 now and I agree with you.

11 MR. MURLEY: I think we need to clarify a point. It
12 does not take us 12 years to make a decision, but the utility
13 has know whether to replace that plant -- where to start
14 replacing that plant; that's the 12 years. We can, of course -
15 -

16 COMMISSIONER CARR: It doesn't take us 12 years to
17 make our decisions. I'm trying to figure out what's going to
18 take 2 years. Is it 2 years per plant or 2 years to get the
19 procedures in place and then we can do the plants with a little
20 more rapidity than that.

21 MR. SHERON: I'll jump ahead here. The schedule that
22 we're proposing is to put regulations in place that would be
23 available so that the industry would know what the NRC
24 requirements are, by about 1991 at the latest. This allows
25 some uncertainty in whether there's a public hearing required

1 or something like that.

2 This is consistent with our understanding of when the
3 industry needs to have these regulations in place. We have
4 discussed this with the industry. NUPLEX, I believe is the
5 industry organization. I have a letter from Mr. Niles which
6 indicates that our current schedule appears reasonable to them
7 and doesn't really produce any hardships.

8 MR. STELLO: Brian, I think the Commissioner's
9 question was, how long will it take us to do the reviews.

10 MR. SHERON: We're assuming about 2 years. We're
11 estimating 2 years.

12 COMMISSIONER CARR: What review are we talking about?

13 MR. STELLO: From the time the application comes in
14 asking for a license extension, till we review it and get an
15 approval out -- 2 years to do that.

16 COMMISSIONER CARR: When that application comes in,
17 we will have told them what we want in it. It will take us 2
18 years to review all that data?

19 MR. STELLO: Yes, until we're finished.

20 CHAIRMAN ZECH: Will we tell them ahead of time what
21 we expect?

22 COMMISSIONER CARR: You have to.

23 MR. STELLO: Yes.

24 CHAIRMAN ZECH: This is what I think we need to do.
25 When the application comes in, I recognize that we need review

1 time, but before they put in an application, it seems to me we
2 have an obligation to put out what are the requirements -- what
3 do we expect and what are we looking for?

4 MR. STELLO: That's our plan.

5 CHAIRMAN ZECH: When are we going to have that? Is
6 that all in this?

7 MR. STELLO: We're going to tell you how we're going
8 to develop that in the briefing and that guidance in the body
9 of the rule.

10 CHAIRMAN ZECH: That's going to be in place by 1991?

11 MR. STELLO: Yes, the final rule, which will --

12 CHAIRMAN ZECH: Which will give the standards, the
13 expectations and the requirements that were anticipated.

14 MR. STELLO: That's correct, yes.

15 CHAIRMAN ZECH: All right, well let's go ahead then,
16 I guess.

17 MR. SHERON: On Slide 4, I just wanted to bring to
18 your attention here that we have tried to pick up some time in
19 our schedule by eliminating the issuance of a policy statement,
20 but rather going directly to a proposed notice or rule-making.
21 We recognize that the policy approach would have declared the
22 Commission's intent in this matter in producing such as policy
23 for you to issue.

24 However, when we looked at the overall picture of
25 license renewal, we felt that a rule offered substantially more

1 benefit to the industry as well as to the staff in providing
2 more definitive guidance.

3 NRR made the suggestion, we took a look at it, and we
4 agreed that, indeed, we could probably pick up at least six
5 months on the schedule by going directly to a proposed notice
6 of -- advanced notice of proposed rulemaking.

7 CHAIRMAN ZECH: Well, did you think about the
8 necessity of going through the advanced notice of rulemaking as
9 opposed to just going through proposed rulemaking? And what
10 was your rationale with going through with the advanced notice
11 of proposed rulemaking?

12 MR. SHERON: The fact that we were studying options
13 for rulemaking, and I'll get to those in a couple slides. One
14 of the things that we wanted to do was to solicit the public's
15 comments on this whole process.

16 We've been trying to do this in a very open form to
17 make sure that we properly considered comments on relicensing
18 from all different organizations that are interested.

19 CHAIRMAN ZECH: Well, we certainly want to do that,
20 but can't we do that in a proposed rulemaking also? We solicit
21 comments. We have comment period on proposed rulemaking.
22 That's my understanding.

23 MR. SHERON: But we did not have a specific rule
24 prepared at this time. Our schedule was calling to have a
25 specific rule with specific requirements, etcetera, available

1 in about a year from now.

2 We did have an options paper prepared, which is the
3 NUREG, which you've seen, and we felt it would advantageous to
4 solicit comments on those options, make sure that we've covered
5 all the options and, therefore, we could factor the public
6 comments when we develop this final proposed rule.

7 CHAIRMAN ZECH: Okay. I'm not finding fault with
8 what you're doing. I just want you to explain the rationale
9 that you came up with.

10 MR. SHERON: We really couldn't have prepared a rule
11 any quicker than what we're doing right now. What we are doing
12 in this stage is actually being able to consider public comment
13 much earlier in the process.

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

15 MR. SHERON: On slide 5, as I said before, when we
16 take a look at the current regulations that are in place, we
17 don't believe that they really provide adequate guidance to the
18 industry with regard to relicensing a plant that has operated
19 for 40 years.

20 Our program right now is designed to develop
21 regulations and sufficient regulatory guidance for the industry
22 so that we can start processing their applications beginning in
23 the 1991-1992 timeframe.

24 And as I said before, based on our discussions with
25 the industry, this appears consistent with their needs. On

1 slide 6, just to point out that in the Commission's policy and
2 planning guidance, as far back as '86, NUREG 0885, we were
3 provided I guess guidance to proceed with the developing of
4 license renewal rules and regulations.

5 Also in the PPG of 1987, it has retained the same
6 wording. On slide 7, you'll see that there is just a history
7 of some of the things we've been doing in license renewal.

8 We started this back in November of 1986. We issued
9 a Federal register notice with a number of questions regarding
10 license renewal and solicited public comment on those.

11 In SECY 87-179, which we sent to you last July, we
12 gave you a status of the activities that were going on in the
13 licensing renewal rulemaking activities.

14 As I said before, in February, we analyzed the rule
15 versus policy and decided we could substantially reduce the
16 schedule by going directly to a proposed rule.

17 And as you have before you, SECY 88-180 presents the
18 regulatory options and the advanced notice of proposed
19 rulemaking.

20 On slide 8, what we have here is our proposed
21 schedule. And what we are proposing is to complete our draft
22 of the proposed rule by February of next year, which is about 7
23 or 8 months.

24 We will take it through CRGR, ACRS and the like, and
25 we would propose to have it before you in June of '89, just in

1 about 11 months.

2 We would hope to get your approval and be able to
3 publish the rule, the proposed rule, by September. We are
4 proposing to hold some public meetings once the rule is issued
5 so we can again solicit public comments on the proposed rule,
6 as well as to receive them by written comments.

7 And we would like to publish the final rule in 1991.
8 We will, in parallel to preparing the rule, be also preparing
9 regulatory guides and standard review plans that we can have
10 issued in the early 1990's.

11 We don't have any definitive schedule yet for each
12 guide, but the thought is to get them, the important ones you
13 might say, the key ones that the industry needs, out on the
14 street in about the same timeframe as the rule.

15 COMMISSIONER CARR: For the industry's planning,
16 won't the rule stand alone?

17 MR. SHERON: The rule will provide the basic
18 guidance, but you typically need regulatory guides to provide
19 clear interpretation of what constitutes an acceptable
20 submittal.

21 COMMISSIONER CARR: But if those don't come out till
22 the 1990's, and that goes all the way to 1999, you know --

23 MR. SHERON: Well, I said -- I'm sorry. Early
24 1990's, if you -- on the slide. Our plan is to issue the reg
25 guides around the same timeframe as the rule.

1 COMMISSIONER CARR: I guess I was really worried.
2 Why does it take a year to get the rule out, or is that by
3 1991. Is that December '91?

4 MR. SHERON: Right now, I would not want to hazard to
5 guess which part of 1991. There are a lot of uncertainties, as
6 you're aware.

7 COMMISSIONER CARR: Well, let's say you hold all the
8 dates before that, and that public meeting takes place in
9 November or December '89.

10 MR. SHERON: It could be as early -- it could be
11 early 1991 then. If we had very little public comments and we
12 could incorporate them very easily, we could have a proposed
13 rule down in early 1991.

14 COMMISSIONER ROBERTS: I think it will be unrealistic
15 to assume there's going to be little public comment.

16 MR. SHERON: Well, that's why we didn't try and --

17 COMMISSIONER ROBERTS: I understand. I'm not taking
18 issue with you.

19 CHAIRMAN ZECH: Let's proceed.

20 MR. SHERON: On slide 9, within the NRC, the Office
21 of Research has the principal responsibility for developing the
22 renewal rulemaking, and also the conducting of the aging
23 research program which will provide substantial support with
24 regard to technical guidance to the industry on the content of
25 the applications for the rulemaking.

1 We have been down and advised the ACRS on several
2 occasions of the license renewal activities. We have very
3 close coordination with the other program offices within the
4 Commission.

5 We have a number of steering groups in this area
6 which are designed to make sure that we coordinate all of the
7 activities.

8 Slide 10, please. The question that we are
9 struggling with right now, and I guess is central to the
10 renewal issue, is what should be our approach in requirements
11 for renewed licenses in order for continued assurance of public
12 health and safety.

13 That's the basic question that we have to answer. On
14 the next slide, you'll see that we have tried to bracket the
15 alternatives with what we would call reasonable possibilities
16 here.

17 The first one is an approach which would perpetuate
18 the original licensing basis of the plant, just modified the
19 way it's been amended over the years.

20 A second approach, which is sort of at the other end
21 of the spectrum, would be that a plant that has run 40 years
22 would be considered a new plant and, therefore, would have to
23 meet the licensing requirements for new plants, that new plants
24 would have to meet at the time they proposed to submit their
25 renewal application.

1 COMMISSIONER ROBERTS: Well, if you use that, you
2 won't renew any.

3 MR. SHERON: That's probably correct. A third
4 approach is one in which we look at the original licensing
5 basis and modify it as necessary to take into account any
6 significant safety concerns that one might have with the aging
7 process or beyond 40 years of life.

8 One may want to employ a PRA, for example, to
9 identify the risks, significant components, and systems and to
10 make sure that they're not subject to any accelerated aging.

11 Also, another area we're looking at is that some
12 plants may commit and only want to run two more years. Others
13 may commit and want to run 10 years.

14 And the question is do we want to set the same
15 requirements for both types of plants, or do we want to have a
16 graded approach.

17 COMMISSIONER CARR: What was the basis for the 40
18 years?

19 MR. SHERON: My understanding, it was an economic
20 consideration.

21 MR. PARLER: The 40 year provision in Section 1039(c)
22 of the Atomic Energy Act, it was not based on the technical
23 grounds or safety considerations at all.

24 There is a good little bit of legislative history on
25 the subject which is contained in one of the earlier reports.

1 It goes by the name of the NESP Report that was done in 1986.

2 In order to save time, the 40 year period was based
3 on essentially the financing practices, amortization, etcetera.
4 It has nothing at all to do with the technical considerations
5 or with public health and safety.

6 COMMISSIONER CARR: So we're going to try to find a
7 technical reason to extend the non-technical license.

8 MR. MURLEY: We did review the plants, though, on the
9 basis that we had to be satisfied they could last 40 years. So
10 even though the original did not have a technical basis, once
11 the rule was in place, then we've been reviewing it so that the
12 --

13 COMMISSIONER CARR: But that review was at least 40
14 years, I assume.

15 MR. MURLEY: I'm not following you.

16 COMMISSIONER CARR: You had to make a determination
17 that they would last at least 40 years.

18 MR. MURLEY: At least 49 years, that's right.

19 MR. SHERON: Keep in mind that at the time the plants
20 were reviewed, a couple things. One is that certain components
21 were actually designed for 40 year lives.

22 Like for example, thermal sleeves were designed for
23 so many thermal cycles. One needs to know have they hit that
24 thermal cycle limit? Have they exceeded it? How far away are
25 they?

1 The other thing is that even though we did review
2 plants for 40 years, we did not have any information on aging
3 at that time.

4 And as plants have been operating, we have been
5 accumulating information on the aging process, and as we learn,
6 we see that aging does have an effect on safety and I think we
7 need to take that into account now once we go beyond 40 years.

8 CHAIRMAN ZECH: What kind of a research basis do we
9 have for making regulatory decisions on the plant aging? Do we
10 have strong research base? Do we have a -- is industry
11 participating in it in a strong way? Has DOE got any
12 participation in it? What is our research program and what are
13 other research programs, what kind of a research confidence
14 factor do we have?

15 Please identify yourself for the Reporter.

16 MR. BOSNAK: I'm Bob Bosnak. The Division of
17 Engineering, Office of Research, we have a -- between our aging
18 research program, which is about an \$8 million program per
19 year, we also have the pressure vessel integrity program which
20 has aspects of aging and aging research.

21 We are cooperating and coordinating our efforts with
22 the EPRI, Electric Power Research Institute. The Department of
23 Energy also has research functions.

24 So the answer to your question, we feel we have a
25 strong program in aging. We're identifying, or trying to

1 identify, the areas that we need to look at. Which areas need
2 to prioritized.

3 There is also a strong tie-in to the maintenance rule
4 that's coming before the Commission. Obviously, maintenance
5 plays a strong role in managing aging.

6 If you have a good program for maintenance and you
7 are replacing things before they fail, you have confidence that
8 the plant is going to be operated and run safely.

9 CHAIRMAN ZECH: Are we working with the international
10 nuclear organizations?

11 MR. BOSNAK: Yes. We've presented papers before
12 IAEA. In fact, the international organization is following the
13 approach that the NRC has taken in looking at how aging should
14 be managed.

15 COMMISSIONER CARR: Those major components, the
16 reactor vessel and the containment, are the research programs
17 for those going to be completed in time to support this piece
18 of paper that's going to tell them what they need in their
19 license renewal application?

20 MR. BOSNAK: Well, the two major components, the
21 reactor vessel and the containment, the work is continuing on
22 those.

23 I don't know if we'll have all the answers in place
24 by the time that the rule will be out, but we expect to do the
25 best that we can.

1 We are answering the questions on, for instance, low
2 upper shelf. The fact that some vessels may need to be
3 annealed. Some vessels will approach the point in their life
4 that they will have to do something, either flux reduction.

5 This is one of the things that going to be included,
6 or it will have to be included, in any rule. The consideration
7 of the vessel and also, of course, containment with respect to
8 any degradation mechanisms.

9 COMMISSIONER CARR: Yes. It's the timing that's got
10 me worried.

11 MR. STELLO: I think the utilities have sufficient
12 information today that if they are going to plan for life
13 extension, they know what the lifetime fluence they're going to
14 accumulate in 40 years, and where they will be with respect to
15 our requirements for vessels today.

16 So if they do plan, they will know they either are
17 going to have to get a flux reduction program early to
18 accommodate additional lifetime of the vessel, or they're going
19 to have to make plans on annealing the vessel. It can be done.

20 I think the Soviets have already done, as I recall,
21 two of them. They've annealed them. They've had actual
22 experience with vessels.

23 But those are the choices. The utilities, with
24 respect to the pressure vessel, I think, today, based on the
25 research we've already done, has the technical information

1 available to them now to make those kinds of decisions.

2 COMMISSIONER CARR: So you must have it available to
3 put it in the rule.

4 MR. STELLO: We already have a rule in place. The
5 rule is in place and it does dictate how to do a calculation
6 for pressure vessel lifetime due to fluence with time.

7 So there is enough information, I think, for the
8 utilities to make those kinds of decisions now. And those are
9 the only two components that you really need to worry about.

10 Essentially, the rest of the components you can
11 replace. You can replace piping, steam generators.

12 COMMISSIONER ROBERTS: Putting a drill on in some
13 instances to replace steam generators.

14 MR. STELLO: But, nevertheless, it's a real
15 possibility if they haven't taken care of them, they're sloppy
16 on water chemistry --

17 COMMISSIONER ROBERTS: I feel like when I was adding
18 on to my house and I wanted to change and I asked the builder
19 and he said, Roberts, with your time and my money, we can do
20 anything.

21 MR. STELLO: But they do know if they really are
22 going to plan for life extension on a steam generator, and they
23 want to use those steam generators, they'd better be very
24 careful about water chemistry.

25 Because if they're not careful, then the likelihood

1 is they're going to have to replace steam generators. They
2 won't last 40 years and they may not last 30.

3 There are some of them that you obviously are aware
4 of that had to be replaced already. So the care that the
5 utilities place with respect to components will dictate to what
6 degree they're going to have to replace those.

7 But nevertheless, they are replaceable. So the big
8 components are pressure vessel, the steam generator, and the
9 containment.

10 If they give them proper care now, they're not going
11 to be a problem, and I think they have enough information to
12 know that.

13 COMMISSIONER CARR: And we're running from
14 Shippingport, La Salle, all those, and their pressure vessels?

15 MR. STELLO: Yes.

16 CHAIRMAN ZECH: How about just the knowledge of
17 piping and cables itself as far as aging is concerned? I know
18 they can be replaced, of course, but what knowledge do we have
19 that would give us the confidence that certain cable could last
20 a certain number of years, or piping would retain its
21 resilience and strength over a period of time?

22 MR. BOSNAK: Again, we have ongoing research in the
23 area of electrical components with respect to how long they're
24 going to last, what is their probable failure mode, and when
25 should they be replaced.

1 CHAIRMAN ZECH: All right. Thank you. Proceed.

2 MR. SHERON: On slide 12, the regulatory topics that
3 were examining the technological ones. Verification of design
4 adequacy of a plant to be relicensed.

5 This is what we were just talking about here, the
6 residual life of components and systems, the replaceable versus
7 the non-replaceable components and structures, particularly the
8 reactor vessel in the containment building.

9 And then the other thing we are looking at is how we
10 should compensate for uncertainties related to the aging
11 process, and how do we take that into account in our licensing
12 process.

13 Also, recognizing though that we have an imperfect
14 knowledge of the aging mechanisms, although we are learning
15 more with our research.

16 We want to make sure that we can either predict the
17 age related failures before they occur, or to make sure that
18 have a compensating program.

19 And I would think of something like very aggressive
20 maintenance, surveillance, replacement program to make sure we
21 catch them before they really fail.

22 COMMISSIONER CARR: What is the age of the oldest
23 fossil plant in the country, do we know?

24 MR. SHERON: Well, I would imagine it's over 60
25 years, but I don't know for sure.

1 MR. STELLO: We'll try to find out and get the answer
2 to you.

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

4 MR. SHERON: On slide 13, the other regulatory topic
5 which we are currently evaluating is the scope of the
6 environmental review that might be needed for the plants.

7 Can we just do an update or our environmental impact
8 assessment or do we have to do a complete new impact assessment
9 for the renewed license.

10 We don't know yet, but it's just an issue that we
11 have to deal with. On slide 14 --

12 MR. PARLER: Do you want me to comment on that?

13 CHAIRMAN ZECH: Please do.

14 MR. PARLER: There are three aspects of the
15 Environmental Policy Act problem that we have identified and
16 Mr. Sheron is quite correct that we haven't finished our work
17 yet and haven't reached any conclusions, but the guidance is
18 clear to me.

19 First of all, in connection with the proposed
20 rulemaking, certainly my judgment would have to be an
21 environmental assessment.

22 If that environmental assessment concludes that the
23 rule does not have any significant impact on the environment,
24 perhaps that would be good enough. There would be no need for
25 an environmental impact statement.

1 For the individual plant that may be renewed,
2 sometime in the 1990's, the current rule in Part 51 indicates
3 that there would be an environmental impact statement required.

4 Whether or not that should be changed should be and
5 is being evaluated. At the very least, for the individual
6 plant licenses, there should be an environmental assessment.

7 And I say, under the existing rule, there would have
8 to be also an environmental impact statement. Beyond those two
9 things, however, it would seem to me that considerations should
10 also be given to whether there should be an overall look-see at
11 environmental considerations.

12 This is known as a generic of a programmatic
13 environmental impact statement. There are arguments, legal
14 arguments, that could be made, pro and con, as to whether or
15 not such a generic statement should be prepared.

16 I think that my conclusion probably would be that as
17 a matter of law such a generic statement need not be prepared.
18 However, one should not lose sight of the benefits of a generic
19 statement.

