

ORIGINAL

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

Title: BRIEFING ON PROPOSED RULE FOR MAINTENANCE OF NUCLEAR
POWER PLANTS

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1 UNITED STATES OF AMERICA
2 NUCLEAR REGULATORY COMMISSION

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4 COMMISSION BRIEFING ON PROPOSED RULE FOR
5 MAINTENANCE OF NUCLEAR POWER PLANTS

6 ***

7 [PUBLIC MEETING]

8 ***

9 Nuclear Regulatory Commission
10 One White Flint North
11 Rockville, Maryland
12

13 FRIDAY, OCTOBER 14, 1988
14

15 The Commission met, pursuant to notice, at 10:00
16 a.m., the Honorable LANDO W. ZECH, Chairman of the Commission,
17 presiding.

18 COMMISSIONERS PRESENT:

19 LANDO W. ZECH, Chairman of the Commission
20 THOMAS M. ROBERTS, Member of the Commission
21 KENNETH CARR, Member of the Commission
22 KENNETH ROGERS, Member of the Commission
23
24
25

1 NRC STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

2

3 S. Chilk W. Parler

4 J. Taylor E. Beckjord

5 T. King B. Morris

6 T. Murley E. Jordan

7 T. Novak T. Gody

8

9 AUDIENCE SPEAKERS:

10 B. Lee, NUMARC

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P R O C E E D I N G S

CHAIRMAN ZECH: Good morning, ladies and gentlemen.

On August 16, 1988, the NRC Staff briefed the Commission concerning the results of a public workshop held in July to explore issues related to the development of a proposed rule on maintenance of nuclear power plants. The proposed rule was is being prepared by the Staff, consistent with the Commission's policy statement on maintenance of nuclear power plants. The Staff recently forwarded a paper to the Commission which requested a vote that provides the details of the proposed rulemaking on maintenance of nuclear power plants.

The Staff has also recently forwarded a paper to the Commission for information concerning preliminary results of the trial program on maintenance performance indicators. There is no question in my mind concerning the strong relationship between effective maintenance performance and nuclear safety. This relationship becomes even more apparent as the current generation of nuclear power plants age. In my view, it is important that this agency have the regulatory tools necessary to assure that maintenance is properly and effectively performed in order to assure the continued safe operation of nuclear power plants.

This morning, the NRC Staff will brief the Commission concerning the proposed rule for maintenance and the status of its efforts to develop indicators of the effectiveness of

1 maintenance at nuclear power plants for the use in monitoring
2 individual plant maintenance performance.

3 I understand that copies of the Staff's presentation
4 are available as you entered the room.

5 Do any of my fellow Commissioners have any opening
6 comments before we begin?

7 [No response.]

8 CHAIRMAN ZECH: If not, Mr. Taylor, you may proceed.

9 MR. TAYLOR: Good morning, Mr. Chairman. The Staff
10 presentation today will be basically in two parts; first, by
11 the Office of Research and then by AEOD. With me at the table
12 today are Eric Beckjord, Bill Morris, Tom King from Research;
13 Ed Jordan and Tom Novak from AEOD, and Tom Murley and Tony Gody
14 from NRR.

15 As you emphasized, Mr. Chairman, this proposed rule
16 has as its objective the enhancement of safety by strengthening
17 the effectiveness of maintenance throughout the nuclear
18 industry. Although there are a number of licensees who are
19 conducting excellent maintenance programs, there are others
20 where there is room for substantial improvement.

21 The proposed rule defines in very general terms what
22 the Staff believes constitutes a good maintenance program and
23 specifies the date when all licensees should have such programs
24 in place. The EDO's position is that there is a need for such
25 a rule. The Federal Register Notice, which would accompany the

1 proposed rule, indicates the Commission's preference that the
2 industry assume considerable responsibility for implementing
3 the rule. Specifically, the industry is called on to develop a
4 standard for maintenance, which would incorporate the good
5 practices being followed by those utilities who have
6 outstanding maintenance programs -- and there are those -- and
7 it builds upon ongoing industry initiatives. You heard about
8 some of these initiatives during the presentation on August
9 3rd.

