

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

**Title: BRIEFING ON PRA IMPLEMENTATION PLAN -
PUBLIC MEETING**

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2 NUCLEAR REGULATORY COMMISSION
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6 BRIEFING ON PRA IMPLEMENTATION PLAN
7 PUBLIC MEETING
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12 Nuclear Regulatory Commission
13 One White Flint North
14 Rockville, Maryland
15 Wednesday, April 5, 1995
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17 The Commission met in open session, pursuant to
18 notice, at 10:00 a.m., Ivan Selin, Chairman, presiding.
19

20 COMMISSIONERS PRESENT:

21 IVAN SELIN, Chairman of the Commission
22 KENNETH C. ROGERS, Commissioner
23 E. GAIL de PLANQUE, Commissioner
24
25

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1 STAFF SEATED AT THE COMMISSION TABLE:

2

3 JOHN HOYLE, Secretary of the Commission

4 KAREN CYR, General Counsel

5 JAMES TAYLOR, Executive Director for Operations

6 ROBERT BERNERO, Director, NMSS

7 WILLIAM RUSSELL, Director, NRR

8 EDWARD JORDAN, Director, AEOD

9 ASHOK THADANI, Associate Director for Inspection and
10 Technology Assessment, NRR

11 GARY HOLAHAN, Director, Systems Safety and Analysis
12 Division, NRR

13 MARK CUNNINGHAM, Chief, Probabilistic Risk Analysis Branch,
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P R O C E E D I N G S

[10:00 a.m.]

CHAIRMAN SELIN: Good morning, ladies and gentlemen.

Today the Commission is to receive an update on the status of the PRA Implementation Plan. In fact, I want to say just at the beginning, I've been quite impressed by the amount of progress and the fact that this is hard. I mean it's not just taking a general principle and carrying it out, but the applications are different in different areas. I may have a different view at the end of the briefing, but coming in you've done a good job of balancing practical problems and a real desire to have a radical change in the way we do business. So, I very much look forward to the presentation.

Mr. Taylor?

MR. TAYLOR: Good morning. With me at the table are a number of people directly involved in carrying out this plan, the three office directors, Mark Cunningham, Ashok Thadani and Gary Holahan. Ashok Thadani will begin the formal briefing.

DR. THADANI: Thank you.

Good morning.

May I have the first viewgraph, please?

[Slide]

1 DR. THADANI: I will make some general comments.
2 about our progress since the last Commission brief.
3 Subsequently, Gary Holahan, Mark Cunningham, Ed Jordan and
4 Bob Bernero will go through specific activities at each
5 office that's been involved in it.

6 May I have the next viewgraph, please.

7 [Slide]

8 DR. THADANI: We briefed the Commission on August
9 30th last and covered the policy statement as well as the
10 implementation plan. Subsequently, the Commission directed
11 the staff to ensure that there was consistency in the policy
12 statement in terms of prior Commission decisions on use of
13 PRA. Also to exercise care in allocating appropriate
14 priorities to various aspects of the implementation plan.

15 Broadly, I would say that I certainly agree with
16 the Chairman. I think we've made considerable progress. At
17 least that's our view. There are some areas where I think
18 we could have done better than we've done, but in general I
19 think it's been very upbeat in terms of the activities that
20 we've already embarked on and some cases completed.

21 I wanted to go through some key areas where I
22 think we've made real positive accomplishments. The policy
23 statement was issued for public comment. We received public
24 comments and we don't see any significant impact in terms of
25 what we had put out as a result of the public comments. We

1 held a workshop on the implementation plan in December and
2 again I would say that the implementation plan was generally
3 fairly well received. There were a number of presentations
4 and there's fairly extensive participation not only by the
5 industry but also by broad sections of the NRC, which I
6 think was a very positive sign.

7 COMMISSIONER ROGERS: On that workshop, did you
8 get any negatives? Did you get any --

9 DR. THADANI: Oh, yes. There were some negatives
10 that the industry -- and we're going to go into those, but
11 there were some negatives such as concern on the part of
12 some industry members that this not be yet another
13 requirement imposed on the industry. It doesn't become
14 something more they have to do.

15 COMMISSIONER ROGERS: Well, I was thinking more
16 about PRA itself. I mean there's always that concern, that
17 there's a layering of --

18 DR. THADANI: No. In fact, broadly there was very
19 strong support that this is, in fact, the correct way to go
20 forward and that it was time. In fact, the push was we
21 should be moving faster to a certain extent. But we're
22 going to be going through each of the elements and share
23 with you some of the comments.

24 We have also been interacting, as we indicated to
25 you at the last meeting, with Nuclear Energy Institute in

1 terms of developing guidance on various aspects in terms of
2 applications of these techniques, documentation, decision
3 criteria, et cetera. And I must say -- in fact, we sent a
4 letter to NEI recently. I think what they have put together
5 is a fairly good document and I think we could start
6 applying that and seeing how well it actually works in
7 practice. So that's yet another, I think, important
8 milestone.

9 We have also made progress, I think, in various
10 areas where one needs to pay attention to risk management,
11 operational aspects I would say. As example, we have now
12 completed all our site visits, nine pilot studies that we
13 looked at in terms of implementation of the maintenance
14 rule. As part of that, we were also looking into the issue
15 that had been raised in the last several months about on-
16 line maintenance concerns. What we're seeing is much
17 increased awareness. That doesn't mean that people are
18 actually necessarily taking appropriate things into
19 consideration, but we see the awareness, the need to do
20 that. I must say there was a letter recently sent by Zach
21 Pate to Jim Taylor in March, as a matter of fact. I thought
22 that was a very thoughtful letter which went to all the
23 utilities and giving them some guidance on the kinds of
24 things they should be considering when they into preventive
25 maintenance activities. I thought that was a very good

1 letter.

2 MR. TAYLOR: I had written to Pate as part of the
3 general concern about on-line as well to utilities. They
4 had previously worked in this area and also this was a
5 follow-up to some earlier guidance that INPO had issued.

6 DR. THADANI: Yes. We're also making progress in
7 terms of applications of PRA to support reductions in
8 certain testing, such as motor-operated valves and in
9 general the whole issue of in-service testing.

10 I think broadly I would say that having this
11 implementation plan with a focused look and support from
12 various parts of the organization I think has worked fairly
13 well and we've made a lot of progress, as a matter of fact.
14 Now, there's an area that I wish I could have said that
15 we've made more progress than we have and that's the area of
16 graded QA, application of PRA techniques and different
17 levels of quality assurance that one could apply. We worked
18 with NEI and it hasn't worked very well.

19 We're at a point now we have some volunteer
20 licensees who have indicated their desire to apply
21 probabilistic techniques to try and develop some graded
22 levels of requirements and we're going to be pursuing that.
23 As a matter of fact, we have a meeting coming up next month
24 with Grand Gulf just to see exactly how far they're going.
25 They've asked us -- at least indicated interest in our

1 participation in that program.

2 Now, Gary is going to go through the NRR
3 activities as to where we are on specific issues and then
4 we'll hear from other offices.

5 MR. TAYLOR: I'd like to add that I think that
6 several of the utilities volunteering on a graded QA is a
7 good move because I think the arguments get down to the very
8 specifics of applying the various QA requirements and having
9 a couple of plants work with the staff using PRA and the
10 graded QA concept has been around since Appendix B was
11 written. But it tried to get a consistent look and some
12 models may well help push this type of thing to the right
13 conclusions. I think it's important because the QA aspects
14 apply to spare parts, replacement parts, continue to apply
15 to a great deal of work at the plants.

16 Excuse me.

17 COMMISSIONER ROGERS: Just on that, I know we
18 don't want to get into a long discussion on graded QA at
19 this meeting. But my understanding is that in a
20 conversation I had with the NEI people last week, it seemed
21 to me that it was really a problem arising from how to use a
22 performance-based regulation on connection with QA, graded
23 QA, that just where that came into the thinking and into the
24 process seemed to be part of the reason that there's a
25 disagreement and maybe even a confusion as to where we're

1 going and where we ought to be going on this. I think there
2 seems to be a little bit of an intellectual problem with
3 respect to how to view a performance-based regulation
4 applying to the graded QA problem.

5 I think we had some rather interesting discussions
6 and I think there's a great deal there that needs to be
7 thought through afresh because I think there is the
8 possibility of really a kind of inconsistency in our whole
9 approach in going towards performance-based regulation as it
10 might apply to graded QA. I think there's real
11 clarification needed in exactly what we're trying to
12 accomplish there.

13 MR. RUSSELL: I'd like to add just one thought.
14 That is that quality assurance does not impose hard
15 requirements on design. Quality assurance provides
16 confidence that existing requirements have been met and
17 where you have failures, that appropriate corrective action
18 has taken and that you understand the root cause of the
19 failures, et cetera. We have identified mechanisms for
20 using PRA insights to modify hard requirements, requirements
21 on design, et cetera.