20 The harder the look you give these sorts of issues,
21 that would lessen the issues and the burdens that are placed on
22 the licensing process, the renewal process for individual
23 plants.

24 We have our analysis of these topics, our legal
25 analysis of these topics, in a very advanced stage of our

1 research and preparation, and this one, as well as the other
2 things that I may talk about later, we have a target to be
3 finished by September of this year.

4 CHAIRMAN ZECH: Very good.

5 COMMISSIONER CARR: I'm worried about the environment
6 encroaching on the plant over a period of 40 years like they do
7 on airports.

8 MR. PARLER: That's a question -- as far as I know,
9 Commissioner Carr, this agency has not dealt with explicitly in
10 its siting criteria, in 10 CFR Part 100. My impression, and I
11 wish that I would be corrected if my impression is incorrect,
12 that we have, for the most part, relied on local zoning
13 requirements, etcetera.

14 That was a subject that the task force that was
15 looking at upgrading our siting requirements in 1979
16 considered, or was considering, but that particular project was
17 overtaken by the event of March 28th of 1979.

18 COMMISSIONER CARR: Okay.

19 CHAIRMAN ZECH: All right. Proceed, please.

20 MR. SHERON: Okay. On slide 14, under the regulatory
21 topic, we have some procedural questions which, again, we have
22 to address.

23 These are listed here. The form of the license
24 renewal. The length of renewal term, which I discussed
25 previously. Questions like what is the latest date for the

1 renewal application to be submitted? What is the earliest
2 date?

3 There has been some consideration that a plant that
4 has operated 30 years might wish to come in and ask for renewed
5 license for another 30 years.

6 In other words, I'd like to turn in my license for 30
7 years and get a new one for 30 years, for an effective
8 operating time of 60 years. Is that something we would allow?

9 What would be the effective date of a renewal? The
10 use of the backfit rule. If it's a new plant or if it is a
11 plant that's undergoing relicensing, would we use the backfit
12 rule if we felt that additional improvements were needed for
13 the renewal period.

14 Public hearings. Will we be required, will we be
15 petitioned to hold public hearings? We don't know.

16 MR. MURLEY: Brian, could I interject there?

17 MR. SHERON: Yes.

18 MR. MURLEY: The two year period that we were talking
19 about really dealt with our staff review. It, of course, did
20 not deal with any length that public hearings might add and
21 what contentions might be brought up in those hearings. I just
22 wanted to clarify that.

23 CHAIRMAN ZECH: Thank you.

24 COMMISSIONER CARR: This talk about relicensing, we
25 haven't made the decision yet whether we're going to -- what

1 we're going to call this thing. An extension or a -- not
2 necessarily a relicensing that we're talking about though, is
3 it?

4 MR. PARLER: Well, there has been a good bit written
5 in the new Reg 1317, and in the NESP Report of 1986 about the
6 subject, whether it should be called a new license, a renewed
7 license, or an amendment to the existing license.

8 I think that the crucial question which has already
9 been identified by Mr. Sheron on slide 10 is what is the
10 licensing basis for the plant going to be. And I think that is
11 really the important thing and not what the thing is called.

12 I think if, as Mr. Roberts indicated, the thing is
13 treated as a new license so that it will have to meet current
14 requirements, you're really talking about something quite
15 different from a renewal of an existing license, whether the
16 plant has operated presumably, in accord with our requirements,
17 for 25, 30, or perhaps 40 years.

18 COMMISSIONER CARR: That's what worried me about the
19 term relicensing and implied to me there was going to be a new
20 license.

21 CHAIRMAN ZECH: Let's proceed.

22 MR. SHERON: Other procedural topics we're dealing
23 with, material alterations. Utility makes substantial
24 alterations to the components of a plant and the like, to what
25 extent do we have to look at that.

1 How does that effect the licensing reviews.
2 Emergency planning. Do the emergency planning requirements
3 have to be re-looked at for beyond 40 years.

4 Decommissioning. Right now, as I understand, a
5 plant, within about three years of the end of its license, is
6 supposed to submit an application for decommissioning.

7 We would have to waive that requirement if there was
8 relicensing. Antitrust review. Do we have to do another
9 antitrust review?

10 And then I guess there was a question as to the Price
11 Anderson Act, does it cover the extended period. My
12 understanding is, right now, we think it does.

13 MR. PARLER: Mr. Chairman, these are -- many of these
14 are the items that we are looking at. Do you want me to talk
15 about them now or wait till Mr. Sheron has concluded?

16 CHAIRMAN ZECH: I think we ought to talk about it
17 right now.

18 MR. PARLER: Starting at the end of the list, Price
19 Anderson coverage. Even if the Price Anderson Act is not
20 extended, as I assume that it will be, any plant whose
21 construction permit was issued prior to August 1987 would be
22 covered by the Price Anderson Act.

23 Section 170(c) of the Price Anderson Act so provides,
24 and I assigned a legal interpretation to that effect that we
25 sent to the Congress I believe sometime last year.

1 So we have that essentially covered from the legal
2 standpoint. Antitrust review, pre-licensing antitrust review.
3 Both from the legislative history and from the language in the
4 Atomic Energy Act, I think that the act of renewal itself will
5 not cause or be the cause of an additional antitrust review.

6 The antitrust review that has already taken place
7 should be adequate, and if plants were exempted from antitrust
8 review because they were developmental plants, that, it seems
9 to me, probably should stand the test.

10 The material alterations. The problem there is that
11 presumably, if there is a material alteration to a plant, there
12 will have to be a construction permit either issued or a
13 modification made to the construction permit.

14 When you start talking the issuance of a construction
15 permit, under the Atomic Energy Act, that raises a whole host
16 of legal and procedural issues.

17 For the past three decades, this hasn't been a
18 problem even though there have been extensive modifications
19 made to existing plants.

20 I believe that there is only one instance where a
21 research reactor, or a small university-type reactor was a
22 modification to a construction permit issued.

23 So I don't believe that that should be a problem. As
24 far as public hearings are concerned, a number of type of
25 questions there.

1 Should hearings be held? If so, what type? Whether
2 the hearing has to be finished before or after the licensing
3 action takes place.

4 One thing that's very important to remember here is
5 that if there is an existing license and there is a timely
6 request for the renewal of that license, the old license
7 continues in effect until the regulatory action is completed.

8 Therefore, at least the kinds of problems that we
9 have experienced at the operating license stage, having the
10 hearing, holding up operations, should not be present in the
11 environment that we're talking about.

12 As far as the type of hearings are concerned, I will
13 repeat again what I suggested to the Commission in the briefing
14 on June the 27th on the standardization rule.

15 I would favor moving in the direction, as much as we
16 can, of reducing the procedural complexity of our process,
17 including the formality of hearings.

18 I think that hearings, formal hearings though, would
19 have to be held on issues where there are disputed facts that
20 are material to the licensing decision.

21 And certainly we can learn from our experiences in
22 the hearing area over the last 20 or so years. Having said
23 that, however, I would also emphasize that the process has to
24 be an open one and the decisions have to be made on the basis
25 of a public record.

1 And the test under our statute to request hearing is
2 a very broad one. Any person whose interest may be effected by
3 the proceeding.

4 As far as the backfit rule is concerned, we're still
5 looking at that. I don't see any major problems there.

6 The earliest date for renewal application centers on
7 a provision in our rules at the present time that talk about at
8 least 30 days prior to the expiration of the existing license.
9 It seems to me obvious that we need more -- the staff would
10 need more than 30 days, at least, perhaps a number of years.
11 That issue would seem to me to be largely an academic one for
12 utilities that wanted a decision to be made at least 12 years
13 in advance.

14 The earliest date -- the effective date of the
15 renewal; that issue is one that can be easily addressed and
16 solved. It essentially is whether the license, the existing
17 license would run its course and would be replaced by the
18 renewed license, or whether there would be an extended period
19 tacked on the existing license prior to its expiration.
20 Legally, it could provide for both.

21 Let me see if there are any others here. So,
22 essentially from the legal standpoint, Mr. Chairman, we have
23 the legal authority to accomplish the regulatory policy
24 objective here. No legislation is needed.

25 About 12 issues of the type I've just talked about,

1 as I've already said, we have been analyzing. We have an
2 advance research and memorandum prepared in an advanced stage
3 of completion. I don't anticipate any problems. The problems
4 that I'm aware of have been identified and are readily
5 manageable within our authority.

6 I would like to emphasize, however, that there is a
7 need to have a clear identification of what the procedures are
8 going to be in place ahead of time. Until the answer to the
9 question on Slide 10 is given, I think that whether it be one
10 year, two years, three years, or how many years, to complete
11 the review would be speculation. It would have to be
12 speculation, because no one knows at the present time, what the
13 criteria will be for the renewal.

14 CHAIRMAN ZECH: Thank you very much.

15 COMMISSIONER CARR: May I ask one question of the
16 General Counsel?

17 CHAIRMAN ZECH: Sure, please do.

18 COMMISSIONER CARR: On the hearing, I assume that the
19 hearing -- what we put in the rule would be what would be
20 contended at the hearing -- that they hadn't complied with the
21 rule we make?

22 MR. PARLER: I would hope so. That would be the
23 essential reason why I think that the crucial question was
24 asked on Slide 10 is so important. Otherwise, perhaps
25 everything would be fair game and you'd be back to square one,

1 doing in 1995 what perhaps was examined at length in 1972. If
2 that were done, you'd be talking about a different kind of
3 process from the one that I have in mind. We're trying to work
4 with the technical staff to come up with procedures to
5 accommodate it.

6 CHAIRMAN ZECH: Thank you again. You may proceed.

7 MR. SHERON: I'm on Slide 15 right now and I just --
8 our concluding points in the briefing here. One is that we
9 fully recognize that we need to have timely development of the
10 regulations for license renewal. Getting out our regulatory
11 guidance is important to the industry and to the regulatory
12 stability.

13 We've looked very hard at our current schedule. As I
14 said before, we've discussed it extensively with the industry.
15 We understand that our schedule is consistent and appropriate
16 for their needs, so we're following on that basis. On Slide
17 16, as we said before, we're developing regulatory guide and
18 standard review plans. They will be done on a somewhat,
19 probably longer schedule than the regulation.

20 Some will be out at the time of the regulation.
21 Keeping in mind that as the research information is received
22 and assimilated, both from our own research program as well as
23 the industry's research program, we will be trying to put that
24 into guidance packages, so that plants that will be applying
25 for licenses later on, will have the benefit of the knowledge

1 that we've gained.

2 Also, as we go through a couple reviews, we will be
3 learning.

4 COMMISSIONER CARR: That concerns me that we're going
5 to give them a moving target. The guy who applies is not going
6 to know whether or not he's got it all in the box or not, as
7 long as we say that we're going to keep that open and keep
8 adding things to the box.

9 MR. SHERON: Well, I think that even if you look at
10 our current regulations on the regulatory guide system, they
11 evolved over a number of years and they did not all kind of
12 appear at once and I think that it's only reasonable that as we
13 gain information and gain experience in the relicensing
14 process, we'll be able to issue guidance documents which
15 provide even better guidance to the industry.

16 It won't be anything new, like we've changed our
17 requirements all of a sudden. Rather, it's going to be more of
18 the documentation of what we ultimately accepted, say, on the
19 first several plants, so that the plants coming down the road
20 are going to know what it is that they need to provide.

21 MR. STELLO: Maybe there's a shorter answer. The
22 rule is what they're going to have to meet. We don't expect to
23 be changing the rule, but as you develop guidance and you learn
24 more, you obviously can say more about what you've learned in
25 terms of reg guides. The rule -- I don't think we're

1 suggesting that we're going to go back and change the rule.

2 MR. PARLER: Mr. Chairman, may I make a comment?

3 CHAIRMAN ZECH: Please do.

4 MR. PARLER: At least from a legal perspective, the
5 learn as you license, perhaps was appropriate and essential
6 during the developmental stage of this technology, but it would
7 seem that if we're talking about renewing the licenses of 100
8 or so plants that have been operating for 30-40 years, we must
9 have a pretty good idea as to what has to be done to pass
10 muster from the standpoint of adequate protection of the public
11 health and safety.

12 The circumstances are substantially different in my
13 non-technical judgment, on that point, the reviewing point,
14 than was the case when we had to start out with nothing in the
15 1960's and develop requirements as we gained experience.

16 CHAIRMAN ZECH: Thank you very much. I think that's
17 a good comment.

18 MR. STELLO: Let me add, Mr. Chairman, you recognize
19 that we have 100 plants out there that are different. We have
20 plants that we licensed in the early 60's. What one may or may
21 not need to do for those plants --

22 COMMISSIONER CARR: Every one of these is going to be
23 a specific renewal.

24 MR. STELLO: Well, as you start to get --

25 COMMISSIONER CARR: No doubt about that.

1 MR. STELLO: Back into the 70's, I think that the
2 plants tended to be more consistent. At that time, we did have
3 a standard review plan and a lot of things were in place. As
4 you look at some of these early plants, I see a tough job. I
5 don't want to minimize it. I think the rule that we can write
6 and --

7 COMMISSIONER CARR: That's why I ask if it's a stand-
8 alone document. If they comply with the rule --

9 MR. STELLO: By definition, that's what they have to
10 do.

11 COMMISSIONER CARR: I hate to keep nibbling them with
12 a new guide every once and a while.

13 MR. STELLO: We don't want to do that either.

14 CHAIRMAN ZECH: General Counsel.

15 MR. PARLER: Maybe Mr. Stello has made the point that
16 I wanted to make, at least for transcript. That is, that the
17 rule could distinguish among the plants. If plants that were
18 licensed in a particular era would be subject to something
19 different than others, that's one of the things that the rule
20 should spell out. What would not be recommended, at least by
21 me on the basis of experience starting with the process
22 starting in 1960, would be to develop these things on a case-
23 by-case basis.

24 Develop the requirements and make the distinctions on
25 a case-by-case basis. To the extent that we can do it, it

1 should be done in the rule.

2 CHAIRMAN ZECH: Right. I think everyone would agree
3 with that. We certainly want the rule to be standing alone as
4 much as it possible can and not require an awful lot of
5 modifications and explanations. The rule should be, as near as
6 possible, a stand-alone rule and cover as broad a spectrum as
7 it can. Of course, I recognize that's a tall order, but this
8 is a very important issue and I think we should approach it
9 just that way.

10 All right, have you concluded, Mr. Sheron?

11 MR. SHERON: Just my last three bullets here, is that
12 on Slide 16, and that is that we are continuing with additional
13 research and data gathering. We are very much stressing the
14 importance of the industry-sponsored research. This is
15 something we don't think that NRC should shoulder alone. We
16 think that the benefit for renewed licenses is with the
17 industry and that it's incumbent upon them to provide us with
18 the information that we need to draw the conclusions that we
19 have to.

20 CHAIRMAN ZECH: Are they doing a reasonable job in
21 that are as far as you're concerned at this time or should they
22 do more?

23 MR. SHERON: From what we've seen, they appear to be
24 doing a reasonable job on developing the information.

25 CHAIRMAN ZECH: EPRI has the lead in this program?

1 Is that correct?

2 MR. BOSNAK: I believe it's a joint EPRI/DOE program.

3 CHAIRMAN ZECH: Perhaps you could step to the
4 microphone so that the reporter can hear you better. Thank
5 you.

6 MR. BOSNAK: I believe it's a joint DOE/EPRI program.

7 CHAIRMAN ZECH: EPRI and DOE?

8 MR. BOSNAK: EPRI and DOE.

9 CHAIRMAN ZECH: All right, thank you very much.
10 Well, why don't you get back to the microphone, please. Do you
11 think they're doing enough from a research standpoint.

12 MR. BOSNAK: From a research standpoint, I do believe
13 they could be doing more than they are doing.

14 CHAIRMAN ZECH: Are they doing sufficient as far as
15 you're concerned? Will what they're doing be sufficient to
16 help you make good recommendations or will you be left feeling
17 that they have not done enough?

18 MR. BOSNAK: Right now, we've been working with them
19 to identify what we're doing and what they're doing so that the
20 two programs complement each other and they don't duplicate.
21 That's what we're sorting out now.

22 CHAIRMAN ZECH: Are we telling them what we think
23 that we would like them to do if they're not doing enough? In
24 other words, if you're concerned about them not doing enough,
25 are you telling them about that and asking them to do it? Are

1 you getting responsive answers?

2 MR. BOSNAK? In our own program, we're trying to
3 uncover the areas that we think that there are problems. Once
4 we do find problems, we're going to ask them to solve the
5 problems.

6 CHAIRMAN ZECH: Are you doing that?

7 MR. BOSNAK: Yes, this is what we're doing, sir.

8 CHAIRMAN ZECH: All right. Thank you.

9 MR. STELLO: Mr. Chairman, we're finished and we just
10 suggest that the Commission agree to move forward with this.
11 As you can see, I think the earlier we can get things moving,
12 the better off we're going to be. I think if the Commission is
13 able to agree to move forward, we'll make some progress and get
14 on with it.

15 CHAIRMAN ZECH: All right, thank you very much.
16 Questions from my fellow Commissioners? Commissioner Roberts?

17 COMMISSIONER ROBERTS: Nobody in the U.S. has ever
18 done the in situ annealing?

19 MR. STELLO: To the best of my knowledge, I do not
20 believe that we have ever had an in situ annealing of a vessel
21 for the purpose of offsetting irradiation damage. There has
22 been in situ annealing of vessels when they were manufactured.
23 We had vessels built in place, on-site and I recall, I think
24 there were a couple of them that were, in fact, annealed on
25 site.

1 MR. MURLEY: There was a military vessel that was
2 annealed, but it was --

3 CHAIRMAN ZECH: Could you step to the microphone,
4 please and identify yourself to the reporter. Thank you.

5 MR. ARLOTTO: Guy Arlotto. The specific answer to
6 your question, Mr. Roberts is, to our knowledge, there's been
7 no in situ annealing of a commercial vessel. Whether or not it
8 has been done in the military, we have some signs that it may
9 have been done, but because of the operation, particularly of
10 the nuclear Navy, we are not very privileged to discuss it very
11 much here.

12 CHAIRMAN ZECH: Thank you.

13 MR. STELLO: Guy, may I ask you before you leave, am
14 I correct, were there not some of the vessels that were
15 fabricated in the field and annealed in the field during
16 fabrication?

17 MR. ARLOTTO: To my knowledge, there were none in
18 that category that I know of. There was some work done on the
19 N.S. Savannah that may have fallen in that category regarding
20 the containment vessel, but not the pressure vessel.

21 CHAIRMAN ZECH: Thank you very much. Commissioner
22 Carr?

23 COMMISSIONER CARR: I'm concerned about the reg
24 guides and SRBs lagging the regulation and I would suggest, Mr.
25 Chairman, we add enough resources to the budget to bring all of

1 those out at the same time. I think we can make a case for
2 that with the Congress if we got a lot of work cut out for us
3 that we've got to take care of.

4 CHAIRMAN ZECH: Let's let the staff respond on that.

5 MR. MURLEY: We'll do everything we can to do that.
6 Our plans are that they will. Let me give an example of the
7 type of rule that may come out of this. It could be a risk-
8 based rule, for example. Not that I'm leaning that way, but
9 there's, in fact, a comparable risk argument with a certain
10 intellectual appeal to it.

11 If that were the form that the rule were to take,
12 then there would have to be some pretty complicated and
13 detailed guidance on how to do risk analyses that would meet
14 this rule. In that case, it would not be a simple thing to
15 write the guides and they could well lag a year or so after.

16 I only mention it as an example of --

17 COMMISSIONER CARR: Well, I can't imagine anybody
18 applying for an extension without at least what you call a
19 Level 3 PRA in the first place. I would think that that would
20 be a part of his economic decision.

21 MR. MURLEY: I agree. Whether that's adequate enough
22 for us to make a licensing decision based on a risk-based rule,
23 I'd have to think about that.

24 COMMISSIONER CARR: Well, I don't -- if we're held up
25 for other than resources, that's a different question. If we

1 don't have enough bodies to put on this to get the problem
2 solved, I recommend we seriously consider adding money and
3 bodies to the budget?

4 MR. STELLO: Why don't we take that and work exactly
5 what you said into our plan -- look at what it would take to
6 get the standard review plan and the reg guide developed
7 contemporaneously with the rule. It is a difficult task
8 because it depends, as Dr. Murley has already said, what the
9 form of the rule is, because then that's the form of the
10 guidance of the standard review plan.