10 The Notice also requests comments on the possibility
11 of establishing a third-party maintenance certification
12 program, again the idea that maybe the industry will
13 participate in certifying maintenance programs at the
14 utilities.

15 In summary, the nuclear industry is being invited to
16 participate in implementation of the maintenance rule in a way
17 that will take advantage of the best knowledge, experience, and
18 initiatives in conducting maintenance that the industry has to
19 offer.

20 The rule is general, because there are many different
21 ways to accomplish good maintenance, and this is reflected in
22 varying program in the plant.

23 Although the ACRS is not yet convinced, the EDO and I
24 both believe that the maintenance rulemaking strategy that the
25 Staff has proposed to you will be effective in enhancing

1 safety. We will come back to the ACRS letter later in the
2 presentation.

3 At this time, I will turn the discussion over to the
4 Office of Research and Eric Beckjord.

5 CHAIRMAN ZECH: Thank you very much. You may
6 proceed.

7 MR. BECKJORD: Thank you, Mr. Chairman.

8 We are here this morning to present the proposed rule
9 on maintenance of nuclear power plants. The important in this
10 action are the following: December 30, 1987, the Staff sent an
11 interim policy statement on the maintenance of nuclear power
12 plants to the Commission for its consideration.

13 February 16, 1988, the Advisory Committee on Reactor
14 Safeguards sent its letter of comment on this statement to you.

15 February 25, 1988, the Commission approved the
16 interim policy statement as modified for publication as a final
17 statement and directed the Staff to develop a proposed rule.

18 March 23, 1988, the statement was published in, the
19 Federal Register.

20 The action for rulemaking was assigned to Research,
21 the Office of Research at the end of March, and the Staff sent
22 its proposed plan and schedule for rulemaking to the Commission
23 on May 23rd.

24 Since that time, the Staff has held a public workshop
25 already referred to, to obtain the views of interested parties.

1 It initiated and has received a report by consultants on
2 observations and recommendations for this rule -- that is, the
3 Inaba Report. It has met with the FAA, with EPRI, INPO, and
4 people from France, the Federal Republic of Germany, and Japan,
5 who are knowledgeable in maintenance practices of nuclear power
6 plants in those countries, and it has prepared the proposed
7 rule and the regulatory analysis.

8 The proposed rule requires that licensees develop a
9 documented maintenance program that addresses all the
10 activities listed in the policy statement. The rule also
11 encourages the industry to develop a standard that defines an
12 acceptable approach to satisfying the rule. The schedule for
13 industry compliance with the proposed rule is two years after
14 Commission approval.

15 Mr. Tom King of the Office of Research is prepared to
16 make a detailed presentation to you on the proposed rule.

17 CHAIRMAN ZECH: Thank you very much. You may
18 proceed.

19 MR. KING: The purpose of the presentation is to
20 summarize the contents of the Notice of Proposed Rulemaking
21 which was sent to you at the end of September in SECY-88-277,
22 including our plans and schedule for implementation of the
23 proposed rule.

24 Briefly, the presentation today will cover a summary
25 of the work done leading to the Notice of Proposed Rulemaking,

1 a brief description of the supporting documentation developed,
2 our conclusions and recommendations for the rule, comments on
3 the ACRS letter that we received, a discussion of the schedule
4 and implementation plan, and a review of the contents of the
5 Notice of Proposed Rulemaking package.

6 Beginning on page 2, just briefly, we had submitted
7 our plan and schedule for this proposed rulemaking to the
8 Commission in May of this year, developed a rulemaking options
9 paper in June, which was provided to participants in the
10 workshop, and included in that paper was a strawman rule for
11 one of the five options that were included in the options
12 paper. We held the workshop in July; we briefed the Commission
13 on August 16th on the results of the workshop, and in parallel
14 with these efforts, we reviewed foreign country and other U.S.
15 industry maintenance practices, as Dr. Beckjord mentioned.