22 The issue in the area of quality assurance is more
23 one of providing confidence that requirements have been met
24 and in some cases the activities to provide that confidence
25 are excessive beyond what the safety activity or the safety

1 function is of the particular component. We think that that
2 has existed within the rules for some time. There is a
3 broader view on the part of industry. It's not clear
4 whether they are going to be able to develop a sufficient
5 basis to make a major change to the quality assurance
6 requirements, but we've said that we would review that when
7 submitted. In the short term, I think it's much more
8 appropriate to get some actual experience applying a graded
9 approach and dealing with the details on particular
10 components or particular equipments with licensees so that
11 we can start to reach an agreement. I find that when we get
12 into the generic esoteric discussions it gets to be very
13 difficult to make progress and reach conclusions.

14 If, on the other hand, you can generalize from
15 many specific examples back to a process that works, you can
16 reach closure on the issue. So, we're quite encouraged
17 about working with some licensees on a more limited scope
18 than what the industry has in mind at this point in time and
19 we're going to await their petition for rulemaking and we'll
20 react to that when it comes in.

21 DR. THADANI: Yes. I think the key is to go
22 through and apply these techniques and try and learn how
23 well they work, where they work appropriately and so on, and
24 that's important. That's why we're anxious to start with
25 some plants.

1 CHAIRMAN SELIN: I agree with the statement that
2 we don't want to get into this QA in great detail here. My
3 own view is we never really want to get into the QA in great
4 detail. But putting that aside, I am glad that you brought
5 it up in this context because I think it suffered from being
6 looked at as sort of a stand alone procurement policy
7 question and it really is a wonderful place to see if we can
8 apply PRA techniques. Remember, we're just talking about
9 replacement parts. We're not talking about original
10 construction, in a way that makes sense taking into account
11 the cost and the overall reliability or risk of this huge
12 plant as you change relatively small numbers of safety-
13 sensitive parts. I think the program and your look at the
14 program has benefitted enormously from having this PRA
15 insight and not just look at it as a procurement policy
16 issue where you get two tests or one test. That's a big
17 step in the right direction.

18 DR. THADANI: Thank you.

19 Gary?

20 MR. HOLAHAN: Thank you.

21 Can I have slide number 3, please?

22 [Slide]

23 MR. HOLAHAN: The next two slides present an
24 overview -- the slide before that, please.

25 The next two slides present an overview of the

1 major activity areas for NRR and other offices and I'll go
2 into a little more detail on several of those later in the
3 presentation. Some of these subjects have been covered a
4 little bit already, so I won't dwell on them too much.

5 The workshop was previously mentioned. I think
6 that was a very valuable activity to get the implementation
7 plan on the table and I think it helped us focus on a number
8 of the issues. One of the main issues is the second item on
9 this slide. That is the need for the industry and the NRC
10 to come to some understanding as to just how good does a PRA
11 have to be in order to be used in regulatory applications.
12 I'll have a little bit more to say about that in the future.
13 But I think we are making progress on that area on a number
14 of different fronts. Both NRR and the Office of Research
15 have activities in that area.

16 I'll also discuss a few pilot applications of PRA,
17 including the QA activities. There have been a number of
18 maintenance pilot site visits and I think that those were
19 very helpful in getting insights into the use of PRA. Then
20 there's been a pilot program for integrated performance
21 assessment process, which are inspections to try to pull
22 together in one inspection activity an overall view of risk-
23 related activities at a plant. I think that's been a
24 valuable activity also.

25 Can I have the next slide?

1 [Slide]

2 MR. HOLAHAN: The areas we will be highlighting
3 from the Office of Research, AEOD and NMSS include the
4 insights from the IPE Program, then a very important
5 activity related to staff training which is, I think, a very
6 important element of the implementation plan for the staff,
7 an update on the data reliability rule and then uses of PRA
8 in both the medical and waste areas.

9 Can I have the next slide?

10 [Slide]

11 MR. HOLAHAN: With respect to the proposed policy
12 statement, as Mr. Thadani mentioned, it was issued back in
13 December for comment. We received about 100 comments from
14 17 individual commenters. I would say the comments were
15 generally supportive of the use of PRA. Those individuals
16 also took the opportunity to comment on other aspects of the
17 implementation plan in addition to the policy statement
18 itself. I think there was a sense in those comments of a
19 desire to get on with the implementation, to have some pilot
20 activities and to show some progress in the short-term. So,
21 I would say there was general support for a policy
22 statement, but there was probably even more support for
23 getting beyond the policy and having actual implementation.

24 I think there were a number of comments on the
25 relationship of PRA and deterministic approaches. As the

1 Commission had directed the staff, there was considerable
2 discussion of that topic included along with the proposed
3 policy statement and it did produce a number of comments. I
4 think they were supportive of the approach of having both
5 PRA and the deterministic regulatory requirements in
6 supportive and complimentary roles.

7 As Mr. Thadani mentioned earlier, there were some
8 comments indicating a concern that PRA not be made into a
9 whole new set of requirements on top of the existing
10 deterministic requirements and not to use it to look at what
11 was important or unimportant about the existing
12 deterministic requirements. So, I think that's an area
13 where we'll have to be sensitive to maintaining a respect
14 for the deterministic requirements at the same time that
15 you're using PRA to decide which of those deterministic
16 requirements are really important and which one of those in
17 the light of additional analysis and operating experience
18 weren't really as important as we thought originally.

19 There were a number of comments related to the
20 need for consistency and guidance in the application of PRA.
21 I think this also came up very strongly at the workshop in
22 December. There were concerns about how do you know that a
23 PRA is good enough, and I think it's both from the
24 regulatory point of view and from the utility's point of
25 view. How can they have comfort in knowing that what

1 they're doing will be accepted either by the staff at
2 Headquarters or by the regional inspectors? That reinforced
3 the need to come to some common understanding for quality
4 and decision criteria in use of the PRA.

5 Again, the concept that there need to be some
6 near-term implementation of the PRA-related activities if
7 we're really going to show that the Commission is serious
8 about the subject.

9 COMMISSIONER ROGERS: Just on that, how entirely
10 standardized has the process of doing a PRA for a plant
11 become? In other words, is it conceivable that if a
12 licensee called in a consulting outfit that's an expert on
13 PRA and they did a PRA that they would structure it in a way
14 that might be different from the way another independent
15 analyst might approach the problem?

16 MR. HOLAHAN: Absolutely, yes. Yes.

17 COMMISSIONER ROGERS: And how would we -- how do
18 we tolerate -- to what degree of toleration do we have for a
19 wide range of possibilities here? In other words, the
20 numbers might not be identical, but if you have orders of
21 magnitude difference coming out from something like this,
22 that's an uncomfortable situation. If you don't have a
23 comparison, then you have to just take whatever is done. It
24 seems to me there's a little troublesome element here in
25 this to some extent as to what we agree upon is at least a

1 standard way of doing it, if not actually saying this is the
2 only right way to do it, at least a standard way to do it.

3 MR. HOLAHAN: That's an extremely important issue.
4 It's probably the most important issue to settle in order to
5 really have risk-based regulation. You can't have risk-
6 based regulation with a level of uncertainty of not knowing
7 what does it mean to say your licensee did a PRA. I think
8 this has shown up very much in the IPE reviews that Research
9 is doing.

10 Different consultants have a different approach to
11 how PRAs are done. In fact, I think if you look at the PRA
12 results, you can see them clustered in a way that indicates
13 that who does the PRA has an important impact on what the
14 answers are. I think we are not so much pushing for there
15 to be one standard way of doing PRAs. It's important that
16 there be some basic quality requirements or understanding of
17 how much control there are of the quality of what's in a
18 PRA.

19 The applications guide that NEI has developed with
20 EPRI we think is an important step in establishing that
21 there are some quality controls. There are questions to ask
22 yourself, how good did I do in terms of structuring the
23 fault trees and what level of depth do they go to and where
24 did I get the data? That's a step in the right direction.

25 But I think there's also a question of the

1 application that the PRA is going to be used for. The IPES
2 were originally developed as a search for severe accident
3 vulnerabilities. I think the staff is reasonably
4 comfortable even in the diversity of approaches and results
5 because in some sense that was a relatively easy question.
6 We were looking for relatively large outlier problems. As
7 we go to more sensitive applications where the PRA would be
8 used, for example, in changing tech specs, I think then the
9 quality of the PRA becomes a more important issue. So, one
10 of the activities we're undertaking as part of the research
11 initiative is to try to establish some relationship between
12 the quality and the controls on the PRA and the application
13 that it would be used for. So, it's not necessarily a one
14 size fits all. It could be a graded kind of approach.

15 COMMISSIONER ROGERS: Well, I'm just a little
16 troubled about this in the sense that there is a little
17 parallel with the lack of standardization in our power
18 plants themselves.

19 MR. HOLAHAN: Yes.

20 COMMISSIONER ROGERS: And now if we have a lack of
21 standardization in our approach to doing PRAs, I wonder if
22 we're not going to be suffering somewhat from the
23 consequences of that as we have with the plants themselves.

24 MR. HOLAHAN: The important test is are you
25 getting the correct risk insights, not necessarily the right

1 numerical values, if there are such thing as right numerical
2 values. I think an important activity that the Office of
3 Research is doing is developing the IPE insights document
4 that I think will come to the Commission in around June,
5 which includes a comparison among plants and overall
6 insights among many IPEs.