11 Let's look at how to integrate those in the schedule.
12 If it is truly an issue of resources, then let's bring that up
13 and the Commission can decided to add those resources and we
14 can get it done to the extent we can.

15 CHAIRMAN ZECH: We'll ask the staff to look at that
16 and give us your thoughts on that because certainly, if it's
17 resources, the Commission should be aware of that and let us
18 take that on as our responsibility. If it's not resources, of
19 course, we should know that too.

20 MR. STELLO: It is clearly not only resources.

21 CHAIRMAN ZECH: Would you look at this subject and
22 give us perhaps a paper on that that could talk to this issue
23 straight out so that we'll know exactly your views on it and
24 your recommendations?

25 MR. STELLO: Yes, sir.

1 CHAIRMAN ZECH: And whether resources would assist in
2 bringing them all together in a focused way. Anything else
3 Commissioner Carr? Commissioner Rogers?

4 COMMISSIONER ROGERS: Just coming back to this
5 question of how long it will take the NRC to act on a licensing
6 application -- extension application. It's a 2-year period. I
7 know that's not hard and fast, but that's an estimate period
8 now. Is that to include a hearing period as well, or is that
9 simply for staff action?

10 MR. STELLO: Staff review.

11 [Commissioner Roberts left the room at 3:10 p.m.]

12 COMMISSIONER ROGERS: What impact would you expect
13 the hearing process would have?

14 MR. PARLER: The hearing process would depend upon
15 the issues, the extent to which there are material, factual
16 issues that are in dispute. It's an unknown, even if you have
17 a discipline process. However, as I mentioned earlier, if the
18 application for renewal is timely filed, the existing license
19 remains in effect, even while the hearing is going on and
20 operation can continue if the plant otherwise satisfies our
21 requirements and is okay with the other regulatory staff.

22 COMMISSIONER ROGERS: There's no limit as to how long
23 that would stay in effect?

24 MR. PARLER: That is a question that perhaps one
25 might want to think about. There's no precise limit.

1 Obviously, everything --

2 COMMISSIONER ROGERS: It could go on for 10 years,
3 for example?

4 MR. PARLER: That's my obvious point that I was going
5 to make. Everything has some reasonable bounds to it. I guess
6 perhaps in legal theory, it could go on for 10 years, but I
7 would think that if we got into something like that, a hard
8 look should be taken at it.

9 Under the law that we are subject, if there is a
10 timely and sufficient application for renewal of an existing
11 license, the existing license remains in effect until the
12 Agency reaches its decision. We are under the directions of
13 the Administrative Procedures Act to proceed with reasonable
14 dispatch to do that, but we have been under that direction for
15 the last 25 or 30 years and some of these hearings go on for a
16 long time.

17 COMMISSIONER ROGERS: Well, it just occurs to me that
18 one should at least think through the possibility of a strategy
19 that says you should wait till the last minute and then have a
20 prolonged hearing period that gives you another 5 years
21 automatic extension.

22 MR. PARLER: As I have mentioned, the existing
23 requirement in our rule 2.109, I believe; it talks about
24 waiting until 30 days before the expiration. That obviously
25 has to be changed. The application for the renewal should be

1 submitted long before 30 days, but I agree with your point,
2 Commissioner Rogers, that our procedures that we come up with
3 should guard against the happenstance that you mentioned.

4 [Commissioner Roberts returned to the room at 3:15
5 p.m.]

6 COMMISSIONER ROGERS: Let me add that if there is any
7 question we think that the plant is unsafe, notwithstanding
8 anything else, we could shut it down.

9 MR. PARLER: That's always the case.

10 COMMISSIONER ROGERS: But of course, there's still
11 another possibility.

12 MR. STELLO: If utility wanted to wait 30 days and
13 tender an application and suggest that well, while we're
14 reviewing and there's a hearing and he could operate if he
15 hasn't demonstrated the case and we don't agree, it just won't
16 work.

17 COMMISSIONER ROGERS: Well, I don't think that we
18 want to discuss all the possible ramifications of
19 eventualities, but I think one could imagine a number of
20 different scenarios here that should be considered.

21 MR. STELLO: Yes, that's why the General Counsel
22 highlighted the 30-day requirement on the rule. I think we
23 would definitely want to get rid of that one.

24 COMMISSIONER ROGERS: Well, I think that it might
25 take more than that. The other point I'm a bit uncomfortable

1 about is because it seems to me that we have a little
2 conceptual difficulty here, in that we have this very broad
3 spectrum of plants that may be coming up for relicensing.

4 As Dr. Murley pointed out, this process is going to
5 involved some learning as we go through it and the first ones
6 we're going to be learning on are those that are plants that
7 are going to be quite different in many ways from those at the
8 tail end of the cycle.

9 I'm just wondering how one rolls that learning into
10 the business in a reasonable way. Commissioner Carr has
11 pointed out that you don't want to present a moving objective,
12 really, for the perspective licensees to head for. Somehow it
13 ought to be firmed up. We're talking about a quite precise
14 definition of a rule and yet we're talking about a learning
15 process and I don't know -- it seems to me that it's somewhat
16 contradictory, unless there's some provision for adjustment in
17 the rule.

18 This process that we're talking about here is going
19 to run for a long time, from the year 2000 until the last plant
20 that presently is in existence that might be coming up for a
21 license extension comes up, one of the later ones. I'm just a
22 little puzzled as to how this whole thing is supposed to fit
23 together, accommodating what undoubtedly will be some new
24 factors that we won't be able to predict at the outset of this
25 thing that we have to take into account in the licensing

1 extension, pinning down the rule very hard and fast right away
2 at the beginning of the process.

3 I'm just a little puzzled as to how this is all going
4 to work, because it seems to me that we have some conflicting
5 objectives in this regard.

6 MR. STELLO: It's going to be very difficult.

7 COMMISSIONER ROGERS: It's a comment, it's not a
8 solution to the problem.

9 MR. STELLO: But if we would permit, for example, if
10 the rule would allow a utility that has say only 10 or 15 years
11 or operation to apply at that time for a license that would
12 allow him to operate for say 40 more years, you would be
13 getting some of the very new plants as well as some of the very
14 old plants.

15 And you could get that experience all very early in
16 the process and perhaps one could, DOE already has indicated a
17 desire to support us on this activity.

18 Perhaps DOE may consider broadening it to allow
19 getting that kind of experience to cover the spectrum, and that
20 might be very, very helpful.

21 Perhaps DOE would consider that. So depending on the
22 form of the rule, if that's permitted, we may be able to find
23 ways to make at least that task easier.

24 CHAIRMAN ZECH: Well, let me thank the staff for an
25 excellent presentation. I thought, Mr. Sheron, your briefing

1 was exceptionally good.

2 We all know, Mr. Stello, what an important issue this
3 is and I know that the staff is going to continue giving it a
4 very important priority.

5 And it isn't very far away. That's the thing I think
6 we're all very aware of. I'd like to thank the General Counsel
7 for his discussion and resume of the procedural issues. That
8 was very helpful. Appreciate it.

9 When we consider that the utilities may be submitting
10 applications reasonably soon, the dates we suggested here today
11 are not very far in front of us, certainly early '90's is not
12 very far away, it seems to me that it's awfully important that
13 we maintain the scheduled for the final rule, 1991.

14 That's not very far away either. And that we really
15 pull that up in front of us continually to recognize that
16 that's a challenge that we have and there are a lot of unknowns
17 we're involved in here.

18 I'd also like to say that I certainly would expect
19 that the industry, utilities and industry combined, would take
20 a lead role in trying to address some of the technical research
21 challenges that are right in front of us in order to put in
22 place a responsible license renewal rule.

23 So I would suggest that our staff continue to work
24 very closely with the industry in that regard, and that they
25 have what I would I think is a heavy responsibility to share

1 that burden, because we are in a field that will require our
2 judgments.

3 We want as much technical research and as much
4 scientific evidence and facts as we can possibly muster. So I
5 would ask that my fellow Commissioners review the NUREG 1317
6 carefully and perhaps we'll be able to vote on it here very
7 soon. I'd like to do that if at all possible so we can move
8 ahead with this very important program.

9 MR. PARLER: Mr. Chairman?

10 CHAIRMAN ZECH: Yes.

11 MR. PARLER: If the NUREG 1317 is going to be put out
12 as a basic document for purposes of the advance notice of
13 proposed rulemaking, it was prepared some months ago and
14 certain parts of it, such as a proposed decommissioning rule, I
15 would suggest should be updated at least by footnotes. There
16 are a few things like that in the document.

17 CHAIRMAN ZECH: Fine. Well, certainly we would want
18 to make sure that we're satisfied with that and perhaps other
19 things as we review it, but appreciate that comment.

20 Are there any other comments?

21 [No response.]

22 CHAIRMAN ZECH: If not, thank you very much. We
23 stand adjourned.

24 [Whereupon, at 3:23 p.m., the hearing was concluded.]

25

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 POLICY PAPER FOR PLANT LIFE
EXTENSION

PLACE OF MEETING: Washington, D.C.

DATE OF MEETING: TUESDAY, JULY 12, 1988

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.

Ann Riley

Ann Riley & Associates, Ltd.

REGULATORY OPTIONS FOR NUCLEAR PLANT
LICENSE RENEWAL

PRESENTED BY

BRIAN W. SHERON, DIRECTOR
DIVISION OF REACTOR AND PLANT SYSTEMS
OFFICE OF NUCLEAR REGULATORY RESEARCH
U.S. NUCLEAR REGULATORY COMMISSION

COMMISSION BRIEFING
JULY 12, 1988

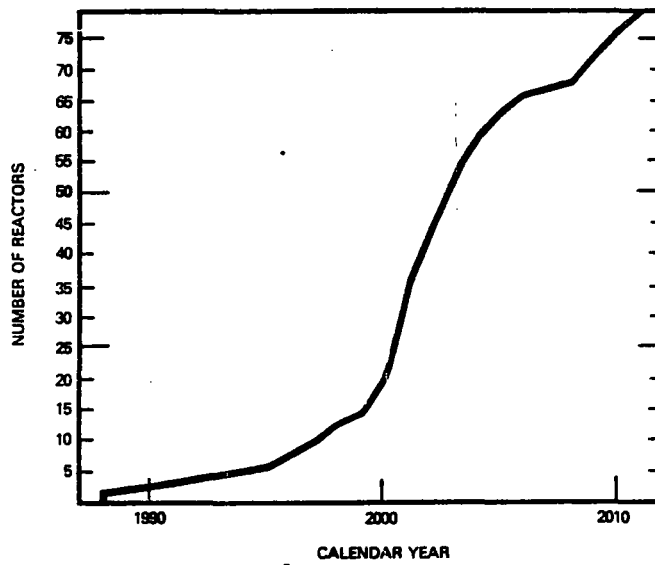
TOPICS

- ° STAFF ACTIVITIES AND SCHEDULE
- ° REGULATORY OPTIONS

LICENSE RENEWAL APPLICATIONS ANTICIPATED

- 12 YR PLANNING HORIZON FOR GENERATING CAPACITY
- DOE LEAD PLANT 1991
- YANKEE ROWE-OL EXPIRES 2000
- ASSUMING 2YR NRC REVIEW AND 12YR PLANNING HORIZON POTENTIAL FOR 35 APPLICATIONS BEFORE YR 2000

**NUMBER OF REACTORS WITHIN 12 YEARS OF
OL EXPIRATION (ASSUMING CP-OL EXTENSION)**



RULE VS POLICY STATEMENT

- ° POLICY STATEMENT WOULD DECLARE COMMISSION INTENT AND APPROACH. HOWEVER, RULE OFFERS SIGNIFICANT BENEFIT.
- ° NRR SUGGESTED SAVING TIME BY ELIMINATION OF POLICY. RES AGREED. THIS SHORTENED RULE SCHEDULE BY ABOUT 6 MONTHS.
- ° RULE WOULD EMBODY SAME INFORMATION AS POLICY STATEMENT AND PROVIDE MORE DEFINITIVE GUIDANCE TO INDUSTRY.

CURRENT REGULATIONS DO NOT PROVIDE
ADEQUATE GUIDANCE

- STAFF PROGRAM IS TO DEVELOP REGULATIONS
AND SUFFICIENT REGULATORY GUIDANCE TO
BEGIN PROCESSING APPLICATIONS BY
1991/92
- THIS TIME FRAME IS CONSISTENT WITH
INDUSTRY'S NEEDS

COMMISSION GUIDANCE TO STAFF

- ° PROVIDED IN "U. S. NUCLEAR REGULATORY
COMMISSION POLICY AND PLANNING
GUIDANCE 1986," NUREG-0885, ISSUE 5
- ° 1987 PPG (NUREG-0885, ISSUE 6) RETAINS THE
SAME WORDING

PAST MILESTONES

- ° FR NOTICE REQUESTING COMMENTS
NOVEMBER 6, 1986
- ° SECY-87-179 - STATUS OF ACTIVITIES
JULY 21, 1987
- ° DECISION TO GO DIRECTLY TO A PROPOSED
RULE FEBRUARY 1988
- ° SECY-88-180 - REGULATORY OPTIONS
AND ANPR JUNE 27, 1988

FUTURE MILESTONES

- DRAFT OF PROPOSED RULE COMPLETED
FEBRUARY 1989
- PROPOSED RULE TO COMMISSION
JUN 1989
- PUBLISH PROPOSED RULE SEP 1989
- PUBLIC MEETINGS NOV/DEC 1989
- PUBLISH FINAL RULE BY 1991
- COMPLETE REGULATORY GUIDE AND SRPs
EARLY 1990s

ORGANIZATION AND COORDINATION OF LICENSE
RENEWAL PROGRAM WITHIN NRC

- ° OFFICE OF NUCLEAR REGULATORY RESEARCH -
LICENSE RENEWAL RULEMAKING AND AGING
RESEARCH
- ° CLOSE COODINATION WITH OTHER OFFICES AND
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

CENTRAL REGULATORY ISSUE

- ° QUESTION IS: WHAT SHOULD BE THE REGULATORY APPROACH AND REQUIREMENTS FOR RENEWED LICENSES IN ORDER TO HAVE CONTINUED ASSURANCE OF PUBLIC HEALTH AND SAFETY?

- THREE ALTERNATIVES BRACKET THE REASONABLE POSSIBILITIES

- PERPETUATION OF THE ORIGINAL LICENSING BASIS OF THE PLANT, AS AMENDED.
- THE LICENSING REQUIREMENTS FOR NEW PLANTS AT THE TIME A RENEWAL APPLICATION IS SUBMITTED.
- A MODIFIED LICENSING BASIS THAT SUPPLEMENTS, AS NECESSARY, THE ORIGINAL LICENSING BASIS IN SAFETY SIGNIFICANT AREAS. (E.G. PRA APPROACH)
- APPROACH USED MAY DEPEND ON LENGTH OF RENEWAL TERM.

REGULATORY TOPICS

- ° TECHNOLOGICAL
 - VERIFYING THE DESIGN ADEQUACY OF A PLANT TO BE RELICENSED.
RESIDUAL LIFE, REPLACEABLE VS. NON-REPLACEABLE COMPONENTS AND STRUCTURES, REACTOR VESSEL, CONTAINMENT.
 - COMPENSATING FOR UNCERTAINTIES RELATED TO PLANT AGING THAT NEED TO BE TAKEN INTO ACCOUNT IN RELICENSING.
IMPERFECT KNOWLEDGE OF AGING MECHANISMS AND ABILITY TO PREDICT AGE RELATED FAILURES.

REGULATORY TOPICS-CONTINUED

- ENVIRONMENTAL REVIEW
CURRENTLY UNDER EVALUATION

REGULATORY TOPICS-CONTINUED

PROCEDURAL

- FORM OF LICENSE RENEWAL
- LENGTH OF RENEWAL TERM
- LATEST DATE FOR RENEWAL APPLICATION
- EARLIEST DATE FOR RENEWAL APPLICATION
- EFFECTIVE DATE OF RENEWAL
- USE OF THE BACKFIT RULE
- PUBLIC HEARINGS
- MATERIAL ALTERATIONS
- EMERGENCY PLANNING
- DECOMMISSIONING
- ANTITRUST REVIEW
- PRICE-ANDERSON ACT COVERAGE

CONCLUDING POINTS

- ° TIMELY DEVELOPMENT OF REGULATIONS
AND REGULATORY GUIDANCE IMPORTANT
TO INDUSTRY AND TO REGULATORY
STABILITY
- ° CURRENT SCHEDULE APPROPRIATE

CONCLUDING POINTS (CONTINUED)

- ° REGULATORY GUIDES AND SRPs ON LONGER SCHEDULE THAN REGULATION
- ° ADDITIONAL RESEARCH AND DATA
- ° IMPORTANCE OF INDUSTRY RESEARCH
- ° GAPS IN KNOWLEDGE COULD LEAD TO REGULATORY CONSERVATISM

Theme of This
International Symposium:

**“Understanding
Aging –
a Key to
Ensuring Safety**

**Managing Aging –
a Necessity to
Ensuring Safety”**

International Nuclear Power Plant Aging Symposium

August 30 –31 and September 1, 1988

Announcement and Call for Papers

Organized by:

United States Nuclear Regulatory
Commission

in cooperation with

American Nuclear Society

American Society of Civil Engineers

American Society of Mechanical
Engineers

Institute of Electrical and Electronics
Engineers

Location:

Hyatt Regency, One Bethesda Metro
Center, Bethesda, Maryland, USA 20814

Registration:

Prior registration is required. Registration
fee is \$20 per person. Checks should be
made payable to “INPPAS”. Only the
first 500 registrants are assured
participation.

Deadlines:

April 1, 1988 Abstracts of technical
papers should be mailed.

July 1, 1988: Technical papers should
be mailed.

August 1, 1988: Authors will be notified
of acceptance.

August 15, 1988: Original manuscripts
should be mailed.

December 1988: Symposium Proceedings
will be available
3 months after the
Symposium.

Mailing Information:

Symposium programs will be mailed to the
first 500 registrants.

Abstracts and technical papers should
be mailed to:

Mr. Satish K. Aggarwal, General Chairman
International Nuclear Power Plant Aging
Symposium

U.S. Nuclear Regulatory Commission
Washington, D.C. 20555, U.S.A

Telephone (301) 492-3823

Call for Papers:

The technical program committee welcomes your prospective papers for this symposium on all phases of nuclear power plant aging. Papers on the following topics are encouraged.

Technical Program

Technical sessions will include presentations of papers and a panel discussion. Suggested topics include, but are not limited to:

Designs and Applications
Role of Equipment Qualification
Operating Experience
Maintenance Experience/Programs
Risk Significance of Aging/PRA
Aging Mechanisms
Aging of Structures and Structural Materials
Detection and Inspection Methods
Surveillance and Condition Monitoring
Trending Performance Parameters
Residual Life Assessment
Component Aging/System Analysis
Role of Human Involvement
Component Replacement/Spare Parts Program
Variation of Failure Rates
Material Degradation
Erosion/Corrosion Effects
Embrittlement, Denting, Radiation Damage
Fire Susceptibility of Aged Insulation
Refurbishment and Replacement
Standards Development

In addition, on Thursday an opportunity will be provided for attendees not presenting formal technical papers to make a brief (approximately 5 minutes) technical presentation. Those wishing to make such a presentation should notify the General Chairman by July 1, 1988, indicating the topic.

A complete transcript of the Symposium will be maintained.

International Nuclear Power Plant Aging Symposium

**“Understanding
Aging –
a Key to
Ensuring Safety
Managing Aging –
a Necessity to
Ensuring Safety”**

AUGUST 30–31 AND SEPTEMBER 1, 1988
BETHESDA, MARYLAND, USA

Organized by
U.S. Nuclear Regulatory Commission

in cooperation with

American Nuclear Society

American Society of Civil Engineers

American Society of Mechanical Engineers

Institute of Electrical and Electronics Engineers



RULEMAKING ISSUE

June 27, 1988

(Notation Vote)

SECY-88-180

For:

The Commissioners

From:

Victor Stello, Jr.
Executive Director for Operations

Subject:

LICENSE RENEWAL RULEMAKING

Purpose:

To obtain approval to publish an advanced notice of proposed rulemaking and to solicit public comments on NUREG-1317, "Regulatory Options for Nuclear Plant License Renewal."