16 Our Notice of Proposed Rulemaking reflects and takes
17 into account what we've learned from all these various
18 activities. We have developed some supporting documentation to
19 go along with the Notice of Proposed Rulemaking. That's listed
20 on pages 3 and 4 -- a summary of the proceedings of the
21 workshop, a draft NUREG that summarizes our maintenance -- the
22 maintenance approaches and practices that we looked at in the
23 U.S. and in foreign countries, and we received a report from
24 our consultant, Dr. Inaba, and his views on the proposed
25 rulemaking. The reports will be available to go into the PDR

1 at the time the rule is published for comment. These are the
2 reports that will give you an idea of the extensive work that
3 was done.

4 Basically as a result of the workshop and the review
5 of these other activities, the maintenance practices, the Staff
6 recommends that the Commission proceed with a general rule.
7 Basically, the thrust of that rule is, one, that it will
8 specify those attributes in the policy statement, which the
9 Commission considers essential for an effective maintenance
10 program, and this will include provision for monitoring program
11 effectiveness and feedback to improve the maintenance program,
12 and its an approach which we believe promotes and encourages
13 industry participation and responsibility for defining,
14 monitoring, and improving maintenance programs, thus building
15 upon the ongoing industry initiatives.

16 On pages 6 through 8, there is a brief summary of the
17 rulemaking approach.

18 As I mentioned, it's a general rule; we propose it as
19 10 CFR Part 50.65. It will require licensees to have a
20 documented maintenance program addressing all the activities
21 listed in the Commission's policy statement. We believe these
22 activities as listed in the rule essentially represent those
23 items which, through experience and judgment, contribute to
24 effective maintenance.

25 The rule has only made minor wording clarification

1 changes to those attributes as listed in the Commission's
2 policy statement. The rule would apply to all systems,
3 structures and components in the plant, commensurate with their
4 safety significance. That means that everything in the plant
5 would be covered, but perhaps some of the attributes may not
6 apply to certain systems or components that have little or no
7 safety significance.

8 COMMISSIONER ROBERTS: Would you repeat that last?

9 MR. KING: The rule would apply to all systems,
10 structures and components in the plant; that some specific
11 attributes that are listed as part of the maintenance program
12 might not be applicable to certain systems or components that
13 have little or no safety significance. For example, root cause
14 analysis may not be necessary on some electrical system that
15 doesn't have any safety connection.

16 COMMISSIONER ROBERTS: But if I read the supplemental
17 information section, it says the rule is intended to cover all
18 systems, structures and components, including those in the
19 balance of plant.

20 MR. KING: Yes. That means the basic provisions of
21 good maintenance; following procedures, having good
22 communications and so forth, would apply to everything. There
23 may be some specific engineering evaluations that perhaps you
24 wouldn't need to do on systems or components that really don't
25 have much to do with safety of the plant.

1 COMMISSIONER ROBERTS: Well, I guess my question is
2 to the General Counsel: do we have the authority to initiate
3 rulemaking on things that are not, quote, "important to
4 safety"?

5 MR. PARLER: A question such as that was addressed to
6 me in connection with the Surrey matter, as I recall, and
7 perhaps also in connection with how our requirements
8 interrelate with those of other agencies such as OSHA.

9 As long as there is some possible basis for relating
10 that which we are trying to reach to radiological health and
11 safety, we have the authority to reach it from a regulatory
12 standpoint. If someone concludes -- which one rarely concludes
13 in this business -- that there's absolutely no possibility of
14 such an interrelationship that could affect safety, then we do
15 not have the authority to reach it, unless there are
16 environmental considerations that are involved, and then
17 possibly we could reach it under the National Environmental
18 Policy Act.

19 COMMISSIONER ROBERTS: The short answer is we could
20 reach it.

21 [Laughter.]

22 CHAIRMAN ZECH: All right, you may proceed.

23 [Slide.]

24 MR. KING: Continuing on to page 7, the rule includes
25 a requirement for licensees to assess their program

1 effectiveness and make improvements where warranted, although
2 the rule does not require the licensees to report performance
3 indicators. We believe this provision in the rule adds the
4 performance-based considerations to the rule, although at this
5 time we are not prepared to spell out specific performance
6 indicators to be reported.