7 DR. THADANI: I think the issue you have raised is
8 a real issue and it deserves a lot of attention. We are
9 finding, as Gary said, what I would call differences in
10 assumptions, some of them in terms of success, failure
11 criteria. In some cases you see certain sequences appearing
12 as important and identical plants those sequences don't
13 appear at all, driven largely by certain assumptions. This
14 is a real issue with I think important implications on
15 applications of IPEs. The Office of Research is looking at
16 those specific areas that at least have been identified to
17 date as a result of some of the reviews that the NRC has
18 conducted.

19 In addition, I think, Mark, you might want to
20 describe the activity with the societies that you're going
21 to be going forward with. That has bearing on this issue as
22 well.

23 MR. RUSSELL: That's going to come up in
24 discussion, plus we have a planned briefing for you on the
25 IPEs. In addition to the success criteria, there is an area

1 that I think creates fairly substantial uncertainty from
2 plant to plant and that is assumptions on recovery actions
3 and the human performance aspects.

4 COMMISSIONER ROGERS: Oh, yes. That's another
5 question, but that really, I think, is quite --

6 MR. RUSSELL: But in my view that's potentially a
7 bigger uncertainty than it is associated with your ability
8 to develop fault trees. So, that's on that end. Ed is
9 going to talk about the data that goes in. We've seen cases
10 where industry generic data is used and you then apply plant
11 specific data particularly on reliability of important
12 components which appear to be not consistent with what
13 industry averages are and we're finding that there are
14 significant changes in the results. So, it's an area where
15 we see a lot of benefit. I don't see us -- given the
16 investment that's already been put into the IPEs that have
17 been done, I see us more in the mode of modifying those,
18 trying to understand them, rather than saying that here is
19 the prescription you need to follow for redoing your PRAs to
20 use them. So, we see more in the context of insights, what
21 are the important systems on a relative basis, what things
22 don't you want to have out of service at the same time, how
23 do you maintain configuration and shifting it more into what
24 I will characterize as operational safety application and
25 insights as well as using it to provide burden relief where

1 you've got a sufficient confidence that that's appropriate
2 and using it to change some deterministic requirements.

3 CHAIRMAN SELIN: It would be very nice if we got
4 comparable figures across plants from one to another, but
5 that's a little too much to ask for at this time. It would
6 be nice if three different people did a PRA on the same
7 plant that they got comparable results and use mathematical
8 terms. What Mr. Russell is describing is to get partial
9 differentials so that we know -- we don't know what the
10 absolute amounts are. That's hard to get to. At least we
11 know what the contribution in a given plant of some major
12 system or some operation is and that would be helpful to the
13 plant. That you could generalize. Even if the overall
14 numbers aren't comparable, if you can say that on this class
15 of plants a quarter of the risk seems to come from loss of
16 off-site power or what have you, that's helpful.

17 So, I do encourage you to keep looking for
18 specific well defined useful limited objectives that get the
19 values out of that. Nobody will ever believe the numbers
20 that say Fitzpatrick came in with a -- but still is useful
21 to find out what was going on in the plant. They were doing
22 it on a base 2 instead of a base 10, but other than that it
23 was an excellent job.

24 COMMISSIONER de PLANQUE: I think we shouldn't
25 lose sight of the fact that this is a better tool than we've

1 had so far. You're in the mode of trying to get the bugs
2 out of it, figure out how to improve them and as you gather
3 more data you'll see where it's important to have
4 uncertainties and how you get those uncertainties, what
5 elements have to be in and they screw it up if they're not
6 in there. But it's a better tool than I think we've had so
7 far. So, I don't think we should lose sight of that
8 benefit.

9 MR. HOLAHAN: Can I have the next slide, which
10 really is a follow-on to this item?

11 [Slide]

12 MR. HOLAHAN: I think the industry has recognized
13 the need also if not to standardize at least to come up with
14 some guidance and decision criteria in use of PRA. This has
15 been under development for some time by NEI. The staff has
16 had discussions throughout 1994 and early this year with
17 NEI. We were given a -- I think last June was about the
18 second or third draft of the report and then early this year
19 they issued to the staff not for review and approval but for
20 comment the latest version of what's called the PSA
21 Applications Guide. We've recently written back to NEI
22 indicating that we think this version of the guide is a
23 good, high-level guidance document. Not that we didn't have
24 some reservations with it and there were a number of
25 questions, but rather than pursue a long review process

1 before we come to some final agreement on the guide, we
2 thought it was best to take this version of the guide and
3 say, "This is good enough for pilot applications," and go
4 out and use it in graded QA, MOV applications. The staff
5 also provided about 15 specific comments that areas where
6 there were either questions or things that could be improved
7 in the guidance.

8 The best way to come to a decision about does this
9 guidance really work is to put it out there and test it and
10 then look at the results it gives you. Are you comfortable
11 with the level of consistency it produces? Are you
12 convinced that you're getting the right insights? Where
13 it's used for ranking systems, are you comfortable in the
14 answers that it's giving you? So, we think that this is an
15 important step in the right direction.

16 In addition there are two other activities going
17 on related to the quality and decision criteria for PRAs.
18 NRR has an activity at Brookhaven National Lab where we're
19 looking at previous cases in which PRAs have been used and
20 to see if we can draw some insights as to how you can use
21 decision criteria from those. In addition, as was mentioned
22 earlier, Research has a long-term activity under guidance
23 development involving a general framework and also an
24 attempt to get some sort of national consensus standard
25 developed for the use of PRAs.

1 Can I have the next slide?

2 [Slide]

3 MR. HOLAHAN: I'd just like to cover the status of
4 a few pilot applications of PRA. The in-service testing
5 program and the MOV program have ongoing activities. The
6 IST activity involves the ASME and their code committees.
7 The MOV testing program has been an initiative of the BWR
8 Owners Group. In both cases they're really looking at using
9 a ranking of what are the most important systems, most
10 important components in the plant for making decisions about
11 what should be tested and how frequently testing should be
12 done. We think that this is, in fact, one of the things
13 that PRA ought to be best at. PRAs are good at identifying
14 what's important and what's not important. Among the things
15 that are important, it's pretty good at identifying what's
16 more important than other things. That's exactly what you
17 ought to know in deciding what should be tested and how
18 frequently it should be tested.

19 As part of that activity, we've come to realize
20 that how maintenance activities are undertaken at a plant is
21 very important and that there is a dynamic nature to risk.
22 When we talk about a PRA showing the risk is two times ten
23 to the minus five, that doesn't mean that the risk is
24 constant over a whole year. But the risk increases and
25 decreases when equipment is taken out of a service or when

1 failures are found and that there are some higher risk and
2 lower risk periods of time. In looking at decisions about
3 not only how frequently should testing be done, but during
4 what periods of time it should be done, it's important to
5 recognize that not all time periods are equally important
6 with respect to risk. So, I think there's some evolving
7 understanding of risk in that sense also.

8 As was mentioned earlier with respect to graded
9 QA, we do have some discussions ongoing with some individual
10 utilities. I think we'll pursue this aspect in the same
11 sense as the IST and MOV activity, in the sense of ranking
12 what systems are most important and therefore those ought to
13 have -- the more important systems ought to have some higher
14 level of QA.

15 In addition, we have completed nine maintenance
16 rule site visits and I think the general observation from
17 those is that what we are seeing from the early visits to
18 the later ones is an increasing recognition of the
19 importance of risk insights in the use of IPES and other PRA
20 tools. So, I think it's fair to say that early on we saw
21 very little use of the plant's own IPES in the maintenance
22 rule implementation. But near the end we saw a much greater
23 recognition and I think by the time the rule is actually
24 implemented in June of '96, I think there will be a pretty
25 strong use of PRA in that activity.

1 Can I have the next slide?

2 [Slide]

3 MR. HOLAHAN: Probably the most important area in
4 which PRAs have recently been used to address an ongoing
5 safety concern is this issue of on-line maintenance. What
6 we found both through the maintenance site visits and
7 through management site visits, and particularly Bill
8 Russell has raised this issue with a number of utilities,
9 was that even though utilities had spent a fair amount of
10 time and effort in developing IPEs and, in fact, have PRA
11 groups, that those groups weren't communicating very well
12 with the actual plant staff, either operations or
13 maintenance groups, and they really weren't taking advantage
14 of the work that was done in the day to day operations of
15 the plant. This observation I think was taken to heart.

16 As Mr. Taylor mentioned earlier, there were
17 letters sent to INPO and others to alert the industry to
18 what was risk-significant situation and also a kind of a
19 missed opportunity at the time. I think INPO has put out
20 some recent guidelines which we think are very helpful and I
21 think we're seeing progress in this area. But it's a very
22 important item and it's something the staff will continue to
23 put some attention on.