Background:

In response to the Commission's 1986 and 1987 policy and planning guidance the staff is conducting a program to develop license renewal regulations and associated regulatory guidance. In SECY-87-179, dated July 21, 1987, the Commission was informed of the status of staff activities in that program and the results of the November 6, 1986 Federal Register notice requesting comments on development of a policy for nuclear power plant license renewal. A reassessment of the merits of publishing a proposed and then a final policy statement, followed immediately by a proposed rule, has resulted in a decision by the Office of Nuclear Regulatory Research and the Office of Nuclear Reactor Regulation to eliminate these steps and proceed directly to developing a proposed rule for license renewal. Three to six months are expected to be saved in issuing a proposed rule. Consistent with this decision the staff has revised the policy options paper referred to in SECY-87-179. This paper is now NUREG-1317, "Regulatory Options for Nuclear Plant License Renewal," Enclosure B.

Discussion:

NUREG-1317, "Regulatory Options for Nuclear Plant License Renewal," is an interim product of the staff activity to develop a rule for license renewal. As the staff begins to focus on the integration of analyses of a wide variety of topics into a proposed license renewal rule it is worthwhile to provide industry, the public, and other government agencies the opportunity to comment on the scope of issues and options under consideration, the relative merits of each option, and any related matters. At this time, it is also appropriate to publish an advanced notice of proposed rulemaking to inform

Contact:

Donald P. Cleary, RES
49-23556

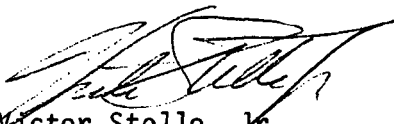
interested parties that the Commission intends to go directly to a proposed rule for license renewal rather than to first publish a policy statement.

NUREG-1317 consists of introductory and summary discussions, four major sections, and two appendices, one repeating the questions listed in the November 6, 1986 Federal Register notice on license renewal, and the other summarizing the public comments received on those questions. The titles of the four major sections are: Approach to Development of Options; Technological Topics; Environmental Review Topic; and Procedural Topics. To guide commenters, the section "Introduction" lists four questions concerning the content of NUREG-1317. A fifth question involves the extent of interest in a public meeting to discuss the comments received. If the staff decides there is sufficient interest in a public meeting, it will be held approximately four weeks after the close of the comment period.

No positions are taken nor are recommendations made in the report because further technical analysis is required, related legal analysis is not yet completed, and public comments have not yet been received and evaluated. The staff is continuing to progress in these areas and plans to complete all analyses in advance of the proposed license renewal rule; which we plan to send to the Commission about June 1989.

Recommendation: We recommend that the Commission approve publication of the advanced notice of proposed rulemaking which includes a request for comments on NUREG-1317, "Regulatory Options for Nuclear Plant License Renewal." The notice is provided as Enclosure A and NUREG-1317 is provided as Enclosure B.

Coordination: The Office of General Counsel has reviewed this paper and has no legal objection to it.


Victor Stello, Jr.
Executive Director
for Operations

Enclosures:

- A. Federal Register Advanced Notice of Proposed Rulemaking
- B. NUREG-1317, "Regulatory Options for Nuclear Plant License Renewal"

Commissioners' comments or consent should be provided directly to the Office of the Secretary by c.o.b. Friday, July 15, 1988.

Commission Staff Office comments, if any, should be submitted to the Commissioners NLT Friday, July 8, 1988, with an information copy to the Office of the Secretary. If the paper is of such a nature that it requires additional time for analytical review and comment, the Commissioners and the Secretariat should be apprised of when comments may be expected.

DISTRIBUTION:

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NUCLEAR REGULATORY COMMISSION
10 CFR PART 50

Nuclear Plant License Renewal

AGENCY: Nuclear Regulatory Commission

ACTION: Advanced notice of proposed rulemaking.

SUMMARY: The U.S. Nuclear Regulatory Commission (the Commission) is developing regulations for extending nuclear power plant licenses beyond 40 years. In order to inform the public, industry and other government agencies of its activities and to solicit timely comments on various regulatory options and issues developed thus far, the Commission is promulgating this notice and requesting comments on NUREG-1317 "Regulatory Options for Nuclear Plant License Renewal."

A free single copy of NUREG-1317 may be requested by those considering public comment by writing to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. A copy is also available for inspection and/or copying for a fee in the NRC Public Document Room, 1717 H Street, NW, Washington, D.C.

DATES: The comment period expires [add date 60 days from date of publication].

ADDRESSES: Send written comments or suggestions to the Secretary of the Commission, Washington, D.C. 20555, Attention: Docketing and Service Branch. Copies of comments received by the Commission may be examined at the NRC Public Document Room, 1717 H Street, NW, Washington, D.C. 20555.

Enclosure A

FOR FURTHER INFORMATION CONTACT:

Donald P. Cleary, Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission, Washington, D.C. 20555
Telephone (301) 492-3556

SUPPLEMENTARY INFORMATION: In the early part of the twenty-first century, a significant number of the licenses for the existing operating nuclear power plants are due to expire. Without renewal of these licenses, these plants will be shut down and their generating capacity will be lost. The electric power which would have to be supplied from new generating capacity is substantial. In response to the recognition of this situation and the necessity to address license renewal issues early, the utilities, industry and the Department of Energy (DOE) are sponsoring programs to study plant life extension for both nuclear and non-nuclear generating plants. The Commission understands that electric utilities may desire to submit applications for renewal of operating licenses beginning in the early 1990s.

The Commission has undertaken a program to develop a regulatory framework which meets the need of utilities to be informed of license renewal requirements sufficiently early so that utilities can either prepare for license renewal or pursue alternative sources of generating capacity. A solicitation for comments on seven major issues (21 separate questions) was published on November 6, 1986, "Request for Comments on Development of Policy for Nuclear Power Plant License Renewal," Federal Register, Vol. 51, No. 215, pages 40334 and 40335. A total of 58 written comments were received from a cross section of the U.S. electric utility industry, public interest groups, private citizens, independent consultants, and government agencies. These comments were reviewed and a summary provided to the Commission in SECY-87-179, "Status of Staff Activities to Develop a License Renewal Policy, Regulations and Licensing Guidance and to Report on Public Comments," dated July 21, 1987.

Subsequently, the Commission has decided to go directly to a proposed rule and by-pass a policy statement. As the Commission begins to focus on the integration of analyses of a wide variety of topics into a proposed license

Enclosure A

renewal rule, it is worthwhile to provide the opportunity for public comment on the issues and options under consideration. Through this notice the Commission is making NUREG-1317, "Regulatory Options for Nuclear Plant License Renewal," available for public comment.

Comments are solicited on the following set of questions concerning the content of NUREG-1317. This set of questions is not exhaustive, therefore, comments on any additional questions raised by NUREG-1317 are welcome.

1. Are there any other major regulatory options that should be considered for license renewal?
2. What are the relative merits of each option with regard to ensuring the continued adequate protection of the public health and safety?
3. What are the benefits of requiring a licensee to verify his original licensing design basis, as subsequently amended, as a part of the license renewal process?
4. With regard to each of the technological, environmental, and procedural issues, are there any comments or other information that should be considered in their resolution? Comments submitted in response to the November 6, 1986 Federal Register notice are already being considered and need not be repeated.
5. Is there interest in participating in a public meeting that will discuss the comments received? Which issues should be given priority attention in the meeting, if held?

Dated at Rockville, Maryland this day of 1988.

For the Nuclear Regulatory Commission.

Samuel J. Chilk
Secretary of the Commission

Enclosure A

NUREG-1317

Regulatory Options for Nuclear Plant License Renewal

Draft for Comment

Manuscript Completed: May 1988
Date Published: June 1988

Division of Reactor and Plant Systems
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, DC 20555



Enclosure B

NUREG-1317

Regulatory Options for Nuclear Plant License Renewal

Draft for Comment

**U.S. Nuclear Regulatory
Commission**

Office of Nuclear Regulatory Research



ABSTRACT

The NRC is developing regulations for relicensing nuclear power plants. In recognition of the need to resolve the issues affecting public health and safety in a timely manner, the NRC issued a Federal Register notice in November 1986 requesting public comments on the license renewal policy development effort. Fifteen topics of concern have been identified from the public's response to NRC's request. The topics have been categorized as: technological, environmental, and procedural. The review and analysis of these topics have resulted in the characterization of regulatory issues and the identification of ways for dealing with certain issues. This report presents the status of this effort and is being issued for public comment. The comments would help focus on the issues that should be addressed in the proposed rule on license renewal.

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EXECUTIVE SUMMARY

Background and Purpose

The Atomic Energy Act and the implementing regulations of the U.S. Nuclear Regulatory Commission (NRC) permit the renewal of nuclear plant operating licenses upon expiration of their 40-year license term. However, the regulatory process by which license renewal may be accomplished and the requirements for the scope and content of renewal applications are yet to be established. Consistent with the expected schedule of license renewal applications, the NRC is now developing regulations that will ensure the continued safe operation of relicensed power plants. Rather than issuing a policy statement prior to a rule as previously planned, the NRC intends to move directly to rulemaking on a slightly accelerated schedule.

In November 1986, the NRC issued a request for public comments on the license renewal policy development effort and indicated its intent to develop a Commission policy statement. The response has been analyzed and various topics of concern to license renewal have been identified. The review and discussion of those topics and related issues have also resulted in the identification and characterization of ways to address certain issues. This report describes the status of this effort. The purpose of the report is to stimulate further discussion and to obtain comments on the material presented herein. The NRC is considering holding a public meeting to discuss the comments.

Central Regulatory Issue

The central regulatory question in license renewal is: What is an adequate licensing basis for renewing the operating license of a nuclear power plant? The following three alternative licensing bases bracket the reasonable possibilities:

1. The original licensing basis of the plant, as amended.
2. The licensing requirements for plants at the time a renewal application is submitted.
3. A modified licensing basis that supplements, as necessary, the original licensing basis in safety significant areas.

For each of these alternative licensing bases, there could be alternative approaches for implementing the safety review of license renewal applications. The NRC has not yet chosen what the licensing basis or the implementing approach will be. While such a choice may ultimately be a policy judgment, that judgment will rest on what is needed to ensure

the continued adequate protection of the public health and safety. Specific considerations will include the relative merits of new versus old technology and other technical strengths and weaknesses that the alternatives may exhibit.

Alternative 1 offers the lowest threshold for license renewal. It requires the evaluation of the adequacy of the plant against its original licensing basis, as amended through subsequent licensing actions. One implementing approach for this alternative would be to leave the existing licensing basis, the current licensing documentation, and the current level of configuration control in their "as is" condition. The largest drawback of this approach is its dependence upon an outdated and an oftentimes poorly recorded licensing basis. An approach that could partially offset this disadvantage would require thorough updating of the final safety analysis report and associated technical documents (analyses, design criteria, specifications, manuals, procedures, etc.) and thorough checking of the present configuration of the plant to demonstrate conformance to the original licensing basis, as amended.

Alternative 2 presents a much higher threshold for license renewal by requiring the use of current standards for new plants. A drawback of this approach, which requires full conformance to current standards, is that it would potentially require redesign and backfit of many safety features, although not all backfits could be justified on a cost/benefit basis. A more practical implementing approach under this alternative would require plant modification based on a comprehensive and systematic evaluation of the design against current standards and permission for justification of deviations. A probabilistic risk assessment (PRA) could be used to assist in justifying deviations from current requirements.

Alternative 3 represents a middle-ground position. It would involve modifying and supplementing the original licensing basis. The implementing approach could focus on requiring conformance either to standards which are specifically developed to be consistent with the safety goals, or to a subset of current standards that are particularly relevant to the risk-significant aspects of plants requesting license renewal. This alternative could employ a plant-specific PRA that could be used to focus licensing attention on the need for new standards to be applied to critical safety functions and equipment in demonstrating design adequacy or in choosing critical elements of a plant for backfitting.

Each of these alternatives could be formulated to address the licensing design basis of the plant, its physical condition, and the expected aging of its components and structures over the renewal term. In addition to those areas, license renewal decisions by the NRC may be influenced by the adequacy of the operating and maintenance organizations of the utility running the plant. The organization and management of

operating plants have been addressed relatively recently. Thus, it is likely that in the future all plants will be judged against current requirements for operations and maintenance, and perhaps other areas such as emergency preparedness and safeguards. It should not be necessary, therefore, to develop new requirements for these items for license renewal.

Even though organizational and management matters may be controlled by current requirements and new requirements may not be required for license renewal considerations, these matters are important and must be considered by the NRC in making a decision to grant a request for license renewal. For example, if a plant is shut down by the NRC or its owner because of an inability to meet regulatory requirements on operations or maintenance, then any license renewal that had been requested would have to be contingent upon coming back into compliance with current requirements on operations and maintenance. In fact, there are several aspects of safe plant operations that the NRC could consider before granting a license renewal and that might lead to contingencies on such a renewal. In addition to operations and maintenance indicators, these other aspects include licensee evaluation and use of operating experience, as well as the performance of the licensee as measured in the NRC's Systematic Assessment of Licensee Performance program or the NRC's performance indicator program.

Thus, at this time, the NRC is considering a range of approaches for ensuring that the material condition of the plant, the licensing basis of the plant, and the performance of the licensee are adequate to support renewal of the license to operate the plant.

Regulatory Options

The regulatory issues concerning license renewal have been categorized under three topics: technological, environmental review, and procedural. At this time, the issues within the technological and environmental topics have been characterized to a greater degree than others.

The technological topics concern (1) verifying the design adequacy of a plant to be relicensed, and (2) compensating for uncertainties related to plant aging that need to be taken into account in relicensing. The two topics are interrelated. This report provides a limited amount of detail on these topics.

Two options are discussed for verifying that the design basis of a plant is adequate for license renewal: the first involves a detailed assessment of safety-significant components subject to aging; the second is based on a PRA of the plant, which also addresses future plant aging. However, even the best estimates of aging effects on plants will involve uncertainties, given our incomplete understanding of the nature of aging mechanisms. Again, two options are presented here for dealing with such as

uncertainties: the first emphasizes monitoring, surveillance, inspection, and maintenance to prevent age-related failures before they occur; the second emphasizes providing adequate safety margins through design modifications or additional safety features. The characteristics of the options for addressing the two technological topics are summarized in Tables ES-1 and ES-2. These options should not be considered as mutually exclusive; rather, their identification at this stage is intended to stimulate further discussion and assist in the evaluation of various elements of an overall regulatory approach.

For addressing the environmental review topic, the NRC is considering the preparation of a generic environmental impact statement. This approach would help address potential environmental issues that are common to several or all plants requesting license renewal. It would also identify major factors that could influence the need for site-specific environmental impact statements in making individual relicensing decisions.

The procedural topics relate to the form of the license renewal process, the timing of renewal applications, and concerns regarding the adequacy or consistency of existing policies and regulations for license renewal. The discussion of these topics in this report is intended to elaborate the issues that need to be resolved.

Public Meeting and Future Steps

After the staff has had an opportunity to review all comments received on this report, it will determine whether a public meeting should be held to discuss issues raised in written comments. The public meeting will address the issues and options presented in this report, as well as the public response to specific questions concerning the content of this report.

Questions which the NRC staff would like readers of this report to consider are:

1. Are there any other regulatory options that should be considered for license renewal?
2. What are the relative merits of each option with regard to ensuring the continued adequate protection of the public health and safety?
3. What are the benefits of requiring a licensee to verify its original licensing design basis, as subsequently amended, as a part of the license renewal process?

4. With regard to each of the technological, environmental, and procedural issues, are there any comments or other information that should be considered in their resolution? Comments submitted in response to the November 6, 1986 Federal Register notice are already being considered and need not be repeated.
5. Is there interest in participating in a public meeting that will discuss the comments received? Which issues should be given priority attention in that meeting, if held?

Concurrent with the publication of this report and with subsequent consideration of comments received, the staff is continuing other activities necessary for performing a regulatory analysis and developing a proposed rule on license renewal.

TABLE ES-1
TWO OPTIONS FOR THE ISSUE ON LICENSING DESIGN BASIS

TABLE ES-1
TWO OPTIONS FOR THE ISSUE ON LICENSING DESIGN BASIS

Issue: How should the NRC determine the design adequacy of a plant for continued operation over the renewal term?

Options	Licensee Activities	Areas Requiring NRC Guidance	Attributes
<p>A. Review of safety-significant components and structures subject to age-related degradation.</p> <p>This option provides for the identification and evaluation of significant effects of aging based on operating history and regulatory guidance provided by the NRC.</p>	<ol style="list-style-type: none"> 1. Identification of safety-significant components, systems, and structures. 2. Determination of the effects of aging using operating history and mechanistic models. 3. Evaluation of the safety significance of aging effects and proposal of plant modifications needed. 	<ol style="list-style-type: none"> 1. Generic list of items for evaluating the effects of aging. 2. Methodology for evaluating the effects of aging and estimating residual life of components and structures. 	<ol style="list-style-type: none"> 1. The scope of the licensee's effort will be identified in advance through the generic list of items for review. 2. This option may not provide a comprehensive list of safety-significant items for the plant.
<p>B. Review of plant using a PRA, with emphasis on future plant aging.</p> <p>This option provides for an integrated assessment of the effects of age-related degradation and risk-based prioritization of items for analysis.</p>	<ol style="list-style-type: none"> 1. Preparation of a plant-specific PRA to assist in identifying and prioritizing safety-significant components, systems, and structures. 2. Estimation of the effects of aging in terms of changes in failure probability, system availability, and risk. 3. Identification of any plant modifications needed to minimize the risk due to continued aging. 	<ol style="list-style-type: none"> 1. As in item (2) above. 2. Analytical techniques to incorporate aging effects into PRA, particularly for passive components and structures. 3. Criteria for determining the risk significance of components and structures. 	<ol style="list-style-type: none"> 1. PRA provides a tool for understanding system interactions, relative importance of components, and additional risk due to aging. 2. The methodology for incorporating aging effects into a PRA has not been completely developed and verified.

TABLE ES-2
TWO OPTIONS FOR THE ISSUE ON UNCERTAINTIES
IN AGE-RELATED DEGRADATION

Issue: What is needed to reduce and manage the uncertainties related to the aging of components, systems, and structures in order to ensure that nuclear plants will continue to operate safely over the renewal term?

Options	Licensee Activities	Areas Requiring NRC Guidance	Attributes
<p>A. Emphasize maintenance, inspection, and reliability assurance.</p> <p>This option provides for the systematic identification and prevention of potentially significant age-related failures.</p>	<ol style="list-style-type: none"> 1. Develop measures for tracking and trending the performance of safety-significant components. 2. Assess historical and current plant performance relative to the reference performance levels. 3. Implement changes to meet reference performance levels. 4. Monitor plant performance to ensure effective management of aging effects. 	<ol style="list-style-type: none"> 1. Methodology and criteria for developing performance measures. 2. Monitoring and maintenance programs for age-related degradation. 3. Equipment qualification procedures from an aging perspective. 	<ol style="list-style-type: none"> 1. Reduces uncertainties through maintenance and replacement before actual failures occur. 2. Offers flexibility in identifying and implementing corrective actions. 3. Requires additional monitoring and performance trending techniques.
<p>B. Emphasize defense-in-depth against age-related failures.</p> <p>This option would ensure that, given the uncertainties in age-related failures, safety systems will be adequate to meet potential challenges to the plant.</p>	<ol style="list-style-type: none"> 1. Assess the capabilities of safety systems and containment. 2. Identify areas where safety margins may be reduced because of aging effects, and propose equipment upgrades and other design modifications. 3. Ensure that sufficient safety margins exist following proposed replacements or additional safety features. 	<ol style="list-style-type: none"> 1. Methodology and criteria for age-related assessments of safety systems and containment. 2. Criteria for acceptable safety margins for safety systems and structures. 3. Design and qualification of new safety features for accident prevention or mitigation. 	<ol style="list-style-type: none"> 1. Provides effective and visible safety upgrades. 2. Requires additional analysis of system interactions to assess the impact of design changes.

1. INTRODUCTION

1.1 Background

The NRC has begun to develop nuclear plant license renewal regulations that will ensure the continued safe operation of relicensed power plants, as well as continued compliance with the National Environmental Policy Act (NEPA).

The Atomic Energy Act of 1954 provides a statutory limit of 40 years for the duration of licenses issued by the NRC to electric utilities that operate commercial nuclear power plants. Until recently, this term started with issuance of the plant construction permit. With construction periods ranging from 3 to 11 years, the productive life of a plant would be significantly less than 40 years.