7 The rule, we believe, encourages industry to develop
8 a standard to define an acceptable way to meet the rule. Our
9 intent would be that NRC would review and endorse that standard
10 in a Regulatory Guide. As I mentioned before, this is an
11 effort to promote industry participation and responsibility for
12 good maintenance, and allows the utilization of the industry
13 initiatives in this process.

14 [Slide.]

15 Finally, on page 8, compliance with the rule would be
16 determined by NRC auditing inspections. And as another
17 provision we've added into the Notice of Proposed Rulemaking,
18 we solicit comments and proposals for third-party certification
19 of plant maintenance programs. We've put this in as a further
20 effort to promote industry responsibility and participation in
21 problem identification and resolution.

22 [Slide.]

23 Page 9, on September 13th we received a letter from
24 ACRS as a result of our review with them of this Notice of
25 Proposed Rulemaking package. That letter basically had two

1 points in it. One was that they weren't -- it wasn't clear to
2 them that the maintenance rule would reduce risks at nuclear
3 power plants; and they were concerned that it may detract from
4 good maintenance at some power plants.

5 [Slide.]

6 Our views on this are discussed on pages 10, 11 and
7 12. I don't think there's any question that well-maintained
8 plants represent lower-risk plants versus those that are poorly
9 maintained. I don't think ACRS disagrees with that nor does
10 anyone on the Staff.

11 What we did with the rule was try and structure it so
12 that licensees' maintenance programs will be required to
13 include those attributes that have been determined by
14 experience and judgment to contribute to effective maintenance.
15 Although it's tough to measure effective maintenance
16 quantitatively, we believe that such a rule if properly
17 implemented would contribute to reduction of risk at power
18 plants.

19 [Slide.]

20 On page 11 we've provided the Staff's regulatory
21 analysis which made an attempt to quantify such risk reduction.
22 We also believe that the rule is not solely directed toward
23 today's poor performers. In other words, it should not be
24 looked at as just an effort to bring up today's poor performers
25 to some acceptable level, but really is directed toward

1 ensuring consistent performance over time.

2 [Slide.]

3 Regarding the second point of ACRS, that it would be
4 detracting from good maintenance programs, we believe the
5 provision for encouragement of industry to take the lead and
6 develop a standard and perhaps pursue a third-party
7 certification program provides an opportunity for them to
8 develop a maintenance program that would not detract from their
9 initiatives and would not detract from good maintenance
10 practices at existing plants today.

11 COMMISSIONER ROBERTS: Before you leave the ACRS, I
12 quote directly from their letter. "The regulatory analysis
13 provided by the Staff makes an arbitrary assumption that a
14 reduction in risk will occur as a result of the rule, and bases
15 its cost-benefit conclusions on a guess about the amount of
16 risk reduction expected." I think that's a rather strong
17 criticism.

18 MR. KING: We don't believe it's an arbitrary
19 assumption that there is a reduction in risk. The regulatory
20 analysis looked at the reduction in risk several different
21 ways, and there was some basis for the numbers that are in the
22 regulatory analysis. I can go through that now or I can go
23 through that at the end of the presentation when we get to the
24 slide and talk about how we estimated the risk, what the
25 assumptions were. Whichever you prefer.

1 COMMISSIONER ROBERTS: Just for my own information,
2 did you meet with the ACRS and make a presentation to them?

3 MR. KING: Yes. We've met with them four times; two
4 with the subcommittee and two times with the full committee.

5 COMMISSIONER ROBERTS: You certainly didn't persuade
6 them.

7 MR. KING: Obviously we didn't persuade them.

8 CHAIRMAN ZECH: Proceed.

9 [Slide.]