24 Can I have the next item?

25 [Slide]

1 MR. HOLAHAN: The last NRR activity I want to
2 cover is the integrated performance assessment process which
3 is an attempt to pull together operations, maintenance and
4 engineering type activities at a plant and look at them from
5 a risk perspective. There were a number of pilot activities
6 undertaken and I'm only going to mention Beaver Valley and
7 South Texas because I think those are the last two and
8 they're the ones for which I think we've begun to understand
9 how to use PRA in these inspection activities. I think one
10 of the things we've found is that it's not easy to do. It's
11 not easy to take risk insights which are appropriate to a
12 specific plant and to understand their relationship to
13 maintenance, engineering and operations activities and to
14 draw that information together in such a way that it can be
15 used in an inspection activity. But if it can be done and
16 where it can be done, and I must say that in both of these
17 cases there was a considerable amount of cooperation on the
18 part of the utility, I don't think the staff could go in
19 with the present state of PRA and IPE activities and do its
20 own assessment. It really took cooperation on the part of
21 those utilities to either run PRA cases for us or to
22 actually allow us to use their analysis to draw out what
23 were the most important systems, what combination of systems
24 were risk significant and then look at the actual operation
25 of a plant and say, "Is the plant being run in such a way

1 that it's using the insights from those risk analyses in a
2 sensible way?"

3 So, we found that it's a valuable activity, but
4 it's not so easy to do.

5 CHAIRMAN SELIN: You actually raised an
6 interesting question. Well, you raised many interesting
7 questions, but this one I hadn't thought about at all. Is
8 the inspection an inspection of the PRA or is it a PRA
9 guided inspection of the physical state?

10 MR. HOLAHAN: It's really PRA guided.

11 CHAIRMAN SELIN: That means that one has to have
12 some confidence in the PRA so we don't end up looking at
13 trivia. Do we audit the PRAs? Do we set some standards for
14 them? How do we intend to do this?

15 MR. RUSSELL: Right now the focus is more on using
16 the licensee's PRA and information that the licensees have
17 submitted to the NRC through their IPEs, identifying for
18 example the relative importance of systems where the human
19 actions which are being depended upon in the context of
20 reducing potential vulnerabilities for severe accidents and
21 procedures that are important for recovery actions in PRAs.

22

23 Also, the sequences which are significant, because
24 you find if you talk to operators, if they know that the
25 unit has a particular vulnerability to station blackout, the

1 operators know very well what equipment they need to combat
2 a blackout scenario. So, transferring that type of
3 information to the operation staff has been what the early
4 focus has been. We're also seeing cases where the analyst
5 can preanalyze combinations of equipment and identify those
6 which are important and those which are not. So, you can
7 have a simplified logic and some plants have done this where
8 you simply have a matrix that says, "If this is out, don't
9 have these out," and to reduce the risk.

10 But those operational aspects, we have not
11 factored well yet into our inspection activities.

12 CHAIRMAN SELIN: That's all well and good. In
13 fact, that's very desirable. But this suggests something
14 that I just had not thought of at all. That is we take the
15 PRAs as given as right and then we say, "What are the
16 implications?" When I so cavalierly said, "I'm not so
17 concerned about relative PRAs from plant to plant," maybe
18 that's a little fast because if we see that the
19 sensitivities that are very different from one plant to
20 another, maybe -- turn it around another way. If we see
21 PRAs in a number of plants are consistent, then we can have
22 some confidence that they're probably pretty accurate and
23 use the insights. But if we see funny things from PRA to
24 PRA, we need to know if that's a peculiarity of the plant or
25 does that mean that the PRA itself just has to be reviewed?

1 MR. RUSSELL: That type of work is ongoing now.
2 We're looking at comparable plants. In fact, we use that as
3 a part of our screening processes, looking at it as one
4 indicator. We do see that there are differences in results.
5 Sometimes it's a function of what they assume by way of
6 success criteria or what they're defining as the end state.
7 Is it really core damage or the onset of core damage?

8 CHAIRMAN SELIN: Don't go off so fast, Mr.
9 Russell, with all respect. The point I'm trying to make is
10 what we need -- you know, we've gone a couple levels pretty
11 fast. The first is performance-oriented regulation. But we
12 see outcomes. So, assuming that people aren't fraudulent in
13 their reports, we can relate these outcomes of performance
14 indicators and a number of other things directly to
15 performances that says, "Where shall we put the measure?"

16 Now we're saying, "Well, we're going to carry it a
17 step further in abstraction. We don't see actual outcomes,
18 we see pieces which can then be combined in the PRA to get a
19 simulated outcome." We need to have some kind of a measure
20 if we're going to use these PRAs as opposed to actual
21 indicators to guide inspection. We need some kind of an
22 indication about whether this PRA looks okay and we can
23 follow up on it or we should be looking for deeply into the
24 PRA before we modify the inspection program.

25 MR. HOLAHAN: That goes back to the issue of the

1 quality of PRA and the decision criteria. I think it's a
2 key element in all of the PRA applications.

3 CHAIRMAN SELIN: It will really be ironic if we
4 end up doing just as much work but spending more time
5 looking at the PRA and less at the plant.

6 DR. THADANI: We are, in fact, the Office of
7 Research and NRR certainly are planning -- we've just come
8 to recognize some of the implications of what we're seeing
9 in these IPEs and we're in fact at this time trying to
10 figure out how do we proceed, and there's a discussion
11 planned between the two offices on just that issue.

12 CHAIRMAN SELIN: I would like you, not as a result
13 of this briefing per se but in preparing the next update to
14 the plant, to spend a little time thinking about what I
15 might call PRA indicators as opposed to operational
16 indicators. You know, what should we be looking for to
17 indicate that a PRA is probably pretty good or that it's
18 suspect and ought to be looked at more carefully before it's
19 used as a guideline to inspect?

20 MR. HOLAHAN: There is an element of that in --

21 CHAIRMAN SELIN: I guess I'm Mr. Russell's
22 straight man.

23 MR. RUSSELL: We are going to be discussing that
24 with you at the IPE. We'll give you a briefing on the
25 results to date, what we're seeing and how we're using it.

1 CHAIRMAN SELIN: Okay.

2 MR. RUSSELL: One comment, though, just to put it
3 in context. When, for example, the BWR licensees compared
4 the results of the important systems and trains in the
5 context of the maintenance rule, while there were
6 differences in the IPE results, some differences in the
7 relative importance of various sequences -- blackout was
8 more important on some than others. ATWS was important on
9 some, not on others. Transients were important on some but
10 not on others -- we found that generally the same sets of
11 equipment were being identified as being more important than
12 others.

13 And so while there were differences, and some of
14 this may have been as a result of the panel process because
15 it was both using the PRA and then putting it through a
16 panel that included both PRA, deterministic and operations
17 expertise, they came out with relatively consistent results
18 on what's important and what's not and it's that insight --

19 CHAIRMAN SELIN: Well, that's the ultimate
20 objective.

21 MR. RUSSELL: -- in looking at getting to the
22 operation staff to make sure that a part of the organization
23 doesn't understand that particular equipment is more
24 important than others and have that be in the engineering
25 department but not have the operators have that same

1 understanding, so there's a short-term goal and that's where
2 we are seeing some improvements.

3 COMMISSIONER de PLANQUE: You gave the magic word
4 in my mind and that's the consistency argument. This is not
5 unlike a lot of scientific problems where you have various
6 ways of getting at the answer and you don't know how to
7 assess the accuracy or the validity of any one of those
8 mechanisms independently. What you ultimately are looking
9 for to verify those methods is the consistency among them,
10 consistency of various types of PRA techniques applied in
11 the same plant or consistency plant to plant, and it's the
12 accumulation of the evidence and the consistency ultimately
13 in the evidence that allows you to give some validity to it
14 while you can't independently assess any one particular
15 thing.

16 MR. HOLAHAN: There's one additional element of
17 the plant that I think speaks to this point and that is
18 AEOD's program on accident sequence precursors and on
19 equipment reliability will also be used to go back and to
20 check whether actual operating experience is being found to
21 be consistent with what the PRAs were predicting. So there
22 can be a self-correcting mechanism, but there's a lot of
23 equipment on which there won't be much data so it will work
24 in some cases and not well in others.

25 COMMISSIONER de PLANQUE: That's the old situation

1 where you have the empirical data and the theory and how do
2 you bring the two together.

3 MR. HOLAHAN: I'd like to move on now to the Mark
4 Cunningham presentation on the research activities.

5 MR. CUNNINGHAM: Could I have slide 10, please.

6 [Slide]

7 MR. CUNNINGHAM: I have four points to make with
8 respect today to IPE reviews and insights. Several of these
9 have been mentioned already.

10 The first is that we'll be back two weeks from
11 today with a much more detailed discussion of what we've
12 been doing in the IPE reviews and in the insights program,
13 so this is basically a snap-shot of what we've been up to.

14 The second point is we've been undertaking an
15 acceleration of the reviews that we've been doing on the
16 IPEs. In the original implementation plan in SECY-94-219
17 we'd indicated that we thought we would be done in the end
18 of December of '96 with the IPE reviews. Our goal today is
19 to be done at least six months before that and to have the
20 majority of the reviews done this year.

21 The next point is we are refocusing some of the
22 staff efforts in the IPE program into two areas. One is
23 more in the area of insights and the second dealing with
24 communicating the IPE information to other people on the
25 staff, particularly the regions.