In 1982, the NRC determined that the 40-year license term could begin with issuance of the operating license, and this became standard practice for the licensing of subsequent commercial nuclear plants. More recently, a few of the earlier plants have been granted license term adjustments or extensions: the expiration date of their initial license has been extended to recover the construction time and allow a full-term operating license of 40 years. Several other plants have already applied for such extensions, and the remainder are expected to follow suit. Based on the assumption that all current operating licenses will be extended to 40-year terms, license expiration schedules range from years 2000-2028.

License renewal for a commercial power plant denotes the NRC's possible future action allowing the plant to operate beyond the initial or extended term of 40 years. Such an action by the NRC is explicitly permitted by the Atomic Energy Act. However, the regulatory requirements for the scope and content of license renewal applications, the criteria for evaluating such applications, and the procedures for submitting and reviewing them are yet to be established.

License renewal by the NRC is obviously a prerequisite to the plant life extension being considered by several licensees. To support plant life extension, the nuclear industry has undertaken studies to evaluate the aging of hardware and its effect on plant reliability and safety. In particular, the industry has formed the Nuclear Plant Life Extension (NUPLEX) Steering Committee. In addition, under the sponsorship of the Electric Power Research Institute (EPRI) and the Department of Energy (DOE), pilot studies have been conducted at two nuclear plants to determine which components and structures could be affected by aging, and how their longevity can be assessed. The industry, as represented by NUPLEX, has stressed the need for early decisions--approximately 12 years prior to license expiration--concerning license renewal and plant life

extension beyond 40 years. This need is based on two assumptions: a typical utility power replacement and planning cycle of 10 years and a period of two years for the NRC's review of license renewal applications.

In light of industry initiatives and in recognition of the need to resolve all issues affecting public health and safety in a timely manner, the NRC has undertaken its effort to develop regulations for license renewal. On November 6, 1986, the NRC issued a request for comments from the public, industry, and other government agencies on the development of a policy for nuclear power plant license renewal (Ref. 1). This request posed several questions, which are listed in Appendix A. These questions are paraphrased below:

1. Timeliness of the policy. To what extent should the NRC proceed now with policy development? By what time should the policy be in place?
2. Timing and length of license renewal requests. What should be the criteria for a timely and sufficient request? What should be the duration of interim operation while the request is under review?
3. Acceptable level of plant safety. How should the NRC use performance-based information and probabilistic risk assessment (PRA) in the application review? Should the plants conform to all regulations in effect at the time of renewal application? Should the intent of renewal be factored into backfitting* considerations?
4. Scope of plant life extension applications. Should renewal be for a specific period of time? Should requirements vary according to duration? Which licensing criteria are not appropriate? To what extent should operating history be considered?

*Backfitting refers to regulatory requirements that are imposed after an operating license has been granted and that were not a condition of the original license. Included are modifications to systems, structures, components, designs, and procedures resulting from changes in the rules or staff guidance interpreting the rules. Formal procedures for analyzing and implementing backfits were implemented in 1985.

5. Technical considerations. Which plant components will require residual lifetime evaluations? What are the major technical parameters and criteria for renewal consideration? What monitoring and maintenance programs are needed to ensure safety? Which are the major "leadtime" monitoring items? How should codes and standards be revised? How should the ongoing investigations and research be coordinated in order to avoid duplication?
6. Resolution of issues. What should be the schedule for the resolution of license renewal issues?
7. Procedural considerations. Should licensing procedures change for renewals? If so, how?

Public comments received in response to the NRC's request have been analyzed. A summary of that analysis is provided in Appendix B. The issues identified through this analysis are technological, environmental, or procedural in nature. These are being addressed by the NRC staff and its contractor, the MITRE Corporation. This effort has also involved identifying and characterizing ways of dealing with these issues, primarily those concerning technology and environment. This report describes the results of the NRC and MITRE effort.

1.2 Definitions

In order to permit discussion on a common basis, a working language needs to be established. Terms used for this purpose are as follows:

1. Alternative regulatory approaches--broad measures available for relicensing nuclear plants in a manner that ensures their continuing operation within acceptable standards for both safety and maintenance of environmental quality.
2. Topics--fifteen areas identified through analysis of public comments in response to the NRC request.

Topics are further categorized as follows:

- a. Technological--those applying primarily to the components and structures of the nuclear plant and directly affecting safe

operations. This category consists of two topics: licensing design basis* and uncertainties in age-related degradation.**

- b. Environmental--a single topic addressing continued compliance with NEPA to ensure the protection of public health and the environment.
 - c. Procedural--those encompassing some combination of technological, operational, administrative, and legal factors pertaining to the application for license renewal. The specific topics identified are reasonably discrete and mutually exclusive.
- 3. Issues--areas of controversy or concern associated with each topic.
 - 4. Option--one of several regulatory ways that NRC might deal with a specific issue.

Issues and options associated with different topics may be interrelated. For instance, the issues and options involved in the specific topic of length of renewal term are not independent of those involved in technological topics.

1.3 Purpose and Scope of the Report

The purpose of this report is to present the status of the current work on license renewal. Consensus on options to be recommended as part of an overall regulatory approach for license renewal must evolve after further analyses have been performed. Those analyses will include

*Design basis is the information that describes the physical configuration of the plant, including its components, systems, and structures; it identifies the functions that the components, systems, and structures are to perform and specifies the values of controlling parameters chosen as the reference bounds for design.

**Age-related degradation is the cumulative deleterious effect of changes that occur over time within plant components and structures. Aging may be caused by several mechanisms: internal chemical or physical processes during operation; environmental conditions such as temperature, pressure, and humidity; and stresses arising from service wear, abnormal operating events, testing, and maintenance practices. Since the resulting changes may adversely affect plant safety and reliability, age-related degradation is a continuing concern for any nuclear plant, even during its initial license term.

consideration of public comments received on the material in this report. In particular, comments are solicited on the following set of questions concerning the content of this report:

1. Are there any other regulatory options that should be considered for license renewal?
2. What are the relative merits of each option with regard to ensuring the continued adequate protection of the public health and safety?
3. What are the benefits of requiring a licensee to verify its original licensing design basis, as subsequently amended, as a part of the license renewal process?
4. With regard to each of the technological, environmental, and procedural issues, are there any comments or other information that should be considered in their resolution? Comments submitted in response to the November 6, 1986 Federal Register notice are already being considered and need not be repeated.
5. Is there interest in participating in a public meeting that will discuss the comments received? Which issues should be given priority attention in that meeting, if held?

This set of questions is not exhaustive; therefore, comments on any additional questions raised by this report are welcome. Any additional written comments should be keyed to the specific sections in this document.

Since this is a status report, its scope reflects differences in the degree to which various topics have been developed. The development of technological and environmental topics is more complete than that of the procedural topics. One purpose of inviting comments and stimulating discussion on a broad front is to obtain additional insight and clarification. The results will further guide the development and selection of options and the formulation of draft regulations.

The next section describes the approach used to characterize topics and develop options. The technological and environmental topics and issues are addressed in Sections 3 and 4, respectively. The procedural topics and issues are characterized in Section 5.

1.4 Public Meeting and Future Steps

After the staff has had an opportunity to review all comments received on this report, it will determine whether a public meeting should be held

to discuss issues and concerns raised in written comments. If the staff decides to hold a public meeting, it would be held approximately four weeks after the close of the comment period. A notice of dates, times, place, and an agenda will be published in the Federal Register within ten days after the end of the comment period and will be mailed to all parties submitting written comments.

Concurrent with publication of this report and with subsequent consideration of comments received, the staff is continuing other activities necessary for performing a regulatory analysis and developing a proposed rule on license renewal. It is anticipated that a proposed rule will be published in the Federal Register in the summer or fall of 1989, and that public meetings will be held 2 to 3 months thereafter. It is anticipated that the final rule will be issued in 1991.

2. APPROACH TO DEVELOPMENT OF OPTIONS

This section presents a discussion of the general approach to the development of regulatory options for license renewal. An integral part of this approach is the characterization of topics and issues. This characterization is based on consideration of public comments on the questions posed by the NRC, along with analysis of regulatory needs.

Alternative regulatory approaches for plant license renewal are also presented. Consideration of these approaches provides a framework for describing and characterizing options for addressing the specific license renewal issues.

2.1 Characterization of Topics and Their Relationship to Issues and Options

Figure 2-1 shows a systematic approach for formulating and evaluating options. Work has been completed on items enclosed in solid boxes. The analysis of public comments has resulted in the identification and categorization of topics and the characterization of related issues. Specific options have been formulated for the prospective resolution of technological issues.

The specific topics and their structural relationship to related issues and options are depicted in Figure 2-2. The dashed lines depict potential interrelationships among the issues and options under the various topics.

2.2 Alternative Regulatory Approaches: A Framework for Development of Options

The pursuit of regulations on plant relicensing is basically a matter of answering the question: How can the NRC be assured that a nuclear power plant, if relicensed for operation beyond its original 40-year term, will not endanger public health or safety or the environment? While there are many important procedural and legal aspects to this question, the NRC's answer to the key safety aspects are likely to be embodied in its requirements for the review of the licensing basis and physical condition of the plant to be relicensed. Therefore, the central regulatory question may be phrased as: What is an adequate licensing basis for renewing the operating license of a nuclear power plant?

In the absence of technically valid arguments that nuclear power plants cannot be operated safely beyond their original license term, there is a range of possible relicensing approaches. Each has advantages and disadvantages. The following three alternative licensing bases bracket the reasonable possibilities:

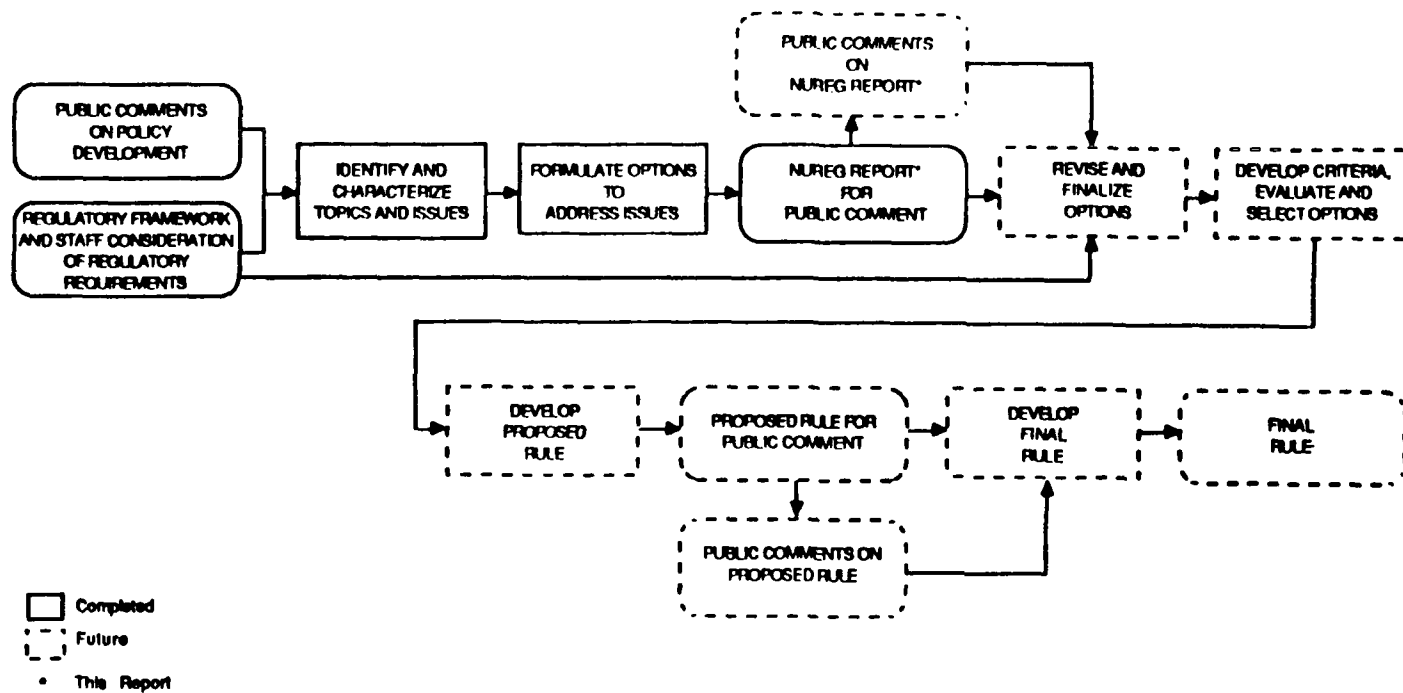


FIGURE 2-1
 APPROACH TO THE PROCESS OF DEVELOPING REGULATIONS
 FOR RELICENSING NUCLEAR POWER PLANTS

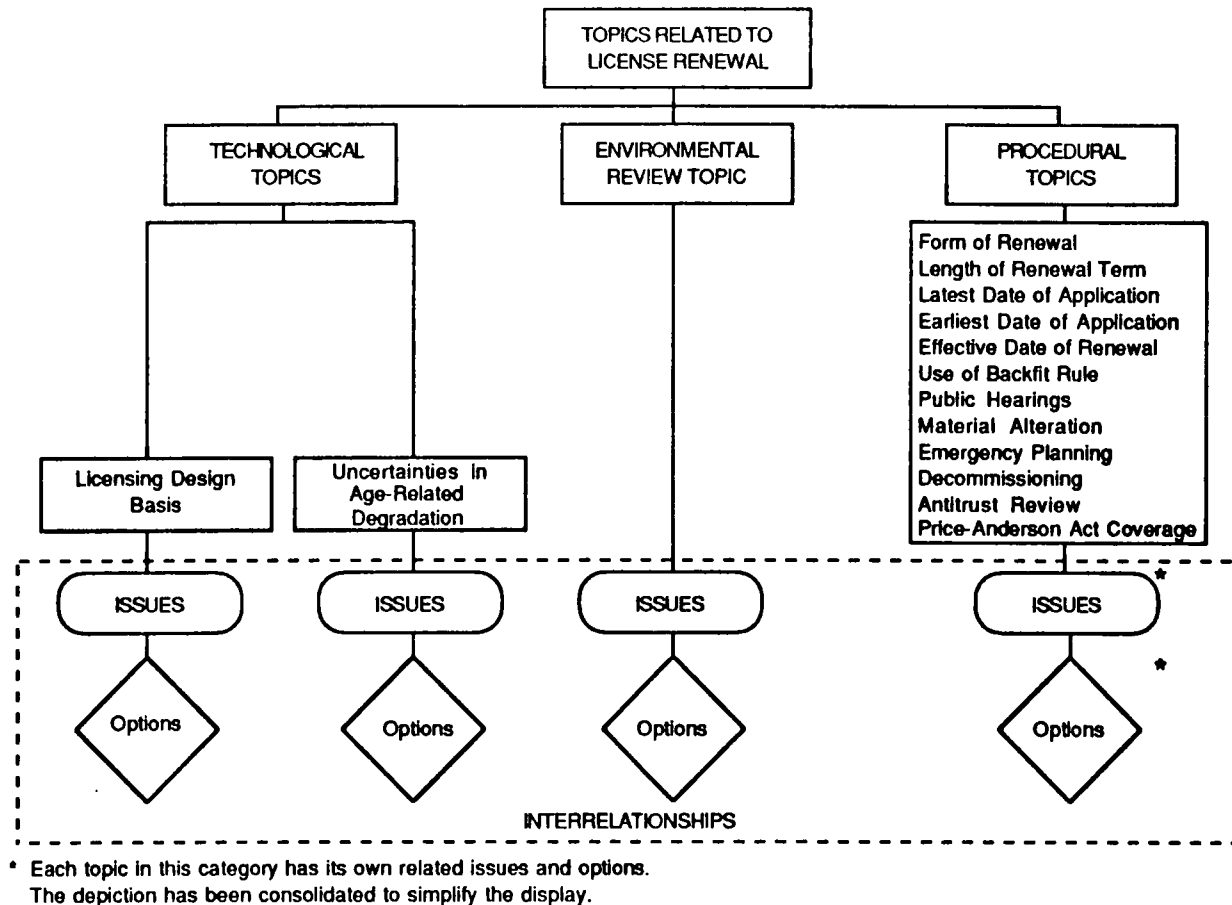


FIGURE 2-2
CATEGORIZATION OF LICENSE RENEWAL TOPICS
AND RELATIONSHIP TO ISSUES AND OPTIONS

1. The original licensing basis of the plant, as amended.
2. The licensing requirements for plants at the time a renewal application is submitted.
3. A modified licensing basis that supplements, as necessary, the original licensing basis in safety significant areas.

For each of these alternative licensing bases, there could be alternative approaches for implementing the safety review of license renewal applications. The NRC has not yet chosen what the licensing basis or the implementing approach will be. Such a choice may ultimately be a policy judgment that will rest on what is needed to ensure the continued adequate protection of the public health and safety. Specific considerations will include the relative merits of new versus old technology and other technical strengths and weaknesses that the alternatives may exhibit.

At one extreme, the NRC could adopt the posture that if a plant is operating satisfactorily on the day before its original license expires, then it can safely be operated beyond that date if it remains in compliance with the following: (1) all requirements applicable to that plant at that time, and (2) all modifications of those requirements that the NRC might, as a result of its normal procedures, subsequently hold to be necessary. This approach would allow continued operation, much as before, relying on normal NRC and licensee operating procedures to disclose and correct any problems that might arise in the future. The largest drawback of this approach is its dependence upon an outdated and an oftentimes poorly recorded licensing basis. At the other extreme is an approach that would require the licensee to demonstrate, de novo, compliance with all regulatory requirements applicable to the startup of a new plant. This relicensing approach could require plant shutdown and extensive plant modifications.

Not surprisingly, there is a spectrum of approaches that lie between the extremes and may embody some features of the extremes in varying degree. An approach that could partially offset the disadvantage of accepting the existing licensing basis in its "as is" condition would require thorough updating of the final safety analysis report and associated technical documents (analyses, design criteria, specifications, manuals, procedures, etc.) and thorough checking of the present configuration of the plant to demonstrate conformance to the original licensing basis, as amended through subsequent licensing actions. A more practical implementing approach to requiring compliance with all regulatory requirements applicable to the startup of a new plant would require plant modification based on an integrated evaluation of the design against current standards and permission for justification of deviations. A PRA

could be used to assist in justifying deviations from current requirements. Still another approach could involve modifying and supplementing the original licensing basis. In implementing this approach, the NRC could focus on requiring conformance either to standards which are specifically developed to be consistent with the safety goals or to a subset of current standards that are particularly relevant to the risk-significant aspects of plants requesting license renewal. This approach could employ a plant-specific PRA that could be used to focus licensing attention on the need for new standards to be applied to critical safety functions and equipment in demonstrating design adequacy or in choosing critical elements of a plant for backfitting.

Another aspect of these approaches requiring additional consideration relates to the choice of analytical techniques for conducting safety reviews and for identifying any necessary plant modifications. A variety of analytical tools are available, ranging from detailed evaluation of aging effects for a particular component to conducting a plant-wide PRA. Some techniques may be better suited to one approach than to another.

Each of these alternatives could be formulated to address the licensing design basis of the plant, its physical condition, and the expected aging of its components and structures over the renewal term. All of the above are presented as possible approaches, not as discrete alternatives from which a choice must be made. Further analysis is needed to determine which of them or, more likely, what combination is best for the NRC to pursue. Each approach involves addressing both technical and procedural issues whose analysis would lead to specific implementable options. The NRC's regulations for relicensing could then be based on the most satisfactory set of those options.

In addition to those areas, license renewal decisions by NRC may be influenced by the adequacy of the operating and maintenance organizations of the utility running the plant. The organization and management of operating plants have been addressed relatively recently. Thus, it is likely that in the future all plants will be judged against current requirements for operations and maintenance and perhaps other areas such as emergency preparedness and safeguards. It should not be necessary, therefore, to develop new requirements for these items for license renewal.

Even though organizational and management matters may be controlled by current requirements and new requirements may not be required for license renewal considerations, these matters are important and must be considered by the NRC in making a decision to grant a request for license renewal. For example, if a plant is shut down by NRC or its owner because of an inability to meet regulatory requirements on operations or maintenance, then any license renewal that had been requested would have to be contingent upon coming back into compliance with current requirements on

operations and maintenance. In fact, there are several aspects of safe plant operations that NRC could consider before granting a license renewal and that might lead to contingencies on such a renewal. In addition to operations and maintenance indicators, these other aspects include licensee evaluation and use of operating experience, as well as the performance of the licensee as measured in NRC's Systematic Assessment of Licensee Performance program or NRC's performance indicator program.