10 MR. KING: On page 13, the schedule for the final
11 rule, to meet the Commission's desired completion date of April
12 of '89 to have a final rule we have developed the schedule that
13 is shown on page 13. We would hope to be able to publish the
14 proposed rule by November 1st of this year, have a 60-day
15 public comment period which would end in January. That gives
16 approximately two months to look at the public comments, make
17 any revisions to the rule we believe are necessary, prepare a
18 final package, go through ACRS and CRGR reviews, and provide to
19 the Commission a final rule package the beginning of April.
20 And we would hope then about a month later the final rule would
21 be published.

22 [Slide.]

23 The plan for implementation is shown on pages 14 and
24 15. As proposed in the Notice of Proposed Rulemaking package,
25 the rule would require full implementation two years after the

1 final rule is approved. It calls for licensees to develop
2 their own implementation plans 90 days after approval. It
3 calls for or encourages the industry to develop a standard that
4 we could review and endorse in the Reg Guide; however, we also
5 propose a parallel effort -- that the Staff in parallel with
6 the industry developing a standard. The Staff would develop a
7 draft Reg Guide basically for two purposes; one, it could be
8 used as a benchmark with which to evaluate the industry
9 submittal, and two, it provides a fallback in case an industry
10 submittal does not come forward.

11 We would plan to issue the Reg Guide, whether it
12 endorses an industry standard or whether it's our own, in April
13 of 1990 to provide approximately a year to the industry to
14 implement the requirements or the guidance in that Reg Guide
15 prior to the time the rule is fully effective.

16 If there is an industry standard, we would hope to
17 receive that approximately a year from now in September of '89
18 so that we can review it and go through our process of
19 developing a Reg Guide and going out for public comment on that
20 Reg Guide to meet that April of 1990 date.

21 [Slide.]

22 On page 16, the contents of the Notice of Proposed
23 Rulemaking package. In addition to the proposed rule itself,
24 the package has supplementary information, particularly some
25 guidance on what we felt were attributes in an acceptable

1 standard, some additional items for consideration which came
2 out of our look at other industries and other countries'
3 maintenance programs and practices, some specific comments that
4 were requested of industry, and the regulatory backfit
5 analysis.

6 [Slide.]

7 Pages 17 through 19 we list the attributes we believe
8 are necessary for an acceptable maintenance standard which are
9 included in the Notice of Proposed Rulemaking. Basically, they
10 are that (1) it should define the plant systems, structures and
11 components included in the maintenance program -- that's just a
12 common sense item. It should be based upon or require a
13 systematic evaluation of the functions and objectives of the
14 plant systems, components and structures -- in other words, we
15 want to make sure that the maintenance requirements in the
16 standard on individual components and systems are consistent
17 with and support the overall plant performance objectives.

18 [Slide.]

19 Page 18, we state it should provide clear and
20 specific programmatic requirements that can be practically
21 implemented. Too general a standard doesn't accomplish much;
22 too specific a standard doesn't allow flexibility, and we think
23 there needs to be a balance in there to provide enough guidance
24 to the licensee so that he can develop the details of his
25 maintenance program and document that. We don't propose that

1 the standard get into the specific requirements for components
2 and systems and technical requirements, but would provide
3 enough information for a licensee to develop those in his
4 standard that he would maintain at the plant.

5 We believe it should address all the activities and
6 functions included in the proposed rule including a provision
7 for self-assessment. It should reference standards or
8 guidelines that are already on the street developed by ASME,
9 INPO, EPRI and so forth. We believe this standard is a good
10 place to tie together all the various ongoing maintenance
11 initiatives and activities that are on the street today that
12 are directed toward improving maintenance.

13 [Slide.]

14 We believe the standard should allow flexibility for
15 adoption of new innovative technologies so that it doesn't
16 prohibit improvement in the way maintenance is done, and should
17 require sufficient documentation so that program effectiveness
18 and compliance with these requirements can be determined.

19 The final rulemaking package will be in a position to
20 expand on these attributes and provide further detail as to
21 what we believe constitutes an acceptable standard.

22 [Slide.]

23 Starting on page 20 is a summary of the items that we
24 feel ought to be discussed and ought to be considered as part
25 of developing a standard, based upon the things we learned in

1 talking with foreign countries and other U.S. maintenance
2 programs at FAA, Boeing and so forth.