1 With respect to the insights, we have been taking
2 more staff time to focus on issues that cut across
3 individual plants to look at general trends, to look and see
4 what's happening across a class of plants or among classes
5 of plants, including the example or the issue that you
6 brought up, Commissioner Rogers, on the variability due to
7 different PRA methods for different PRA groups that are
8 doing the work. We have a document I believe that's due in
9 August according to the plan which will be the first cut at
10 explaining a number of these insights, if you will. And
11 again, in two weeks we'll go into some of them in more
12 detail.

13 With respect to the staff involvement in regional
14 presentations, we've been working with NRR to develop a kind
15 of a standardized discussion package for each of the plants
16 that we will go to the regions with starting in May and
17 going through to December of next year. This will give both
18 plant-specific results and some of the insights we're
19 getting out of the parallel efforts. We'll be talking to
20 the regions, as I say, starting in May. NRR will be
21 following those up with additional site audits, if you will,
22 on the IPE insights and to make sure that, I guess as has
23 been discussed before, that the operating plants are
24 understanding themselves what's in their IPEs.

25 The last point on IPEs is that we also have the

1 IPEEE program. That program is really just beginning. We
2 have about 17 submittals and we have five under active
3 review today. Our goal is to get those done by the end of
4 1998. The process that we'll be using is similar to what
5 I've talked about in terms of the IPE program. We are
6 trying to accelerate that review schedule as well to get
7 more of the reviews done in the next year or two and
8 basically to try to keep up with the submittals as they come
9 in. As I said, there's not many in yet, but we don't want
10 to get behind as they do come in.

11 CHAIRMAN SELIN: The operators, although initially
12 sort of reluctant about the IPEs, are basically uniform in
13 saying these have turned out to be and will continue to be
14 very useful.

15 MR. CUNNINGHAM: Yes.

16 CHAIRMAN SELIN: They did not have the same
17 favorable initial reaction to the IPEEEs. Has this sort of
18 settled down?

19 MR. CUNNINGHAM: The one issue that's still, as I
20 understand it, floating about is the issue of the seismic
21 hazard that goes with the IPEEE.

22 CHAIRMAN SELIN: But that was a question of
23 definition. Were we looking for short-term fixes or were we
24 trying to rebuild the plants from scratch. I mean, I
25 exaggerated, but there seemed to be room for agreement if we

1 were not going to try to reexamine the basic seismic
2 capabilities of the plant.

3 MR. CUNNINGHAM: Yes. I think now it may be down
4 to more of a -- if we've defined different classes of
5 hazards curves, if you will, for seismic, what plants fall
6 in what hazard curves and therefore what they have to do to
7 respond to it. So that may be an outstanding issue right
8 now. Otherwise, I don't know of any particular problems
9 with that.

10 CHAIRMAN SELIN: Thank you.

11 MR. CUNNINGHAM: So that's a snap-shot of IPE.

12 Mr. Jordan is going to talk next about AEOD
13 efforts.

14 MR. JORDAN: Could I have the next slide, please?

15 [Slide]

16 MR. JORDAN: Even before the PRA program plan the
17 NRC staff recognized the need to make a transition towards
18 providing better PRA training for the overall staff and we
19 have had a suite of courses for several years to provide
20 that training. What we did not have was any kind of a
21 hierarchy or a set of qualification requirements or really
22 an organized way of deciding who should have what kind of
23 course.

24 Implementation of the PRA program plan has
25 necessitated that we develop the knowledge, skills and

1 abilities in a more formalized way for the technical staff
2 and the concept of three knowledge and skill abilities
3 levels was then used to help us identify the training
4 courses for the variety of staff positions. The three
5 levels are described as basic, advanced, and expert. We had
6 some very clever suggestions for other different levels to
7 be used as terminology, but we chose those.

8 The job and task analysis methodology was used to
9 identify four courses for development.

10 The first course provided advanced skills in event
11 and fault tree analysis.

12 The second course provides skills in calculating
13 conditional core damage probability from events and
14 conditions using the accident sequence precursor
15 methodology.

16 And the two accident courses provide advanced
17 skills in level 2 and 3 PRA methods.

18 Student and management feedback helped identify
19 two more needed courses.

20 The first course was developed to assist the staff
21 in the use of PRA insights, and this is in association with
22 the IPE results, and to assist in regulatory decision
23 making, so it provides a framework.

24 The second course provides skills in the use of
25 the integrated reliability and risk analysis system

1 software, the IRRAS software.

2 A seminar has been conducted with AEOD and NRR
3 staff to sharpen skills in use of binomial and Poisson
4 update methodology.

5 The staff has briefed ACRS on the PRA training
6 program. We've gotten some very useful insights from the
7 ACRS, suggestions on things we should consider further, and
8 we're continuing discussions with them and have a scheduled
9 visit by some of the ACRS members to the Training Center to
10 look over lesson plans and actual course material.

11 Senior representatives from NRR, NMSS, Research
12 and AEOD with the PRA program responsibilities have formed a
13 focus group to help the Training Center in developing
14 appropriate training programs.

15 My overall goal and expectation for the training
16 program is to integrate it fully with the systems courses so
17 that they flow smoothly.

18 Next slide, please.

19 MR. RUSSELL: Ed, you might comment that these are
20 near-term successes from the standpoint that we're looking
21 at actually implementing these this summer, that we had sent
22 to the Commission a paper addressing what we're doing by way
23 of improved training for residents, senior residents and
24 reactor analysts, and those activities are subject to
25 completion of the selection process for the candidates to go

1 in, ready to begin.

2 MR. JORDAN: Yes. The workshop for the events
3 analysts has already been conducted and the four courses I
4 mentioned earlier, the new courses, the first one begins
5 next month with one each succeeding month until September,
6 so those are real courses.

7 Thank you.

8 Slide 12, please.

9 [Slide]

10 MR. JORDAN: As was mentioned earlier, an
11 important element in the use of risk analysis methodology is
12 having better data, having better bases. We have a proposed
13 reliability data rule. Pat Baranowsky is the branch chief
14 managing that effort. The Commission at the last briefing
15 in August asked what we were doing in that regard. There is
16 now a rule drafted under review at the EDO's office. The
17 object is to provide generic data, plant-specific data in
18 order to support our more wise use of PRA. Presently the
19 generic data that we have is unverified and in many cases
20 outdated. Plant-specific data is sparse. It's very
21 difficult to recover plant-specific data from records, from
22 historic records.

23 There is certainly an activity with regards to the
24 maintenance rule that the same data that we're looking for
25 for safety equipment at the train level is being maintained

1 by plants with respect to the maintenance rule. So, there's
2 a very nice fit there.

3 We have participated in two of the pilot reviews
4 for the maintenance rule and have established that the data
5 that at least those two plants is maintaining would be a
6 very, very good fit for the kind of data we're seeking
7 through this rulemaking.

8 I guess the last two points with regard to the
9 policy statement, it was recognized in the policy statement.
10 There was a need to enhance the collection of equipment and
11 human reliability data. We do not yet have an active plan
12 to collect the human reliability data. It's an area we're
13 continuing to look at, and that these data would be made
14 available to the public and used in our process in a very
15 open fashion.

16 Next slide, please.

17 [Slide]

18 MR. JORDAN: This is just a schedule of the
19 reliability data rule plan. We have met with the ACRS and
20 the CRGR. We'll have a further meeting with the ACRS later
21 this week. We have submitted a rulemaking plan to the
22 Commission consistent with the new rulemaking process. We
23 plan to brief the Commission April 26th on the proposed
24 rule. The end date, I would say the object is to have an
25 effective rule that is consistent with the maintenance rule

1 when the maintenance rule becomes effective July 1996, with
2 a six month implementation plan after that date.

3 COMMISSIONER ROGERS: Just before we move onto
4 something totally different, how do you stand with the
5 industry's position of making the data available publicly?
6 I know that was a matter of some discomfort in some
7 quarters. Have we gotten over that or are we still
8 struggling with that issue?

9 MR. JORDAN: When we were approaching it from a
10 voluntary submission of data without a rule, that was the
11 stumbling point to the voluntary providing of those data.
12 So, the rule would overcome that stumbling point.

13 COMMISSIONER ROGERS: Well, it overcomes a
14 stumbling block, but it doesn't alleviate the discomfort on
15 it.

16 MR. JORDAN: No. I think the way to alleviate the
17 discomfort is some sort of a trial program while the
18 rulemaking process is proceeding to show the NRC's ability
19 to handle that data and to work with the industry in the use
20 of the data in a beneficial way for both the industry and
21 the NRC.

22 MR. RUSSELL: I think the licensees, at least the
23 number of them that I've spoken to, are quite concerned that
24 as they start reporting data, particularly if they happen to
25 have equipment which is not performing as well as the

1 industry, where that turns out to be risk-significant
2 equipment, and the examples are turbine driven pumps which
3 AEOD has recently done a study on and we know that there is
4 a performance problem in that area, that this process would
5 identify, in fact, those facilities that are having
6 performance and/or availability problems with important
7 safety related equipment. In my view that's a very
8 objective way of identifying who needs to have additional
9 NRC resources expended to address the equipment reliability
10 and availability.