Section 3 starts from this general framework and outlines specific regulatory options for addressing technological topics and issues. After considering the full spectrum of approaches described above, the options were developed on the basis of a narrower range of approaches that reflect the following two underlying premises. The first is that since the licensing design basis of operating plants is continually reviewed as part of the NRC's normal procedures, the plant being considered for relicensing warrants a special review only from the standpoint of plant aging. The second is that the analysis of plant-specific and generic operating data will be adequate to do the following: (1) identify those safety-significant components that are susceptible to age-related degradation, and (2) suggest operating procedures and maintenance, inspection, and replacement schedules that would ensure safe operation in the future. While these premises could change in the future, they form the basis for the following discussion of the technological topics.

3. TECHNOLOGICAL TOPICS

The NRC is responsible for determining that the operation of a nuclear power plant does not result in undue risk to the public or the environment. This is the principal consideration when an operating license is granted for the initial 40-year term, and it is a continuing concern throughout the operating life of a plant. An important factor in making this determination is the NRC's review of the design of the plant. In order to renew the operating license of a nuclear power plant, the NRC must determine that continued age-related degradation of plant components and structures over the renewal term will not compromise the licensing basis of the plant. This determination must take into account the uncertainties involved in predicting the rates and effects of aging. The issues concerning this determination are discussed below under two interrelated topics:

1. Licensing design basis.
2. Uncertainties in age-related degradation.

The first topic concerns verifying the adequacy of the licensing design basis of a plant to be relicensed for an additional term; the second concerns compensating for the uncertainties related to plant aging that need to be taken into account in a relicensing decision. Regulatory options are outlined for each topic. These options are not intended to be mutually exclusive. Final formulation of a regulatory approach to address the technological issues could be based on a combination of varying emphases on the options identified. The identification of options at this stage is intended to stimulate further discussion and assist in the evaluation of various elements of an overall regulatory approach.

3.1 Licensing Design Basis

In granting an initial operating license, the NRC makes a finding of compliance with current regulations, taking into account the 40-year license term. If compliance with current regulations were applied to license renewal, the NRC would have to decide how to interpret its regulations and what criteria to use in carrying out the safety review of a plant seeking to be relicensed. The issue under this topic may be stated as follows:

How should the NRC determine the design adequacy of a plant for continued operation over the renewal term?

3.1.1 Discussion of Issue

Detailed interpretation of the regulations used by the NRC in carrying out the safety review of nuclear plants is contained in regulatory guidance documents such as the standard review plan, regulatory guides, and branch technical positions. Since the earliest nuclear power plants were designed and built, the regulatory guidance provided by the NRC has evolved to become much more detailed and comprehensive. This evolution is consistent with the increase in safety information resulting from the analysis of nuclear plant operating experience, regulatory research activities, and further development of design codes and standards.

Consideration of how the NRC will conduct a safety review of the plants requesting license renewal has two aspects. The first is whether the plants to be relicensed should be reviewed again with respect to the current regulatory guidance for licensing. The other aspect concerns the status of the NRC's regulatory guidance for verifying the future operational safety of plant components subject to aging mechanisms such as thermal cycling, corrosion, erosion, and vibration.

Older plants and current regulatory guidance. Although already licensed and operating nuclear plants may not have been comprehensively reviewed with respect to the most current interpretation of regulations, the NRC has regulatory activities and programs to identify safety-significant design and operational deficiencies. Thus, as new regulations and regulatory guidance are developed, the NRC determines whether they apply to plants with operating licenses or if there is a basis for granting regulatory exemptions. The NRC's ongoing regulatory activities include monitoring and evaluating plant operating experience to identify and resolve potential safety problems. Its program on the resolution of generic safety issues addresses a broad range of safety concerns including the availability of decay heat removal and electrical supply systems. Examples of past and future regulatory programs that involve the review of plant design include: (1) Three Mile Island (TMI) Action Plan; (2) Systematic Evaluation Program (SEP); (3) Integrated Safety Assessment Program (ISAP); and (4) Individual Plant Evaluations (IPEs).

In response to the TMI accident, the NRC carried out a number of investigations concerning the adequacy of design features and operating procedures of nuclear plants. The TMI Action Plan required 132 different types of actions, with an average of 90 actions per plant.

The SEP was specifically undertaken by the NRC to achieve the following: to address the evolutionary nature of licensing requirements and developments in plant technology and safety; and to examine potential gaps that occurred between development of the licensing design basis for

the earliest plants and the more recent licensing design basis. Initiated in 1977, the SEP had the following major objectives:

1. To assess the significance of differences between current technical positions on safety issues and those that existed when a particular license was issued.
2. To provide an integrated plant review as a basis for deciding how these differences should be resolved.
3. To provide a documented evaluation of plant safety.

The SEP involved detailed review of the design and operating experience of several older plants. The results of that review showed that for about two-thirds of the safety issues arising from possible deviations of the design basis from current regulatory requirements, the plant met the intent of current criteria or had design features that performed safety functions equivalent to those currently required. For the remaining issues, the NRC required the utilities to undertake hardware or operational changes amounting to a combined total of about 300 specific actions.

In 1984, the NRC initiated the ISAP for additional plants. The ISAP is an expanded version of the SEP; it also includes an implementation plan that prioritizes recommended corrective actions based on plant-specific PRA and operating experience.

As part of the implementation of the severe accident policy, the NRC is considering a requirement for each licensee to carry out an IPE in order to identify severe accident vulnerabilities. The IPE will also address the management of severe accidents.

Through programs such as the SEP and the others mentioned above, the NRC monitors safety issues on a continuous basis, addresses safety concerns, and requires modifications to operating plants as needed. The goal of these ongoing programs is to ensure that the existing licensing design bases of operating plants are adequate, even if they differ from the design bases of new plants. It is assumed in the following discussion that additional analysis, documentation, and review would not be required for revalidating the design basis with respect to all facets of the most current regulatory guidance. Therefore, no options are presented for addressing this aspect of the design basis issue.

Regulatory guidance and aging effects. The second aspect of safety review for relicensing relates to regulatory criteria or standards for assessing and predicting the effects of aging that are significant for future plant safety. The concern is as follows: to determine the remaining safe operating life of a plant requesting license renewal, it is

necessary to examine the plant's design basis from the perspective of its condition at the time of renewal, based on its past operating history. The safety review criteria the NRC might adopt to judge aging effects could affect the design basis of a plant preparing for a renewal term since they may have been designed without the full benefit of current understanding of aging phenomena. For example, the identification of single failure* points in certain passive components or common-mode failures due to age-related degradation could result in design modifications, specification of conditions for renewal, or limitation of the renewal term.

The NRC already has in place regulations and requirements for several selected plant components and procedures. The latter include reactor pressure vessel surveillance; inservice inspection and testing of components such as safety-related pumps and valves; testing and surveillance of containment structures; and qualification of electrical, instrumentation, and control equipment. The NRC also has a comprehensive program (Ref. 2) to develop further regulatory guidance that would be needed to assess the effects of aging in plants to be relicensed. The results of this program would lead to revisions of the current safety review methodology. The program includes the following activities:

1. Developing information concerning which components, systems, and structures are susceptible to aging, particularly those that are important to plant safety.
2. Understanding degradation mechanisms for those components, systems, and structures that are susceptible to aging.
3. Collecting as complete a failure and reliability data base as is practical.
4. Developing methods for evaluating the residual life of components; validating models for failure prediction.
5. Identifying methods of inspection, surveillance, and monitoring to ensure timely detection of aging prior to loss of safety functions.
6. Identifying effective storage, maintenance, repair, and replacement practices to mitigate the rate and extent of aging.

The NRC's regulatory research programs on aging have already identified a number of plant components as being of particular

*A single failure is an occurrence that results in the loss of capability of a system to perform its intended safety functions. Multiple failures resulting from a single occurrence are considered to be a single failure.

significance. These include structures and passive components such as the reactor pressure vessel, reactor coolant piping, and cables; they also include active components such as emergency diesel generators and control rod drive mechanisms. Research into aging phenomena has helped resolve issues related to pressurized thermal shock (PTS) and boiling water reactor pipe cracking. Several aging phenomena appear to be readily manageable as long as the licensee implements appropriate maintenance, test, and inspection activities.

Assessing the condition of a plant's components and structures and licensing the plant for an additional term could require detailed information that would support estimates of remaining safe life or failure probabilities of safety-significant components. Several plant components are designed for a certain number of duty cycles or transients that are not expected to be exceeded during the term of the initial operating license. Other components not so designed require replacement during the operating term. The remaining life of a component will obviously depend upon the age-related degradation modes affecting it, such as fatigue, corrosion, erosion, wear, radiation hardening, and chemical composition changes. The following are examples of information and data that could be used in reviewing the design basis of a plant to be relicensed:

1. Design basis information, such as performance requirements; composition and thickness of materials (for example, weld materials); anticipated number of cycles; and design basis temperatures and pressures.
2. Normal operational transients, including transitions to and from power, primary system heatup and cooldown cycles, reactor trips from power, load runback events, primary system hydrostatic tests, and reactor coolant system (RCS) depressurizations.
3. Unexpected or infrequent transients or events, such as rapid cooldown or heatup transients, step load decreases, safety injection occurrences, loss of offsite power events, seismic events, and inadvertent RCS depressurizations.
4. Test results from initial equipment, system, and materials qualification; accelerated life testing; and in-plant testing.
5. Inspection results from surveillance capsules, ultrasonic testing, dye testing, radiography, visual examinations, ex-vessel neutron monitoring, and nondestructive examinations (NDEs).
6. Component failures, including time-to-failure and time-to-repair histories; root causes; corrective actions; and implications for other components, systems, or structures.

7. Maintenance activities, such as type and frequency of maintenance, replacement intervals, test schedules, and implications of past maintenance practices for safety functions.

The following subsection addresses the regulatory options for taking account of such information in approving the design adequacy of a plant for license renewal.

3.1.2 Discussion of Options

The options outlined here are alternative ways of determining the design adequacy of a plant for continued operation over the license renewal term, taking into account the type of technical information described above in the safety review of applications for license renewal:

- A. Review of safety-significant components and structures subject to age-related degradation.
- B. Review of the plant using a PRA, with emphasis on future plant aging.

Both options would use the complete body of regulatory guidance on assessing the effects of aging at the time of a license renewal application. Under Option A, the licensee would do the following: assess aging effects on safety-significant aspects of plant design and operation; identify potential problems that could compromise safety during the renewal term; and propose or carry out the necessary plant modifications. Option B is intended to be more comprehensive. It would require the licensee to prepare a PRA explicitly taking into account the effects of continued plant aging. A PRA integrates all plant systems into a framework providing information on component importance, system performance, and overall safety on a plant-specific basis. Therefore, the aspects of the plant identified as significant to risk over the renewal term, and the measures proposed for continued safe operation of the plant, could be different from those under Option A.

The characteristics of the two options are further discussed below, and summarized in Table 3-1.

Option A: Review of safety-significant components and structures subject to age-related degradation.

Licensee Activities. The implementation of this option would require the following licensee activities:

1. Identification of safety-significant components, systems, and structures. The licensee would use NRC guidance and various

TABLE 3-1
TWO OPTIONS FOR THE ISSUE ON LICENSING DESIGN BASIS

Issue: How should the NRC determine the design adequacy of a plant for continued operation over the renewal term?

Options	Licensee Activities	Areas Requiring NRC Guidance	Attributes
<p>A. Review of safety-significant components and structures subject to age-related degradation.</p> <p>This option provides for the identification and evaluation of significant effects of aging based on operating history and regulatory guidance provided by the NRC.</p>	<ol style="list-style-type: none"> 1. Identification of safety-significant components, systems, and structures. 2. Determination of the effects of aging using operating history and mechanistic models. 3. Evaluation of the safety significance of aging effects and proposal of plant modifications needed. 	<ol style="list-style-type: none"> 1. Generic list of items for evaluating the effects of aging. 2. Methodology for evaluating the effects of aging and estimating residual life of components and structures. 	<ol style="list-style-type: none"> 1. The scope of the licensee's effort will be identified in advance through the generic list of items for review. 2. This option may not provide a comprehensive list of safety-significant items for the plant.
<p>B. Review of plant using a PRA, with emphasis on future plant aging.</p> <p>This option provides for an integrated assessment of the effects of age-related degradation and risk-based prioritization of items for analysis.</p>	<ol style="list-style-type: none"> 1. Preparation of a plant-specific PRA to assist in identifying and prioritizing safety-significant components, systems, and structures. 2. Estimation of the effects of aging in terms of changes in failure probability, system availability, and risk. 3. Identification of any plant modifications needed to reduce the risk due to continued aging. 	<ol style="list-style-type: none"> 1. As in item (2) above. 2. Analytical techniques to incorporate aging effects into PRA, particularly for passive components and structures. 3. Criteria for determining the risk significance of components and structures. 	<ol style="list-style-type: none"> 1. PRA provides a tool for understanding system interactions, relative importance of components, and additional risk due to aging. 2. The methodology for incorporating aging effects into a PRA has not been completely developed and verified.

information sources (such as safety analyses, operating experience, insights gained from available PRAs, and expert judgment) to develop a list of items requiring detailed analysis for aging effects. Technical information from vendors of nuclear plant components, as well as reliability data bases maintained by the nuclear industry, would also be important in identifying key operating transients, degradation mechanisms, and affected components.

2. Determination of the effects of aging on the performance of safety-significant items. The NRC and the industry have developed or are developing models for evaluating the residual life of items subject to age-related degradation. Information from the plant's operating history regarding operational loads, environmental conditions, maintenance, inspection, and testing provides a profile of the dominant modes of degradation for components and structures. This information can be translated into estimates of corrosion, creep, fatigue, and embrittlement, using the mechanistic models and information about the design basis. The analysis would be supplemented with tests and measurements to confirm the estimates. Further analysis would determine the effects of aging mechanisms on the integrity or performance of the item.
3. Evaluation of the safety significance of aging effects. The licensee would ensure that the anticipated age-related failures would not compromise safety. Safety analysis methods would identify potential single failure points, common mode failures, and adverse system interactions. Estimates of the residual life of critical components, along with proposed plans for inspection, testing, maintenance, and replacement activities, would be used to justify the proposed term for a renewal license.

NRC Guidance. The following items elaborate the type of guidance the NRC could provide for licensee activities related to the selection and evaluation of safety-significant plant items under this option:

1. Development of a generic list of review items. Using its research on aging and evaluations of operating data, the NRC would develop a list of topics related to the design or operational aspects of plants that have potentially significant safety implications. Since safety significance can be determined accurately only on a plant-by-plant basis, the preparation of this generic list would require careful structuring and formulation. Such a list could then be used by the licensee to determine which of the generic review items selected by the NRC are applicable to the plant. NRC guidance keyed to a generic list of review topics would help

define in advance the physical scope of the plant and the plant history data on which the licensees need to focus their efforts.

2. Evaluation of aging effects. As already noted, the NRC is currently revising its safety review procedures to include explicitly the assessment of aging effects. Considerable information already exists on safety-significant plant components, methods to assess their residual life, and appropriate inspection and surveillance procedures needed for safety assurance. In particular, the NRC review of aging effects would have to consider both single failure points within passive components or structures and common mode failures, which may be areas requiring further safety review criteria.

Option B: Review of the plant using a PRA, with emphasis on future plant aging.

The motivation for requiring the licensee to carry out a plant-specific PRA is to account for the effects of aging as they relate to interactions between systems, system reliability, and the prioritization of items requiring analysis or review for a particular plant. The detailed analysis required to assess the effects of aging, such as fatigue due to thermal cycling and stress corrosion cracking, would be carried out where appropriate on all risk-significant items using the same methods as in Option A. However, the PRA provides a tool for expressing the effects of aging in terms of changes in failure probability, system availability, and risk.

Licensee Activities. The implementation of this option would require the following licensee activities:

1. Preparation of a PRA to identify risk-significant components and structures. In preparing the PRA, the licensee would compile information such as that indicated in Section 3.1.1 and carry out a failure modes and effects analysis especially to address age-related degradation of plant components and structures. Several measures of risk importance are available to focus attention on those components which are the most significant contributors to risk. Plant-specific variations in design or operating history that could alter the selection of risk-significant components would be an integral part of this approach.
2. Estimation of the effects of aging in terms of changes in system availability and risk. To be useful in this context, the standard procedures for performing a PRA would have to be modified to better account for the effects of aging. For active components such as pumps, valves, or circuit breakers, the impact of aging

would be translated into changes in failure rate as a function of time. The failure rate would depend on several factors, such as operational loads, environmental stressors, and maintenance intervals. For passive structures and components such as piping and vessels, the lack of sufficient failure data makes it difficult to use current PRA techniques to identify their contribution to risk. However, analyses could be carried out to estimate uncertainties due to inadequate data.

3. Demonstration of minimal increase in risk due to continued aging over the renewal term. The PRA would be used to develop optimal intervals for maintenance, testing, and inspection. The licensee would develop an approach for reducing the risk due to identified weaknesses in design or operation. The PRA would be used as a supplemental tool in determining the value of alternative proposed modifications for managing age-related degradation.

NRC Guidance. In addition to the regulatory guidance that the NRC could provide on identifying and evaluating aging effects on components, the preparation of an adequate PRA would require further guidance:

Examples of areas requiring NRC attention are as follows: (1) the identification of risk-significant plant items, and (2) the data and methods to be used in PRAs to account for increased probabilities of component failure due to age-related degradation. The NRC has in the past issued guidance for preparing a PRA, and it continues to support improvements in PRA techniques. New methods to account for plant aging, and to better handle uncertainties and common mode failures, will enhance the quality of PRAs and increase confidence in applying them. Improvements are also being made in the quality and amount of component failure data collected for components in nuclear plants.

3.2 Uncertainties in Age-Related Degradation

Uncertainties in age-related degradation of components and structures arise from our lack of complete understanding of the nature, effects, and rate of aging and degradation processes. In addition to the normal aging of components, operations and maintenance practices also influence the rate of aging. Therefore, another topic of concern in developing a regulatory approach for license renewal relates to compensating for the uncertainties involved in characterizing and anticipating aging effects. The issue under this topic may be stated as follows:

What is needed to reduce and manage the uncertainties related to the aging of systems, components, and structures in order to ensure that nuclear plants will continue to operate safely over the renewal term?

3.2.1 Discussion of Issue

As discussed under the previous topic, determination of the adequacy of a plant for continued operation over a renewal term will require current understanding of aging phenomena. The best estimates of component failure probabilities will have uncertainties that will depend on the amount of data available to support assumptions concerning aging mechanisms and the availability and validity of analytical models for predicting age-related failures.

Many factors complicate assessment of the contribution of aging effects to the residual life and usage factor* of various safety-significant plant components and structures. Factors such as the following are sources of uncertainties:

1. Differences in design codes and standards for components of different vintage.
2. Inadequacy of past measurements and records.
3. Limitations in the applicability of time-dependent models for quantifying the contribution of aging to overall system, component, or structure failure.
4. Inadequacy of detection, inspection, surveillance, and maintenance methods for aging components and structures.
5. Inadequacies in identifying and implementing the required adjustments to the operations and management of an aging plant.

Older plants comply to design codes and standards that may have been subsequently revised. For example, early steam generator design practice did not require fatigue evaluation. Assessment of the steam generator's useful life will require such an evaluation, along with the analysis of past records on tube plugging and sleeving.

The inadequacy of past measurements and records could arise from differences in requirements for different vintage plants. Several types of transients may not have been considered in the design basis of primary systems. These include certain hydrostatic tests, turbine runback events, inadvertent depressurizations, and safety injections. Furthermore, the degree of component degradation depends upon the number and kind of transients experienced, as well as upon the magnitude of key operating

*Usage factor is defined as the fraction of design life that has been consumed because of transients experienced.

parameters for the component during each transient. Complete information may not be available for every plant transient that has been experienced.

The ability to predict future failures accurately and to assess the contribution of aging to overall risk also depends on the availability of time-dependent models for quantifying aging effects. Several analytical assessments treat all failures as random, an approach that tends to underestimate risks due to aging significantly. While work in this area is progressing, the applicability of the methods developed so far has not been demonstrated fully for many critical components, systems, and structures.