3 These are basically items at this point in time that
4 we want to put on the table for discussion; we're not putting
5 them forth as hard and fast requirements at this time, but they
6 derive from discussions where people we talked with said, these
7 are things that we feel are key to our programs, and we wanted
8 to get those laid out and on the table for discussion in the
9 development of this standard. I will just run through those
10 quickly.

11 Numbers 1 and 2 are basically tied together. We feel
12 that the standard should focus on long-term maintenance
13 objectives and promote a proactive maintenance program versus a
14 reactive maintenance programs. In other words, emphasize
15 things like preventive maintenance, predictive, reliability-
16 centered approach to maintenance. This would include looking
17 at what needs to be done when you do maintenance as well as how
18 often you do it, and optimize both of those activities.

19 [Slide.]

20 Page 21. Root cause analysis. Engineering
21 evaluation of failure data (root cause analysis). We feel
22 that's an important factor to a good maintenance program.
23 Using an integrated information system for collecting data and
24 using that to monitor effectiveness and feedback to improve
25 maintenance.

1 Maintenance technician training and certification
2 programs. There was a statement in the attributes in the
3 Commission's policy statement and in the rule dealing with
4 maintenance personnel training and qualification and we wanted
5 to emphasize it here as something other people said as very
6 important.

7 Providing, planning and scheduling from overall
8 program objectives -- that ties in again with Items 1 and 2; a
9 top-down approach, making sure what you do is consistent with
10 the overall plan objectives.

11 [Slide.]

12 Page 22. Enhance the environment/motivation of
13 skills and maintenance technicians through what we call, some
14 people call, cross-training or crew chief concept. In other
15 words, have certain crews be experts on certain systems or
16 components in the plant. They will be able to apply their
17 expertise we believe and become more efficient and more
18 accurate in terms of doing maintenance.

19 Would define interfaces between maintenance and other
20 activities. That certainly would seem a common sense thing to
21 do but again, it was pointed out by a number of people that
22 this is a key area that needs attention to make sure you've got
23 the proper work control and the proper communications going on
24 when you're doing maintenance.

25 And finally, include in your maintenance program

1 those things we're learning from the plant aging studies. As
2 you know, the Office of Research has an extensive aging program
3 underway and there's valuable information coming out of that.
4 A lot of that information deals with what should be looked at
5 in maintenance, how do you do good maintenance to counteract
6 some of these aging concerns. We feel that ought to be
7 considered in any maintenance standard.

8 [Slide.]

9 Pages 23 and 24, specific comments that we requested
10 in the Notice of Proposed Rulemaking.

11 First, is it appropriate for the nuclear power
12 industry to develop a maintenance standard, and if so, would
13 the industry develop such a standard. We would like to get
14 feedback early on at this stage of the rulemaking development
15 from the industry as to whether they will step forward and take
16 the lead to develop a standard.

17 A further follow-up question: what level of detail
18 should be included in the standard. We'd like to have specific
19 comments back regarding that. And the timeframe we proposed:
20 two years to develop and implement such a standard. We asked a
21 question specifically directed towards the reasonableness of
22 that approach, that schedule.

23 [Slide.]

24 There's a question on the third-party certification
25 process -- would someone be willing to do that, is it

1 appropriate to do that.

2 And finally, a discussion on maintenance performance
3 indicators and some feedback from the public and industry
4 regarding should they be in the rule and is there a set out
5 there that someone believes is a validated set that would give
6 us an indication of performance and effectiveness of
7 maintenance.

8 [Slide.]

9 Finally, the last slide on the regulatory and backfit
10 analysis. The basic conclusion is that the rule will have an
11 overall positive benefit; it's based upon looking at public
12 risk reduction, it's based upon looking at costs, both the cost
13 to the industry and cost savings that result from increased
14 plant capacity factor.