11 The rule, maintenance rule, today requires that
12 they look at industry-wide experience. One of the issues
13 that they had very great difficulty with is that they don't
14 have the necessary industry-wide experience to compare their
15 performance. So, there are really two issues. There's one
16 of the industry -- individual plants evaluating their own
17 performance against what would be expected availability
18 reliability, and the other is our use of it to identify
19 areas where we may want to provide focus by way of
20 inspection activity. Some have been quite candid saying
21 that they don't want to use this as a potential indicator
22 and make it publicly available. They'd be willing to
23 provide the information with it being anonymous. That is
24 give us the data, let us do it generically, but not
25 necessarily identify the particular plant that has data

1 which is an outlier.

2 COMMISSIONER de PLANQUE: Is it possible to do it
3 that way? Are there any constraints against doing it that
4 way?

5 MR. TAYLOR: I think we're going to have to think
6 that through before we get an answer to that. We weren't
7 prepared today to get into that particular aspect of it.
8 So, I think we have more to do before we come back to you on
9 this.

10 COMMISSIONER de PLANQUE: To do a trial program,
11 presumably you need a volunteer.

12 MR. JORDAN: Right.

13 COMMISSIONER de PLANQUE: It's not clear that
14 they're lined up at the door.

15 MR. JORDAN: No. I really don't want to talk
16 about who would participate.

17 MR. TAYLOR: We're not ready.

18 MR. RUSSELL: But the licensees would have their
19 own site-specific data available on-site and through
20 inspection activity we would clearly have access to that
21 information on-site such that we could use it to focus our
22 activities. The issue becomes one as to whether it's
23 available also for parties other than the NRC.

24 MR. TAYLOR: We have to work that out. Obviously
25 that's an important issue.

1 MR. BERNERO: I'd like to say a few words about -
2 -

3 CHAIRMAN SELIN: The only reason you got off so
4 easy is because you're coming back.

5 MR. BERNERO: I'd like to say a few words about
6 PRA applications for medical devices and in waste
7 management. If we turn to slide 14, we can start with
8 medical radiation devices.

9 [Slide]

10 MR. BERNERO: For some time we've recognized that
11 isotope teletherapy units are fading away as a less popular
12 way of providing teletherapy in favor of linear
13 accelerators. However, there are other isotope devices,
14 high energy density devices that have come into use. Things
15 like stereotactic devices, the gamma knife where there is a
16 system which provides many radiation beams all focusing on a
17 single point to get the job done very quickly or high
18 density or high dose rate brachytherapy where a source is
19 mechanically moved through passages in a fast controlled
20 fashion to give many high dose rate exposures all around the
21 tumor. These devices are systems in many ways that lend
22 themselves to PRA.

23 We held a workshop in August of 1994 as part of
24 the address of developing risk methodology and we have
25 conducted and completed one study, NUREG-CR-6323. This is

1 on the gamma knife. That will be published shortly. What
2 we have found with the gamma knife study is a lot of
3 interesting insight, the favorite word for PRA, but these
4 devices are just replete with opportunities for human error.
5 It becomes a very dominant factor in the thing.

6 It's interesting to note that the first major
7 misadministration reported for the gamma knife was caused by
8 simply reversing an x-ray film on the viewing screen. Of
9 course, that meant that the beams focused on the wrong lobe
10 of the brain. So, it is useful, but we do have a problem
11 here. We're studying right now. We have a contract on
12 brachytherapy study, but these devices are unique. They are
13 not built in very large numbers. They change design very
14 frequently. They are often software controlled as well and
15 I'm not sure that this is a fruitful path for us to pursue.
16 I think the PRA can be useful to the designer of the
17 equipment, but the vulnerability to human control is a very
18 significant factor.

19 COMMISSIONER ROGERS: Excuse me. Have these
20 devices been analyzed by FDA? I mean they have presumably.

21 MR. BERNERO: Yes. FDA analyzes them, but the FDA
22 focus, they don't use anything like a PRA or that sort of
23 analysis. Theirs is much more on the safety and efficacy of
24 the device and a manufacturing authorization rather than the
25 use.

1 COMMISSIONER ROGERS: That's right.

2 MR. BERNERO: They're just now getting into use
3 reporting.

4 [Slide]

5 MR. BERNERO: If we turn to slide 15, you can see
6 the PRA progress in waste management. I remind the
7 Commission we tend to use the term of art "performance
8 assessment" when we speak of waste disposal or waste
9 management PRA. In high-level waste, we have had a
10 probabilistic risk standard for many years now, the EPA
11 standard 40 CFR 191, and so we have long applied performance
12 assessment techniques there. We're now looking more and
13 more in applications to low-level waste decommissioning plan
14 sites and uranium recovery and what happens when you apply
15 PRA methods to those places or as in high-level waste where
16 we are now considering dose standards rather than
17 probabilistic relief standards, you engage the question of
18 what constitutes compliance. If I have risk information and
19 a risk assessment, a probabilistic assessment, what
20 constitutes compliance over a very long period of time with
21 a simple deterministic standard such as 15 millirem to some
22 individual? This is a very significant point for us to
23 address.

24 In the high-level waste performance assessment
25 activity, we are now entering phase 3 of the iterative

1 performance assessment. This is the method by which NRC in
2 the persons of NMSS, Research and our Center for Nuclear
3 Waste Regulatory Analysis, we have an independent capability
4 to test the acceptability or expected acceptability of high-
5 level waste sites. We're going into phase 3 starting in
6 1995 and that will extend for about two years. We've
7 already done two of them.

8 We have formed a technical assessment team. Rex
9 Wescott in NRC, one of our best practitioners, is the leader
10 of that team to prioritize development of our assessment
11 methods, to explore in our conduct what we need for improved
12 assessment methods. We will continue to use this in the
13 site characterization review at Yucca Mountain and
14 subsequent high-level waste activities.

15 In the low-level waste area, and this applies also
16 to decommissioning and other applications, we have a branch
17 technical position and we are doing this analysis to
18 appraise not only what constitutes compliance, the issue I
19 mentioned before, but also right now we're very deeply
20 involved with evaluating how our decommissioning rule or our
21 low-level waste rules suffice or do not suffice to deal with
22 the EPA groundwater standard. As you know, the EPA has that
23 four millirem groundwater standard. So, we have a great
24 deal of comparative risk assessment going on in that field
25 as well.

1 That's all I have to say. It's back to NRR for
2 the future work.

3 MR. HOLAHAN: And I'd just like to conclude the
4 planned presentation by mentioning the areas where we're
5 going to focus near-term attention. Most of these were
6 mentioned in the presentation. Applications guide having to
7 do with quality of PRAs, number of pilot activities. IPE
8 insight program is a very important near-term activity.
9 Increased staff training and an item that, with Commissioner
10 Rogers' terminology, has caused the staff some discomfort.
11 I think I've caused our staff a little discomfort by moving
12 up the due date on our input to the Commission on the policy
13 statement. It was originally planned for August. We think
14 we can fill that back to a May 15th date based on the
15 limited number and the types of comments that we've
16 received. I think we can accelerate that. However, in
17 order to get that to the Commission by May 15th, we'd like
18 to change the process a little bit as to how we would
19 normally have approached this. What we would do is we would
20 go to the ACRS in parallel with providing it to the
21 Commission. That would allow us to get it to the Commission
22 by May 15th. Otherwise I think we would -- with, you know,
23 the monthly meetings of the ACRS, it wouldn't be available
24 to the Commission probably until mid-June.

25 CHAIRMAN SELIN: At least two of the current

1 Commissioners approved the acceleration, maybe all of us
2 would be interested.

3 MR. TAYLOR: We, of course, will provide the
4 Commission the ACRS input.

5 MR. HOLAHAN: In the final sense we'll pull it
6 altogether.

7 In addition, we would propose that the staff go to
8 an annual update of the Commission with respect to the
9 implementation plan. Of course, that's the Commission's
10 choice. Our previous updates were done on a six month
11 basis.

12 COMMISSIONER de PLANQUE: Gary, given the
13 applications in the waste arena, has this gone to ACNW?

14 MR. HOLAHAN: I believe that there was a meeting
15 and a discussion in February, was it, Bob?

16 MR. BERNERO: Yes, I think it was. The ACNW, of
17 course, is very heavily focused on the performance
18 assessment.

19 COMMISSIONER de PLANQUE: So, do you intend to
20 send it to them as well?

21 MR. HOLAHAN: I think it was the implementation
22 plan that was discussed. I don't remember the policy
23 statement. We can have them definitely look at that.

24 MR. TAYLOR: We'll do that.

25 COMMISSIONER ROGERS: We'd be interested in

1 hearing what they have to say about it.

2 MR. TAYLOR: That concludes the presentation.

3 CHAIRMAN SELIN: Commissioner Rogers?

4 COMMISSIONER ROGERS: Well, I thought this was a
5 very helpful, broad view of the entire program and I share
6 the Chairman's initial comments on how impressive the whole
7 thing is beginning -- impressively it's beginning to shape
8 up. I'm really quite pleased to see that because I think
9 this is a very important tool.