The ongoing NRC and industry programs on plant aging and life extension have identified other areas requiring more research and data. These areas include the following: (1) standardization of inservice inspection programs for identifying deterioration mechanisms and quantification of their effects on concrete components; (2) improved NDE techniques for more accurate quantitative flaw characterization; (3) characterization of thermal aging of cast stainless steel; and (4) feasibility of vessel annealing and replacement.

Plant operations and maintenance practices can themselves impact the rate and nature of aging. Aging can be accelerated by inadequate maintenance, improper or too frequent testing, or excessive cycling from routine and abnormal operations. Similarly, past events, such as those resulting in water hammer, intrusion of heat and humidity, or excessive vibrations, can aggravate normal aging.

Another major area of uncertainty regarding future plant safety pertains to the identification and implementation of various adjustments in operations and management practices needed for managing an aging plant. The effects of age-related degradation on plant operation are numerous. Plant aging necessitates increasingly more extensive inspection, repair, and replacement activities. Aging effects could also influence spare parts inventory management. As plants continue to age, the problem of spare parts availability, especially for older components, becomes more serious. The unavailability of parts could force licensees to rely heavily on repair, instead of replacement, of components. Maintenance work backlogs require attention as well. Increased levels of maintenance increase the potential for personnel errors and unanticipated transients, as well as personnel exposure to radiation. Operator training is another area of concern. The level of operator knowledge and training relative to potential age-related limitations of plant components can influence response to off-normal conditions.

Given these and other concerns, regulatory decisions on relicensing may have to be made in light of uncertainties associated with age-related degradation and without the benefit of definitive technical criteria and

specific regulatory positions on all age-related concerns. If the technical information is insufficient, the NRC may have to take conservative positions in its development of license renewal regulations. The options discussed below consider ways of emphasizing aging management for controlling the uncertainties involved in the data, models, and aging itself and reducing their impact on plant safety. A common characteristic of both options is the development of, and technical justification for, a quality assurance program that ensures continued safe operation of the plant.

3.2.2 Discussion of Options

The following two options are presented as alternative ways of controlling the uncertainties involved in age-related degradation and keeping the risk over the renewal term at an acceptable level:

- A. Emphasize maintenance, inspection, and reliability assurance.
- B. Emphasize defense-in-depth against age-related failures.

The two options are not mutually exclusive, although one relies more on preventing failures while the other emphasizes equipment upgrades or addition of new safety system features to provide additional defense against age-related failures. Both options are currently used for ensuring the safety of nuclear power plants.

The characteristics of the above options are discussed below and summarized in Table 3-2.

Option A: Emphasize maintenance, inspection, and reliability assurance.

This option would help ensure that age-related failures that could impact safety significantly would be identified systematically and appropriate measures taken for their prevention. The emphasis placed on monitoring, inspection, surveillance, and maintenance of safety-significant plant components would reduce the potential impact of uncertainties due to age-related degradation.

Licensee Activities. The implementation of this option would require the following licensee activities:

1. Development of measures for tracking and trending the performance of safety-significant components according to NRC guidelines. The licensee would propose a desired level of performance, which would be consistent with an acceptable level of plant safety and would be tailored to specific plant configuration and conditions. For active systems and components, the performance level could be

TABLE 3-2
TWO OPTIONS FOR THE ISSUE ON UNCERTAINTIES
IN AGE-RELATED DEGRADATION

Issue: What is needed to reduce and manage the uncertainties related to the aging of components, systems, and structures in order to ensure that nuclear plants will continue to operate safely over the renewal term?

Options	Licensee Activities	Areas Requiring NRC Guidance	Attributes
<p>A. Emphasize maintenance, inspection, and reliability assurance.</p> <p>This option provides for the systematic identification and prevention of potentially significant age-related failures.</p>	<ol style="list-style-type: none"> 1. Develop measures for tracking and trending the performance of safety-significant components. 2. Assess historical and current plant performance relative to the reference performance levels. 3. Implement changes to meet reference performance levels. 4. Monitor plant performance to ensure effective management of aging effects. 	<ol style="list-style-type: none"> 1. Methodology and criteria for developing performance measures. 2. Monitoring and maintenance programs for age-related degradation. 3. Equipment qualification procedures from an aging perspective. 	<ol style="list-style-type: none"> 1. Reduces uncertainties through maintenance and replacement before actual failures occur. 2. Offers flexibility in identifying and implementing corrective actions. 3. Requires additional monitoring and performance trending techniques.
<p>B. Emphasize defense-in-depth against age-related failures.</p> <p>This option would ensure that, given the uncertainties in age-related failures, safety systems will be adequate to meet potential challenges to the plant.</p>	<ol style="list-style-type: none"> 1. Assess the capabilities of safety systems and containment. 2. Identify areas where safety margins may be reduced because of aging effects, and propose equipment upgrades and other design modifications. 3. Ensure that sufficient safety margins exist following proposed replacements or additional safety features. 	<ol style="list-style-type: none"> 1. Methodology and criteria for age-related assessments of safety systems and containment. 2. Criteria for acceptable safety margins for safety systems and structures. 3. Design and qualification of new safety features for accident prevention or mitigation. 	<ol style="list-style-type: none"> 1. Provides effective and visible safety upgrades. 2. Requires additional analysis of system interactions to assess the impact of design changes.

- b. Reduce the maintenance interval, and improve the quality of maintenance.
 - c. Change the testing procedures or intervals if the tests accelerate degradation.
 - d. Alter the environmental conditions or operational loads to reduce the rate of aging. This could include reducing neutron fluence near critical structures; changing the configuration of equipment or pipes or adding supports to reduce vibration; or changing water chemistry to reduce stress-corrosion cracking.
4. Monitoring the condition of safety-significant items. The licensee would develop a program to check the assumptions applied in the analysis of aging effects and to monitor key parameters of safety-significant items. This would ensure that the plant would not experience degradation at a faster rate than predicted. The licensee would check assumptions directly with tests and inspections, as in the following examples: (a) ultrasonic tests could be performed to check the level of stress-corrosion cracking; (b) failure times and repair times of active components could be used to check availability; and (c) the number of scrams and other normal transients could be recorded. Other items may be more difficult to check directly so that in some cases aggregate measures of performance would be appropriate. For example, the number of items in the maintenance backlog is one measure of the effectiveness of the maintenance program. The program would also emphasize condition-monitoring schemes that would provide the means to recognize component degradation and determine failure mechanisms that cause equipment deterioration. The program would be structured to identify and resolve problems arising from the analysis of monitoring data. It could be patterned after the recommendations of an ongoing NRC project that is defining the tasks and technology necessary for an operational reliability program at nuclear power plants.

NRC Guidance. The areas requiring NRC guidance for implementing this option are outlined below:

1. Criteria on the development of reference performance measures by the licensee. For each area of concern, the NRC could identify factors to consider in establishing reasonable measures for tracking and trending performance at the system or component level. This would help ensure uniformity in the scope and depth of such licensee efforts. The reference performance levels would be consistent with the Commission's safety goals policy.

measured in terms of availability. However, for passive components or structures, a more appropriate performance measure might be the assurance of functional capability throughout the renewal term, through estimates of the residual life of a component or structure.

2. Assessment of historical and current plant performance relative to reference performance levels. This assessment would be based on the results of analysis carried out to determine the adequacy of the licensing design basis from the point of view of plant aging over the renewal term. The analysis of each safety-significant item would have included an explicit examination of the following aspects of aging: (a) dominant modes of degradation; (b) environmental conditions and operational loads; and (c) current condition and expected rate of future change.
3. Implementation of changes to meet reference performance levels. The licensee would implement or propose solutions to any identified discrepancies between expected performance and reference performance levels. These solutions could include the replacement of equipment and improvements to plant operational and management practices in areas such as the following:
 - a. Preventive maintenance.
 - b. Outage planning and replacement and refurbishment strategy.
 - c. Evaluation of degradation resulting from past events.
 - d. Maintenance and repair backlog.
 - e. Management of spare parts inventory.
 - f. Investigation of failures due to equipment aging and degradation.
 - g. Training of operations and maintenance personnel to detect and manage age-related degradation.

The following are some examples of changes that emphasize the preventive approach:

- a. Replace selected components if there is already indication of significant deterioration due to aging or if the components are expected to age significantly in the future.

2. Monitoring and maintenance programs. The NRC would provide criteria for licensee's monitoring and maintenance programs for preventing failures due to age-related degradation.
3. Equipment qualification from the standpoint of aging. The licensee's implementation of changes to meet established performance levels could require equipment qualification from an aging perspective.

Option B: Emphasize defense-in-depth against age-related failures.

This option would help ensure that safety systems and accident mitigation measures will be adequate to meet the potential challenges from age-related failures. In an aging plant, age-related degradation processes are expected to increase failure frequencies of components, systems, and structures; however, the exact source, mode, and frequency of equipment failures will continue to be uncertain. This option attempts to reduce these uncertainties by emphasizing the availability and effectiveness of plant safety systems, containment, and other mitigative design and operational measures.

Licensee Activities. The implementation of this option would require the following licensee activities:

1. Assessment of capabilities of safety systems and containment. This would include assessing the capabilities of safety systems and the reactor containment to protect the plant against potential challenges brought about by age-related failures.
2. Identification of components and structures where safety margins may be reduced or compromised because of aging effects. This would include consideration of the effects of reduced safety margins* on overall plant performance. Emphasis would be on plant modifications, upgrades, and additional safety features to prevent an accident or mitigate its effects. The licensee would assess the degree of improvement in overall plant safety through proposed replacements, modifications, upgrades, or additional safety features. This would ensure that the plant would have ample protection against the higher frequency and greater diversity of challenges that could result from age-related failures.
3. Assurance of safety margins. Continued monitoring of safety margins could include the implementation of a combination of

*Safety margin is the difference between an operating limit as established by design for a given parameter, e.g., stress limits and cyclic loads, and the value of that parameter once a component or structure is placed in operation.

activities such as (a) inspection and testing; (b) on-line monitoring of component condition; (c) recording of experienced transients and relating their contribution to component degradation; and (d) estimating the degradation rate based on anticipated future operation.

NRC Guidance. The areas requiring NRC guidance for implementing this option are outlined below:

1. Methodology and standards for age-related assessments of safety systems and containment. NRC guidance in this area would focus on the development of a systematic approach for assessing the capabilities of present safety systems and containment in view of uncertainties in predicting and characterizing age-related failures. The NRC aging research program intends to carry out studies that would support the resolution of generic safety issues where aging may be of concern. The results of these studies would be taken into account in formulating such guidance.
2. Guidance on acceptable safety margins. The NRC would develop criteria that would define the acceptable safety margins for relicensed plants.
3. Guidance on new safety features for accident prevention or mitigation. The NRC has carried out considerable regulatory research on the feasibility of improving plant safety through features such as passive decay heat removal systems, primary depressurization, and filter-vented containments. The NRC would provide criteria for evaluating the need for such additional design modifications, as well as guidance on their test and qualification.

4.0 ENVIRONMENTAL REVIEW TOPIC

The National Environmental Policy Act of 1969 (NEPA) places the responsibility for meeting national environmental preservation goals upon each federal agency for the activities that it regulates. There are a number of issues which must be dealt with in the development of license renewal regulations and regulatory guidance for ensuring an efficient approach for NEPA compliance.

4.1 Forms of NEPA Compliance

The NRC regulations given in 10 CFR 51 implement the provisions of NEPA. These regulations also include criteria for determining the need for an Environmental Impact Statement (EIS) or an Environmental Assessment (EA). The regulation (10 CFR 51.20[b][2]) currently requires an EIS or a supplement to an existing EIS for each decision on the renewal of a full power operating license for a nuclear plant. An issue is whether regulations which would permit using an EA to determine the need for an EIS would provide more efficient implementation of NEPA provisions for license renewal.

The efficacy of the EA approach will depend upon the nature of the environmental impacts which can be anticipated from extended operations of nuclear power plants. Further study is required for determining the potential types and magnitude of environmental impacts which may be anticipated before a determination can be made on using an EA in each license renewal action. If the scope and magnitude of environmental impacts are generally insignificant, then an EA would be an efficient approach. If, however, essentially all nuclear plants would require an EIS and EIS supplement, developing two NEPA documents (the EA and an EIS/EIS supplement) would likely be inefficient. In either case, the applicant will have to provide an environmental report containing adequate data and analyses that would allow the NRC to perform a NEPA review of a license renewal request.

Another issue is whether the scope and magnitude of potential environmental impacts can be more efficiently studied and analyzed by a Generic Environmental Impact Statement (GEIS). The GEIS would address the various environmental issues common to all license renewal applications. The GEIS would also define the nature of possible plant specific environmental impacts and provide guidance on their treatment in individual license renewal applications.

By identifying and assessing common environmental issues, the GEIS would provide a framework and a limited scope for subsequent site-specific environmental analyses, whether an EA or an EIS. This framework would

analyses, whether an EA or an EIS. This framework would include guidelines for determining when an EA would be sufficient and when a site-specific EIS would be required. Under 10 CFR Part 51, Subpart A, which adopts Council on Environmental Quality regulations, a site-specific EA or EIS subsequent to the GEIS ". . . need only summarize the issues discussed in the broader statement and incorporate discussions from the broader statement by reference and shall concentrate on the issues specific to the subsequent action . . .". Thus, any subsequent EA or EIS need not repeat the analyses covered in the GEIS.

4.2 Selecting an Efficient Form of NEPA Compliance

The NRC is considering the preparation of a GEIS. The fundamental question is whether a GEIS would provide the reasonable basis for a more narrowly focused NEPA analysis in individual license renewal actions. There are a number of associated considerations in answering this question. A central question is: What is the extent to which potential environmental impacts can be identified and enveloped? This question, in turn, depends upon the extent to which potential changes in equipment, structures, and operations associated with license renewal can be anticipated. Other considerations involve the extent to which the following can be accounted for in a generic environmental impact analysis: (1) differences in plant type, site, and vicinity; (2) availability of data; and (3) appropriateness of analytical methods such as severe accident consequences models.

5. PROCEDURAL TOPICS

This section provides a description of a set of topics pertinent to license renewal that involve a multiplicity of technological, administrative, and legal factors. These topics relate to broad areas of concern, including the procedures for license renewal, the timing of applications, and the applicability of current NRC regulatory policies and practices. Each topic is discussed below, with varying degrees of emphasis on the issues and options that could influence regulatory positions.

5.1 Form of License Renewal

The form of license renewal concerns the process by which the NRC will permit continued operation of a nuclear power plant beyond the statutory maximum term of 40 years for its initial license. This process is a principal concern in that it potentially could provide the framework for resolving other topics of both a technical and procedural nature.

Section 103(c) of the Atomic Energy Act (AEA) of 1954 and the NRC's implementing regulation 10 CFR 50.51 explicitly permit the renewal of a nuclear plant operating license, but provide little guidance concerning the process by which renewal may be accomplished. The issue, therefore, is how the renewal process should be treated. One option to the renewal process may use existing procedures for granting an initial operating license, that is, treat a license renewal application as a request for a new license. Another option may treat renewals as amendments to existing licenses. This option also has the advantage of using existing procedures, but raises the issue of whether the amendment would extend the initial license term beyond the 40-year statutory license term limit. A third option may promulgate a set of regulatory procedures developed especially for license renewal. In adopting this option, the NRC could address adequately those issues unique to relicensing by emulating the desired aspects of the well-established licensing processes for new licenses and amendments.

5.2 Length of Renewal Term

A major concern relative to this topic is the flexibility permitted by the NRC in determining the duration of the license renewal term. Such decisions must balance many complex and substantive factors. These factors include statutory, technical, and administrative policy concerns, which are briefly addressed below.

Statutory authorization under Section 103(c) of the AEA allows the NRC to issue operating licenses for a "specific period, as determined by the Commission, but not exceeding forty years" This language appears to limit the term of any license, including a renewal, to 40 years. However, it is reasonably clear under Section 105(c) that the NRC is not

constrained to grant all nuclear plants a fixed license term of 40 years. The NRC may decide, either as a technical or policy matter or on a case-by-case basis, that a 40-year renewal term is too long. Decisions on the lengths of renewal terms cannot be based solely on statutory provisions, but must also consider technical and administrative policy issues.

Technical concerns, such as the present and projected physical conditions of the plant, will influence the maximum feasible renewal term for a particular plant. Estimates of the remaining safe operating life of a plant will depend upon plant-specific operating history, hardware changes, and aging management programs that may be implemented. Uncertainties in analyzing the effects of aging over a period of 40 years also should be considered in establishing a renewal term.

Administrative policies of the NRC will seek to establish an efficient review process. For example, it may be desirable to specify a minimum renewal term so as not to overburden the regulatory system with frequent requests by licensees for further renewals.

5.3 Latest Date for Renewal Application

Latest date for renewal application concerns the deadline for filing a complete application prior to expiration of the initial license. This date has been established by the timely renewal doctrine (10 CFR 2.109). This doctrine states that a licensee may continue to operate a nuclear facility until a decision has been made on license renewal if the renewal application has been made at least 30 days prior to license expiration. However, based on past regulatory experience, it is generally agreed that a thorough review of a full-power license renewal application may not be accomplished within such a short time period. Initial efforts toward defining the technical information and review requirements suggest that a period of 1-2 years reflects more accurately the time necessary for the NRC's review of a renewal application.

Another aspect of the latest date for a renewal application is the deadline for the alternative to license renewal--decommissioning. The deadline for submitting a license renewal application should be coordinated with that for decommissioning. The topic of regulations for decommissioning and their potential effect on license renewal are addressed in Section 5.10.

5.4 Earliest Date for Renewal Application

The topic of earliest date for renewal application concerns how far in advance of license termination the NRC would begin review of a renewal request. This topic includes issues of planning for replacement capacity by the licensee and the allocation of NRC staff resources for license renewal review. These and other issues are briefly addressed below.

In response to the NRC request for public comments, licensees indicated a need for renewal decisions from 10 to 12 years prior to license expiration. This period would allow ample time for planning refurbishment of the nuclear plant if the license is granted or replacement capacity if it is denied. The NUPLEX response suggests that no limit be set on the earliest date for submission of a license application and the start of NRC review.

Reasons for limiting the length of time between renewal application submittal and initiation of the renewal term stem from data requirements for assessing plant aging. Analyses of plant aging would rely on operating history and maintenance data from previous years. Renewal requests far in advance of the end of the initial license term would exclude plant operating data of later years from these analyses. The analyses will be more reliable as the number of years in the data base increases. In addition, the uncertainties in the analysis of the effects of aging would be larger for projections further into the future.

5.5 Effective Date of Renewal

The topic of effective date of renewal concerns the date on which the license renewal is to begin and the date on which the initial operating license is to end. A license renewal could be granted to begin at the end of the original license ("tack-on" renewal) or to take effect immediately upon favorable action by the NRC ("supersession" renewal), requiring the licensee to surrender the original license. Tack-on renewal generally provides the licensee with greater operating flexibility but poses major regulatory issues of conditional regulatory requirements, enforcement of such requirements, and changes in licensing basis during the interim years of operation under the original license. Supersession renewal may provide the licensee greater confidence in committing resources needed for plant refurbishments, but may not allow as flexible a response to changing economic conditions. The industry has requested that the regulations be developed so that the licensee has the flexibility to choose between tack-on and supersession. The issue is, therefore, under what conditions, if any, could license renewal become effective several years in advance of license expiration.

5.6 Use of the Backfit Rule

The topic of the backfit rule and its relationship to license renewal policy stems from the general requirements for backfit decisions as stated in 10 CFR 50.109. Backfit decisions are made based on analysis of potential safety benefits over the remaining life of the plant.

One issue concerning the backfit rule is whether the intended renewal term should be included in calculating the costs and safety benefits of

backfits. If the renewal term is not included in backfit decisions made prior to expiration of the initial license, should these decisions be reviewed upon approval? For example, the safety benefits of a backfit could be larger relative to the costs if the renewal term were included. It is possible that a decision could be made to require the backfit if the renewal term were included, but not otherwise.

Another issue related to the backfit rule is its applicability to plant upgrades required for renewals. The option developed by the NRC for reviewing the safety of plants seeking to be relicensed, and for placing any additional requirements to ensure the continued safety of aging plants, could depend on whether the backfit rule is applied in its current form.

5.7 Public Hearings

The topic of public hearings is coupled with that of the form of license renewal. Several questions arise concerning requirements for hearings under different forms of renewal. Four such questions are addressed below.