10 A couple of things that I'd like to just hear a
11 little bit more about. One is although the word was
12 mentioned once or twice, we really haven't heard anything in
13 this presentation about human performance and human factors.
14 I know it's a very sticky aspect of PRAs and yet I suspect
15 there are some aspects of human performance that actually
16 can be dealt with with engineering methods. Let's put it
17 that way, particularly control room team performances and
18 things of this sort.

19 I'd like to just urge you to not drop that because
20 it is a sticky area, but to try to pick out at least those
21 aspects of it that are minimal to a more -- an analysis that
22 we're all more comfortable with. I suspect that there are
23 some places. When we're talking about management
24 organization and things like that, that's very fuzzy. But I
25 think when we really, for instance, have the ability to

1 collect data on team performances on the simulators, at
2 least there's one approach that can be quantified and could
3 be used to some extent. It might or might not influence the
4 whole PRA, but it might be useful in this dynamic aspect of
5 PRAs. As different teams perform differently, that could
6 shift your overall PRA.

7 So, I would just urge you to keep looking at human
8 performance and not give up on it as an important input to
9 an overall PRA, although we all recognize the limitations
10 that exist in trying to come to something believable there.

11 I do feel that the issue that we talked about a
12 great deal here early on of how to compare the different --
13 to develop some confidence in PRA models for different
14 plants and different models for the same plant. I really
15 think that's very important and I feel that what we're
16 seeing here is a similar development early on in any kind of
17 new technology where there's many different approaches.
18 They may shake down to something ultimately that's pretty
19 common or they may not, but I'm a bit uncomfortable that
20 with this diversity of approach that's possible. For
21 example, I may be wrong on this. My understanding is that
22 the question of the impact on the overall PRA bottom line of
23 pump seal failure is handled very differently by different
24 PRA analysts and in some cases it doesn't appear at all as
25 if it weren't a problem. In others it's the most important

1 problem.

2 DR. THADANI: Yes, that's correct.

3 COMMISSIONER ROGERS: And so, there's an example
4 of something that I think kind of gives us pause that how
5 the modeling is done to carry out the PRA analysis can have
6 some rather profound effects on what really is important.
7 It's not just a bottom line. It really is what is important
8 on an incremental basis, so I think this is an area that we
9 need really to grapple with. And I know it's not an easy
10 one, but I do have a kind of bias in favor of some kind of
11 standardization that emerges from professional society input
12 to this of what's the way to do it.

13 In other words, I don't think it should just
14 become a free-for-all among possible consultants who can
15 offer their services to individual utilities to do PRAs.
16 It's got to come to some kind of a common professional
17 acceptance of how one constructs the model so that it
18 doesn't give very different results. I mean, there may be
19 differences in how you do it, but I still think that this is
20 a place where some degree of standardization based upon a
21 common peer review concurrence as to that's the way you set
22 up a model is probably something that is best dealt with
23 before everybody gets so far down the road with individual
24 PRA models that they've made enormous investments in and
25 tinkered with over a period of years that they just don't

1 want to change them or don't want to review that. Sticky
2 issue, I know, but I still feel that's something that maybe
3 we should be pressing on a little bit more.

4 On the training level for our own folks, I thought
5 that your approach, your three level KSA levels approach is
6 a very interesting one. Have a few questions about it, but
7 I think maybe they're not of interest to necessarily
8 everyone, just how you got at the PRA training, formal
9 education and experience vertical slices. I think they're
10 very interesting.

11 But I guess my general question is how do we
12 expect to use these basic levels in our policies with
13 respect to who does what? For example, would we ultimately
14 think of a requirement that someone has to have achieved,
15 let's say, an advanced level to do certain kinds of
16 activities at NRC? And where would the expert practitioner
17 come in? Would they be someone that would -- would there be
18 some kinds of work that actually you have to be an expert
19 practitioner to carry out or would that just be sort of a
20 nice gold star on your record that is nice to have but not a
21 necessary requirement? I'd like to hear a little bit about
22 your thinking on that, if you're ready to say something
23 about it.

24 MR. RUSSELL: Ed, you start and then --

25 MR. JORDAN: Okay. The idea of having some number

1 of levels was really for the purposes of understanding what
2 kind of training and what kind of education and what kind of
3 experience was warranted for people doing various levels of
4 work and therefore what training could we provide. And the
5 immediate insight was that we can't provide training to move
6 someone from an advanced to an expert in this scheme of
7 things, that the expert is developed by having the basic
8 education and a big "E" for experience having done a number
9 of PRAs are taught. So, it is a very high level.

10 So, the training program is not going to cause
11 people to become expert, but it can, in fact, by working
12 from education and experience, provide training to move
13 somebody from being I'll say a neophyte to being a
14 practitioner or even advanced level. So, it was in
15 identifying what kind of courses should we provide was the
16 reason for setting up such a scheme. I would be glad to
17 discuss it with you further separately if you like.

18 MR. RUSSELL: We also looked at it in the context
19 of what are the kinds of skills and resources that we're
20 going to need in various places in the organization. We
21 identified some of these to the Commission in our Commission
22 paper on the senior resident and reactor analyst positions
23 where the concept is to have some who are not necessarily
24 experts but through formal training and rotational
25 assignments and developmental activities would, within about

1 18 months, be a resource in each region to be able to
2 provide some insights as to how things are done in
3 inspection activities, et cetera, similar to what we had
4 discussed today.

5 We also are looking at providing additional
6 training to people who may be assigned to the PRA Branch,
7 whether it be in Research or in NRR, people who may be
8 involved in events assessments such that they can perform
9 accident sequence precursor types of analyses. We're
10 looking at a combination of classroom training, on-the-job
11 experience with an evaluation of what the current level of
12 systems knowledge is of the individuals. Recall at least
13 for the reactor analyst we were targeting individuals who
14 had experience levels similar to that of what you would see
15 with a senior resident. That is a pretty in-depth knowledge
16 of systems operations such you'll be able to take and add to
17 that some PRA training so they'd be able to bring the two
18 together.

19 So, we have focused at different levels and we
20 actually have position descriptions that are tied to these
21 that we see fitting into various parts of our organization.

22 COMMISSIONER ROGERS: Well, are the position
23 descriptions, do they reference a level or do they reference
24 certain specific training courses that one would have?

25 MR. RUSSELL: We actually have done this in the

1 context in which you would take a benchmark for the position
2 that describes both knowledge and experience that you would
3 want and then you would compare what the current inventory
4 is that the candidate has to that benchmark and develop a
5 tailored plan for that individual. In going through that
6 process, we identified a number of courses that we needed to
7 modify, some of which were made up with single one day
8 courses and others when it was being done in personnel. We
9 have completed about four or five months of effort on this
10 now. We can actually go through similar to job and task
11 analysis. We've identified it for a number of positions and
12 the kinds of courses that are needed. The next step is to
13 take that for individual candidates with a mentor for the
14 candidate and do it in a managed way similar to what we are
15 doing with some of the supervisory development programs,
16 actually develop these skills and have them available both
17 in the regions, amongst senior residents to a lower level
18 than you would a reactor analyst, but to have a resource in
19 the regions to help them also.

20 COMMISSIONER ROGERS: Well, it sounds like an
21 excellent approach. I really commend you on it.

22 CHAIRMAN SELIN: Commissioner de Planque?

23 COMMISSIONER de PLANQUE: I have just one question
24 and we may have discussed this before but I forget the
25 outcome. To what extent is the airline industry using PRA

1 and what, if anything, can we learn from them?

2 MR. TAYLOR: We looked at this at one time in FAA.
3 Maybe you can recall that.

4 MR. BERNERO: This goes back quite a few years.
5 The Boeing 757 and 767 were certified by FAA with a limited
6 use of reliability analysis or PRA. Electromechanical
7 systems, things like that. They did not use it for the
8 structural analysis and they did not use it for the pilot
9 response. Basically what they said is they have to do that
10 by conventional task analysis methods. But it was widely
11 used and the NRC had a lot of interaction with them at the
12 time.

13 COMMISSIONER de PLANQUE: I'm just curious if they
14 have made any progress in the use of this, especially in the
15 regulatory arena and, if so, if there's anything to be
16 learned.

17 MR. TAYLOR: I suppose we'd have to check that.

18 COMMISSIONER de PLANQUE: Perhaps it's worth
19 taking another look because their problems are always so
20 similar to ours.

21 COMMISSIONER ROGERS: And their maintenance
22 program.

23 MR. TAYLOR: Let's see what we can do before we
24 come back. We'll talk about the IPE if we can get
25 appropriate information.

1 COMMISSIONER de PLANQUE: I have no other
2 questions. It's an excellent briefing.

3 CHAIRMAN SELIN: I have a couple of just
4 observations. One is as, at this point, a disinterested
5 observer about when you do this the next time. Once a year
6 I think makes some sense. I personally don't see much sense
7 in doing performance assessment and reactor PRAs together.
8 I think they're really quite different. I do see a very
9 good thing. When PRA becomes a way of doing business, like
10 spelling correctly and things like that, we probably won't
11 need a PRA session. But right now, these analyses all feed
12 each other and so I do see a benefit in keeping them
13 together. And it may turn out that if, you know, you have
14 something really major to report on IPEs nine months from
15 now, that that would be a good time to do an overall update
16 because there are connections between the pieces. So it
17 would be useful to have an event if it's a broad enough
18 event to trigger these other pieces.