The first question is whether there is any right under the AEA to a hearing on license renewal decisions. Under Section 189 of the AEA, an opportunity for hearing is required "in any proceeding . . . for the granting, suspending, revoking, or amending of any license" An opportunity for hearing is clearly required if the NRC decides to extend the term of an operating license through amendment. Although Section 189 makes no reference to "renewals" of licenses, legal precedents suggest that renewals may be treated as amendments for purposes of the hearing requirements. Therefore, it may be that an opportunity for hearing is required for renewing an existing license.

The second question is the timing of any necessary hearing. A grant of a new operating license (and by implication a renewal) requires a hearing prior to issuance. On the other hand, under the Sholly amendment to Section 189(a), amendments to an existing operating license do not require a hearing prior to issuance if there is an NRC finding of no significant hazards consideration. Thus, the issue is whether license renewal can be considered to have no significant hazards. If so, then provisions of the Sholly amendment for notice of opportunity for hearings following a renewal decision may be appropriate.

If a hearing must be held, the third question concerns the nature of such hearings. The NRC currently employs the formal adjudicatory procedures required by the APA in its construction permit and operating license hearings. However, there is a question, based on previous litigation against the NRC, of whether hearings for license renewal or amendment to extend operation of a nuclear plant must be subject to these procedures. If

there is no such statutory requirement, the NRC can devise more informal procedures for conducting any hearing on license renewal required by Section 189.

The final question is what issues may be litigated in any hearing. Resolution of this question will impact the efficiency of the hearing process. For example, if the NRC issues substantive standards for assessing license renewal applications by appropriate rulemaking, then the technical feasibility of license renewal may not be litigated at each hearing.

5.8 Material Alteration

License renewal may require refurbishment, replacement, or design and new construction at a nuclear power plant. Such alterations may be proposed by the licensee to extend operations beyond the initial 40-year license term or required by the NRC as a condition for license renewal. Thus, there may be a need for the licensee to engage in construction activities.

Section 185 of the AEA requires that a construction permit be obtained in order to "modify" a nuclear power plant. As a matter of practice, the NRC has not required licensees to obtain construction permits for routine maintenance, replacement, or upgrading. However, under 10 CFR 50.92, if a proposed amendment involves a "material alteration of a licensed facility," a construction permit must be issued before the issuance of the amendment. Thus, a licensee's efforts to bring the facility into conformance with applicable standards for obtaining license renewal may require a construction permit.

If a construction permit is required, there may be several implications. First, a public hearing is required under Section 189 of the AEA. Second, there may be antitrust and Price-Anderson Act considerations as discussed in Sections 5.11 and 5.12, respectively. Finally, should NRC deny the renewal request, there may be an effect on the decommissioning process as discussed in Section 5.10.

5.9 Emergency Planning

The emergency planning and preparedness requirements for initial operating licenses are described in 10 CFR 50.47 and 10 CFR Part 50, Appendix E. These provisions require emergency preparedness exercises within two years before the issuance of a full-power operating license. An exercise that tests the licensee's onsite emergency plan is required within one year before issuance of a full-power operating license. The regulations also require onsite exercises to be conducted annually. Offsite exercises are to be conducted biennially, with opportunity for full or partial participation by State and local government authorities within the plume exposure pathway emergency planning zone (EPZ). At least once every seven

years, all States and local governments within the plume exposure pathway EPZ for a given site are expected to participate fully in an offsite exercise for the power reactor site.

The topic of emergency planning can be divided into two areas of concern. First, does license renewal present technical concerns or risks that are different enough from those attributable to the initial term of operation so that the NRC's emergency preparedness requirements in 10 CFR 50.47 should be modified to account for those differences? Second, does license renewal represent an appropriate point for mandatory review of the provisions for emergency preparedness--regardless of whether emergency preparedness requirements have been modified for plants seeking license renewal? These are primarily technical and policy questions; their importance depends upon the adequacy of the current provisions for emergency preparedness exercises and periodic updates of emergency plans with respect to license renewal.

5.10 Decommissioning

At the end of the initial operating license term, the licensee may either implement plans for decommissioning or continue operations based on successful license renewal. These two alternatives introduce the potential for decommissioning and license renewal regulations to interact, as discussed below.

Regulations for decommissioning may impact license renewal activities. A proposed rule for submission of an application for license termination and decommissioning plans within one year of license expiration is in review (Ref. 3). Renewal decisions would need to be made at least one year prior to license expiration, thus influencing the latest date for renewal application.

Conversely, regulations for license renewal may impact decommissioning activities. Decommissioning is governed by 10 CFR 50.82, which sets forth standards for obtaining permission to terminate a license following dismantling and disposal of the facility and decontamination. The potential for interaction between license renewal and decommissioning exists where the NRC rejects a licensee's application for renewal, or alternatively, where the licensee decides to withdraw an application for renewal. Under these circumstances, the licensee would be expected to submit decommissioning plans. However, the licensee may be unprepared to submit plans for decommissioning since it had previously committed itself to continued operation. Moreover, the NRC's requirements for decommissioning appear to be open to interpretation since 10 CFR 50.82 by its terms applies only to voluntary termination and relinquishment of a license. For example, it could be contended that the NRC's refusal to approve extended operation results in an involuntary termination of the operating license.

These discussions underscore the need for consistency between decommissioning and license renewal regulations.

5.11 Antitrust Review

Section 105 of the AEA (as amended December 19, 1970) sets forth the antitrust provisions applicable to nuclear plant licensing. Under Section 105(c)(2), an antitrust review by the Attorney General of the United States is required of any "application for a license to construct or operate a . . . production facility" received after 1970. Plants with pre-enactment applications were grandfathered from this review. License renewal raises the question of whether a license to extend operation beyond the 40-year statutory limit is a "license to operate," thereby requiring antitrust review. Even if one determines that a renewal or amendment is a "license to operate" for purposes of Section 105(c)(2), that Section also provides as follows: for those facilities issued a construction permit under Section 103 of the AEA (and thus already subject to a previous antitrust review), no new antitrust review is necessary unless "significant changes in the licensee's activities or proposed activities" have occurred subsequent to the Attorney General's previous review. Thus a new antitrust review may not be required, although a mechanism, such as a Federal Register notice, may be needed to identify potential antitrust problems on a plant-specific basis.

5.12 Price-Anderson Act Coverage

Sections 170 and 11 of the AEA, commonly referred to as the Price-Anderson Act, concern liability insurance in the event of an accident with offsite consequences. The Act establishes a ceiling on liability for facilities issued construction permits between August 30, 1954, and August 1, 1987.

One concern regarding Price-Anderson coverage in the context of license renewal is whether coverage extends throughout the renewal term. Since the coverage is tied to the date of issuance of the construction permit and does not distinguish among the various licenses issued following construction, the license renewal term would be covered. Furthermore, the last sentence of Section 170(c) appears to extend indemnification to a renewed or amended operating license as long as the facility had a construction permit by August 1, 1987.

Another concern is whether indemnification applies to the period of interim operation after the existing license expires, when the licensee has applied for renewal, but the NRC has not made a decision on the application. However, provisions of the Act specify that indemnity continues even while the reactor is not allowed to operate or is in the process of being decommissioned. Indemnity agreement is terminated when the reactor is dismantled or all radioactive material has been removed from the site.

Thus, Price-Anderson coverage does not appear to be a significant license renewal issue.

REFERENCES

1. U.S. Nuclear Regulatory Commission (USNRC), "Request for Comments on Development of Policy for Nuclear Power Plant License Renewal," Federal Register, Vol. 51, No. 215, 40334, November 6, 1986.
2. USNRC, "Nuclear Plant Aging Research (NPAR) Program Plan," NUREG-1144, Revision 1, September 1987.
3. USNRC, "Decommissioning Criteria for Nuclear Facilities," Federal Register, Vol. 50, No. 28, 5600, February 11, 1985.

APPENDIX A

LIST OF QUESTIONS FROM THE
NRC SOLICITATION OF PUBLIC COMMENTS

The NRC solicitation of public comments (51 FR 40334, November 1986) consisted of seven questions concerning various aspects of license renewal policy development, under which a total of 21 detailed questions were asked. These are listed below.

1. Timeliness of Policy

- (a) To what extent should the NRC proceed at this time in defining the regulatory policy which would be applicable to requests by utilities to extend the operational life of commercial light-water power reactors beyond the current 40-year operating license period?
- (b) Is an effort by the Commission to formulate such a policy well in advance of the expiration of operating licenses appropriate?
- (c) When must such a policy be in place? What is the basis for this time?
- (d) To what extent are the individual reactor licenses or industry groups acting on behalf of licensees actively planning at this time to request NRC permission for extended operation beyond the expiration of power reactor licenses?

2. Timing and Length of License Extension Requests

- (a) What criteria should be applied to judge that a request for license extension is both timely and sufficient?
- (b) Current regulations do not define a time limit beyond the initial 40-year term for which plants could operate while being considered for license extension. Should there be such a limitation? If so, what should the limiting period beyond the 40-year term be during which a plant could continue operation while undergoing license extension review?

3. Acceptable Level of Plant Safety

- (a) In addition to NRC's current requirements, how should the NRC incorporate performance-based information coupled with insights derived from probabilistic risk assessment into the decision making process?

- (b) Should plants applying for life extension be required to demonstrate conformance to regulations in effect on the date of the extension application? On what basis should a licensee not have to demonstrate continued conformance with applicable rules and regulations?
- (c) Should the intent to operate in excess of a 40-year operating period be factored into current and future benefit/cost analyses and safety findings for backfitting considerations? If not, why not?

4. Scope of Plant Life Extension Applications

- (a) Should a life extension application be for a specific period of time? If so, for what length should it be? Should the Commission specify varying requirements based on the period requested for life extension?
- (b) Which, if any, of NRC's licensing criteria are not appropriate for the purpose of reviewing plant life extension requests?
- (c) How and to what extent should the prior operating history of the plant be factored into considerations for license extensions?

5. Technical Considerations for Plant Life Extension

- (a) Which components and structures will require residual lifetime evaluations in consideration for license extensions? What are the criteria for the selection of these components and structures?
- (b) What are the major technical parameters and criteria which should be considered in NRC review to permit power reactor operation beyond the expiration of licenses?
- (c) What additional monitoring and maintenance programs will be needed to assure safety during extended life?
- (d) Which of these technical factors, including degradation processes and methods for detecting such degradation, are major "leadtime" items requiring data accumulation over the years prior to expiration of power reactor licenses?
- (e) How should codes and standards be revised to support license extension?

- (f) What investigations and research have been or are going on that address nuclear plant life extension? What mechanisms should be established to assure timely information exchange with the NRC to encourage communication, early consideration and avoid duplication?

6. Schedule for Resolution of Issues

- (a) What overall schedule is appropriate to achieve major milestones and for resolution of the issues relative to nuclear plant license extension?

7. Procedural Considerations

- (a) Should there be any procedural changes regarding future operating license extensions and current treatment of initial operating license applications? If so, what changes should be made?
- (b) Please be as specific as possible, e.g., identify the specific procedural requirement and describe how it should be changed; identify whether such change can be accomplished under the current provisions of applicable statutes or whether it would involve a statutory change.

APPENDIX B

SUMMARY OF PUBLIC COMMENTS ON THE
DEVELOPMENT OF A LICENSE RENEWAL POLICY
FOR NUCLEAR POWER PLANTS

B.1 INTRODUCTION

The United States Nuclear Regulatory Commission (NRC) is developing regulations for the renewal of operating licenses (OLs) for nuclear power plants beyond their present 40-year term. In support of this initiative, the NRC solicited comments from the public on various issues that will require timely resolution. The solicitation of comments was published in the Federal Register (51 FR 40334) on 6 November 1986 and the extended comment period closed on 2 February 1987.

Fifty-eight (58) written responses were received and docketed by NRC under Proposed Rule PR-50. Comments were provided from a cross section of the U.S. electric utility industry, public interest groups, private citizens, independent consultants, and government agencies. Table B-1 summarizes the number of respondents in each of these five general categories. Detailed comments are contained in document SECY-87-179, "Status of Staff Activities to Develop a License Renewal Policy, Regulations, and Licensing Guidance and to Report on Public Comments." This document is available at the NRC Public Document Room.

B.2 NATURE OF RESPONSES

As evidenced in Table B-1, the majority of responses were received from the nuclear power industry (74 percent). In general, the industry consensus was represented by the Atomic Industrial Forum (AIF) and the Nuclear Plant Life Extension (NUPLEX) Steering Committee, which provided detailed responses. Over half of the industry respondents stated their support of the AIF and NUPLEX positions with little or no additional commentary. On some questions, however, individual industry respondents expressed other viewpoints on such issues as the scope and use of plant performance historical data in license renewals, the extent to which risk assessment should be used in identifying aging-related safety concerns, and the durations of license renewal periods.

Non-industry perspectives were limited: government agencies, public interest groups, individuals, and independent consultants comprised only slightly more than one quarter of the respondents. The three government agencies providing comments were: the U.S. Department of Energy, the U.S. Department of the Interior (U.S. Geological Survey), and the State of Wisconsin Public Service Commission. The Department of Energy response closely paralleled the industry position as stated in the NUPLEX comments. The Geological Survey provided a brief statement on the need to update ground-water data and uses around nuclear plants for license renewals, and the Wisconsin Public Service Commission provided detailed responses to several of the NRC solicitation questions. Two public interest groups provided written comments. One, Ecology Alert, stated its opposition to license renewal, and the other group, Ohio Citizens for Responsible Energy

TABLE B-1
SUMMARY OF RESPONDENTS AND AFFILIATIONS

NRC Request for Public Comments on Nuclear Power
Plant License Renewal

Respondent Category	Number
• Private Citizens	7
• Public Interest Groups	2
• Government Agencies	
- Federal Government	2
- Public Utility Commissions (State)	1
• Independent Consultants	3
• Nuclear Power Industry	
- Nuclear Utilities/Parent Companies	31
- Industry Groups (AIF, NUPLEX)	2
- NSSS Vendors	2
- Owners Groups	2
- Industry/Society Codes & Standards Committees	2
- A/E Constructors	2
- Law Firms Representing Utility Companies	2
Total	58 Respondents

(OCRE), provided detailed comments. In general, OCRE supported the concept of license renewal, but advocated a cautious approach on timing, technical, and procedural issues. Of the ten individuals commenting, six were opposed to license renewal, while the others clearly favored renewal or provided responses to specific questions without expressing an overall position on renewal.

B.3 DETAILED RESPONSES TO THE NRC SOLICITATION

The NRC solicitation was comprised of 21 questions under seven general issue headings (Appendix A). The following subsections summarize the detailed responses received in each of the seven issue categories.

1. Timeliness of Policy. The consensus of those favoring license renewal (including non-industry respondents) was that NRC should proceed immediately to establish a renewal policy by the late 1980's and detailed regulations by the early 1990's (1993). One utility industry respondent stated that NRC need only affirm a licensing policy based on the existing amendment process. Eight utilities stated their intent to apply for renewals; the remaining industry respondents were awaiting NRC regulations and results of aging research studies.
2. Timing and Length of License Extension Requests. Industry responses on the issue of renewal application timing favor maximum flexibility: filing of applications should be allowed at any time up to one year before license expiration. Non-industry respondents felt that applications should be required "well in advance" of expiration; additional comments included a five-year minimum to allow for "adequate public involvement" in the renewal process and a three-year "probationary" period before renewals.

Concerning the question of "sufficiency" of renewal applications, industry respondents stated that NRC regulations should determine requirements for the application, but that the focus of the application should be limited to aging of plant safety items. The public interest group, OCRE, commented that sufficiency should entail a full-scope review (using standard review plan methodology) comparable to that given for the original operating license.

On the question of interim, or postexpiration, operation during renewal review, industry cited the Administrative Procedures Act for continuance of a licensed activity and stated that safe operation was ensured through routine NRC inspection and enforcement. Non-industry viewpoints included OCRE, which stated that a two-year maximum should be imposed to avoid "frustration and

delay" of the renewal process. An individual respondent raised the issues of legality of interim operation and Price-Anderson implications of "unlicensed" operation.

3. Acceptable Level of Plant Safety. There was a consensus among all respondents that previous plant performance data and risk assessment should be considered in the renewal process. Differences arose in the scope and degree of application. Among industry respondents, most felt that performance history should be limited to demonstrating conformance with the original license requirements, and that new performance-based criteria be strictly limited to evaluation of safety-significant aging effects. However, a few industry respondents commented that the full 25-30 year performance history be considered and that management and personnel factors be included.

Comments on the use of probabilistic risk assessment (PRA) were in general agreement among both industry and non-industry respondents: it should be used as an "adjunct" to screen plant items for safety significance of aging only. Several commenters also raised the issue of data validity in qualifying a PRA value.

On the question of conformance to regulations in effect on the date of renewal application, industry and non-industry viewpoints contrasted sharply. Industry respondents strongly felt that satisfaction of the original licensing basis should be the major concern and that any new requirements should be subject to backfit considerations. OCRE and an individual commenter felt that plants should be required to meet all regulations in place at the time of renewal application. Concerning the consideration of extended plant life in generic backfit decisions, all respondents commented that this should not be a factor until renewal applications have been filed: that "intent" is impossible to determine in advance.

4. Scope of Plant Life Extensions. On the issue of license renewal durations, industry supported maximum flexibility: renewal duration should be chosen by the licensee for any period up to a 40-year maximum. Of the two non-industry respondents, OCRE stated that renewals should be for a maximum of 10-15 years, and a single individual stated that the licensee should choose the duration.

Concerning the nature of requirements for renewals and their possible dependence on duration, industry representatives affirmed the position of conformance with the licensing basis as the major criterion and that this should not vary substantially with renewal duration. Non-industry viewpoints ranged from "all NRC licensing criteria are appropriate" (OCRE) to "no major new investigations"

(Wisconsin Public Service Comm.). In addition, OCRE stated that technical standards for renewals should be driven by results of aging research.

5. Technical Considerations for Plant Life Extension. The industry consensus on technical considerations was that: (a) only "safety significant" plant items subject to aging effects should be reviewed, (b) any parameters and criteria applied be limited to evaluating operating license compliance, (c) adequate plant monitoring and maintenance programs addressing aging effects were already in place, and (d) existing codes and standards were generally adequate and aging-related revisions should be limited in scope and determined by aging research results. Non-industry respondents commented that further aging studies were needed to identify technical requirements for renewals and that establishment of requirements was premature at this time.

On the question of aging research coordination, industry favored early coordination and information transfer with the NRC. OCRE expressed the need for NRC to adequately fund independent research to avoid a potential industry bias in research results.

6. Schedule for Resolution of Issues. Industry respondents commented that NRC should: (a) issue a final policy on renewals by 1988, (b) issue definitive guidance by 1993, and (c) complete review of the first renewal by 1995. One non-industry respondent (OCRE) stated that all issues should be resolved five years before the first license expiration, and another individual stated that setting a schedule was premature and that aging studies should drive the policy development schedule.
7. Procedural Considerations. Two sets of recommendations were provided: one from industry and one from a public interest group (OCRE). Industry's position was that major changes were not required in the current body of regulations and that NRC need only affirm certain aspects of its current procedures for license renewals:

- Utilize the license amendment process
- Consider only aging degradation of safety-significant items
- Licensee to choose "tack-on" or "supersession" renewal
- Environmental assessments to determine need for impact statements

- Significant hazards determination to decide need for public hearings
- Filing deadline to be one year before operating license expiration

OCRE provided the following procedural recommendations:

- Treat renewals in the same manner as the original operating license (FSAR, SRPs)
- Resolve apparent conflict between the Administrative Procedures Act and Atomic Energy Act on continuing a licensed activity during "renewal review" versus "no significant hazard" finding
- Authorize Atomic Safety and Licensing Boards to call their own witnesses and raise significant safety issues
- Allow reopening of hearings after initial decisions
- Abolish limitations on "discovery and subpoena" against NRC staff and consultants
- Repeal Backfit Rule

B.4 FURTHER ISSUES

Other issues raised in the public comments were:

Decommissioning: How should decommissioning be accommodated in the context of license renewal?

High-Level Waste: How should the increasing inventory of high-level waste be accommodated? Should renewal policy development and "national" disposal policy be linked?

Interim Operation: What are the Price-Anderson implications of interim operation during the review of renewal applications?

Public Interest Groups: Should "intervenors" be provided with public funding to allow equal access to expert witnesses in licensing proceedings?