19 On the human factors, I agree with what
20 Commissioner Rogers said, but I would like to stress that
21 let's bear in mind what we're trying to do. At this point,
22 we're not trying to get an overall probability and therefore
23 sort of absolute values of human factors, as interesting as
24 they might be, are less important than looking for risk
25 factors in the control room or in the training program, so

1 you're really looking for sort of qualitative things about
2 in the simulators or in the events, what kind of mistakes do
3 people make and are they tied in with equipment design or
4 training or what-have-you.

5 And maybe somewhere down the line after the first
6 30 advanced boiling water reactors and System 80s have been
7 installed we'll actually have some numbers to say this is -
8 - you know, these are the intrinsic risks. But because the
9 overall figures are hard, it shouldn't obscure the need to
10 get some specific insights into training and control room
11 design. You know, is it worthwhile going back and redoing
12 some of these antiquated control rooms now? Is there any
13 reason to believe it would have an effect on risk or is it
14 just to satisfy the desire for order in engineers?

15 I have at least as high an opinion at the end of
16 the briefing as I did at the beginning, maybe even a little
17 higher. It was a very good job, both informative and
18 reassuring that real progress is being made.

19 Thank you very much.

20 [Whereupon, at 11:34 a.m., the above-entitled
21 matter was adjourned.]

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CERTIFICATE

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

TITLE OF MEETING: BRIEFING ON PRA IMPLEMENTATION PLAN -
PUBLIC MEETING

PLACE OF MEETING: Rockville, Maryland

DATE OF MEETING: Wednesday, April 5, 1995

was held as herein appears, is a true and accurate record of the meeting, and that this is the original transcript thereof taken stenographically by me, thereafter reduced to typewriting by me or under the direction of the court reporting company

Transcriber: Carol Lynch

Reporter: Peter Lynch



**STATUS UPDATE OF
PROBABILISTIC RISK ASSESSMENT
(PRA)
IMPLEMENTATION PLAN**

APRIL 5, 1995

OVERVIEW

- **Background**
- **Major activities to date**
- **Future activities**

BACKGROUND

- **Previously briefed the Commission on August 30, 1994, on**
 - **Proposed PRA Policy Statement**
 - **Proposed PRA Implementation Plan**
- **PRA Policy Statement published for comments on December 8, 1994**

MAJOR ACTIVITIES TO DATE

- **Public workshop on PRA Implementation Plan**
- **Applications guidelines and decision criteria**
- **PRA pilot applications**
- **Maintenance Rule pilot site visits**
- **Integrated Performance Assessment Process (IPAP) inspections**

MAJOR ACTIVITIES TO DATE (Continued)

- **Insights from IPE**
- **Training program and new courses for PRA**
- **Draft reliability data reporting rule**
- **Risk assessment for medical devices**
- **High-level waste and Low-level waste performance assessment activities**

PUBLIC COMMENTS ON PRA POLICY STATEMENT AND PRA IMPLEMENTATION PLAN

- **Generally support the PRA policy statement and implementation plan**
- **PRA method should complement the deterministic approach**
- **Any risk-based regulations should avoid an additional layer to the existing deterministic regulations**
- **PRA methods should be applied consistently by the NRC and by the industry**
- **Implementation plan needs more near term activities**

APPLICATIONS GUIDELINES AND DECISION CRITERIA

- **Staff review of NEI Draft PSA Applications
Guide completed**
 - **Guide accepted as a high level conceptual basis to begin pilot applications**
 - **Details to be evaluated in conjunction with pilot applications**
- **BNL is evaluating previous and ongoing regulatory applications of PRA to support near term decisions for pilot applications**

PRA PILOT APPLICATIONS

- **Priority pilot applications**
 - **IST**
 - **MOV testing**
 - **Graded QA**
- **Risk ranking methodology a central issue**
 - **Dynamic vs. static methodology issues being addressed**
 - **Working meetings with industry groups and individual licensees to discuss issues are ongoing**
- **Active discussions with potential volunteer licensees**
 - **Pilots expected to start June/July 1995**
- **Completed 9 Maintenance Rule pilot site visits**
 - **Included BWR and PWR plants from all regions**
 - **Systems ranked by risk significance**
 - **Evaluated on-line maintenance and risk management practices**

ON-LINE MAINTENANCE RISK MANAGEMENT

- **NRR Management Site Visits and Early Maintenance Rule Pilot Site Visits Identified a Safety Issue**
 - **Importance of Risk Management and Safety Implications of On-Line Maintenance not Uniformly Recognized by Licensees**
- **Industry and NRC staff Alerted**
 - **Letters to NEI, INPO and Utility Executives**
 - **NRC TI 2515/126**
- **INPO Guideline Issued**
“Managing Maintenance During Power Operations”
- **Later Maintenance Rule Pilot Site Visit Indicate Heightened Awareness of Importance of Risk Management when Performing Maintenance On-line**

INTEGRATED PERFORMANCE ASSESSMENT PROCESS (IPAP)

- **Assessed plant operation, maintenance and engineering, based on integrated risk-based performance**
- **To aid in focusing/modifying future NRC inspection program and to enhance SALP process**
- **Pilot IPAP performed at Beaver Valley and South Texas Project by generating risk profiles**
- **Two more pilot visits planned for 1995**

IPE/IPEEE REVIEWS AND INSIGHTS

- **Accelerating IPE reviews**
- **Focusing staff involvement on**
 - **Insights and**
 - **Regional presentations - plant-specific results and insights**
 - **First presentation - May 1995**
 - **Complete presentation (IPEs) - December 1996**
 - **NRR/Regional site audits**
 - **Follow regional presentations**
 - **Verify that IPE insights properly considered by operating staffs**
- **IPEEE reviews and insight studies**
 - **Just beginning**
 - **Similar elements to IPE activities**

PRA STAFF TRAINING

- **Establish Three Levels of Knowledge - Skill - Abilities**
- **Courses Based on Job and Task Analysis**
 - **Systems Modeling Techniques**
 - **Risk Assessment in Event Evaluation**
 - **Accident Progression**
 - **Accident Consequence Analysis**
- **Courses Based on Student/Management Feedback**
 - **PRA Insights into an IPE**
 - **Advanced IRRAS**
- **Data Analysis Seminar**
- **Interaction with ACRS**
- **Establish PRA Training Focus Group**

RELIABILITY DATA NEEDS

- **PRA Plan**
 - **Current practice**
 - **Generic data, often unverified or outdated**
 - **Plant-specific data, sparse, inefficient**
 - **Increased PRA role will increase data need**
 - **PRA Plan recognizes need for credible data from current experience for NRC and Industry use**
- **PRA Policy Statement**
 - **Enhance collection of equipment and human reliability data**
 - **Make data available to public**

RELIABILITY RULE PLAN

Status

- **October 1994** - **EDO-Approved rulemaking**
- **March 1995** - **CRGR & ACRS briefing on conceptual rule**
 - **Rulemaking Plan to Commission**

Schedule

- **April 1995** - **Proposed rule to Commission**
- **May 1995** - **Publish rule for public comment**
- **Nov 1995** - **Publish Regulatory Guide for public comment**
- **April 1996** - **Final rule to Commission**
- **July 1, 1996** - **Effective date of rule (consistent with Maintenance Rule)**
 - 6 months to implement**

PRA APPLICATIONS FOR MEDICAL RADIATION DEVICES

- **Workshop conducted in August 1994 for future risk methodology development for medical devices**
- **NUREG/CR-6323, “Relative Risk Analysis in Regulating the use of Radiation-Emitting Medical Devices: A Preliminary Application,” April 1995**
- **Ongoing contract to develop a limited risk assessment to assess specified brachytherapy procedures**

PRA PROGRESS IN WASTE MANAGEMENT

- **Scope of PRA activities in Division of Waste Management**
 - High-Level Waste (HLW), Low-Level Waste (LLW), Site Decommissioning Plan Sites, Uranium Recovery
 - Apply PRA methods according to the complexity of the system, its uncertainties, and the estimated risk
- **Progress in High-Level Waste Performance Assessment (PA)**
 - Iterative Performance Assessment (IPA) Phase 3 initiated
 - Formed a Technical Assessment Team to employ risk-based methods to prioritize development of assessment methods
 - Traditional approaches combined with input from IPA
- **Progress in Low-level Waste Performance Assessment (PA)**
 - Continued development of the Branch Technical Position (BTP) on LLW PA and Test Case demonstrating the BTP approach
 - Risk-based implications of various alternatives used to develop BTP

FUTURE ACTIVITIES

- **Near term focus**
 - **Application guidelines and decision criteria**
 - **Pilot applications**
 - **IPE insights and NRR/Regional briefings**
 - **Increasing staff PRA capability**
 - **Final PRA Policy Statement to the Commission by May 15, 1995
(Copy to ACRS in parallel)**
 - **April 19, 1995 IPE Commission Briefing**
- **Annual status updates for the Commission**