15 Regarding the risk reduction, we looked at it two
16 ways. In Generic Issue, HF-8, it was titled "Maintenance and
17 Surveillance Program." It was prioritized a couple years ago
18 and just recently resolved. In the prioritization resolution
19 of that generic issue there were risk estimates developed for
20 what a good maintenance program does to reduce risk.
21 Basically, it builds upon Japanese experience and was based
22 upon looking at the reduction in the number of scrams caused by
23 having a good maintenance program. It looked at the U.S.
24 industry average number of scrams per year, and based upon the
25 Japanese data made an assumption on how that number would come

1 down as a result of a good maintenance program. And using
2 Oconee and Grand Gulf PRA's, estimated the reduction in the
3 risk from that reduction in the number of scrams.

4 As a result of that analysis, there's an estimate of
5 300,000 person rem reduction in risk over the life of the
6 existing plants.

7 The second way that we looked at risk was using NUREG
8 1150 risk numbers and based upon information that we have on
9 safety system failure rates of plants that have what we believe
10 are poor maintenance programs versus those that we believe have
11 good maintenance programs, came up with an estimate that plants
12 with poor maintenance programs have a factor of 2 to 3 greater
13 safety system failure rate than those with good maintenance
14 programs. We factored that back in to NUREG 1150 risk numbers
15 and estimated a risk reduction. That risk reduction came up
16 with a range of 120,000 to 720,000 person rems -- the point
17 estimate we used was 250,000, and that we feel is pretty
18 consistent with the risk reduction estimated from the
19 resolution of Generic Issue HF-8. So that's the number we used
20 as our point estimate in risk reduction.

21 As far as costs go, we looked at a number of costs;
22 we tried to include everything whether they were benefits or
23 whether they were costs to the industry or costs to the NRC.
24 The two basic ones were the cost to the industry to do better
25 maintenance, and we felt that cost would be limited to

1 approximately 25 percent of the plants that would have to come
2 in and do maintenance in a better way than they're doing it
3 today. And we estimated a cost on that based upon experience
4 and reports from the Salem Nuclear Power Plant.

5 The cost-benefit primarily comes from the reduction
6 or the improvement in plant capacity factor, and that's based
7 upon a correlation of looking at plants that receive low scores
8 in the SALP process from maintenance and surveillance. Perry
9 knows that it received high scores in maintenance or
10 surveillance in looking at their difference in capacity factor.
11 And again, that only applied to 25 percent of the plants
12 because those are the ones we feel will actually get an
13 improvement as a result of this rule, and we estimated a cost
14 based upon a five percent increase in capacity factor for 25
15 percent of the plants.

16 The rest of the costs were fairly minor, but when we
17 went through and added all of that up we estimated a net cost-
18 benefit to industry from implementing this rule.

19 That quickly summarizes the Notice of Proposed
20 Rulemaking package and completes my presentation.

21 CHAIRMAN ZECH: Thank you very much.

22 MR. TAYLOR: Mr. Chairman, we're prepared to proceed
23 with the AEOD portion --

24 CHAIRMAN ZECH: Yes, I think you should proceed with
25 that.

1 COMMISSIONER ROBERTS: Do you want to save all
2 questions for the end?

3 CHAIRMAN ZECH: We can do it either way. If you'd
4 like to ask questions now, go ahead.

5 COMMISSIONER ROBERTS: Well, you mentioned scrams,
6 and I'm looking at the document and as I understand it, by NRR
7 -- and I'm looking at the 1985 weekly average of scrams as
8 10.4, in '86 8.9, '87 8.5, '88 weekly average year to date 6.0.
9 Now, certainly scrams, in evaluating plant safety, is a two-
10 edged sword, and I fully understand that. But this is a pretty
11 compelling trend.

12 MR. KING: You believe it's coming down already,
13 without this rule.

14 COMMISSIONER ROBERTS: Absolutely.

15 MR. KING: We assumed an industry average of 5.3
16 scrams per year in the --

17 COMMISSIONER ROBERTS: As a result of this rule?

18 MR. KING: No. As the industry average prior to
19 implementing the rule. So I think we're --

20 MR. TAYLOR: The Staff does recognize the improvement
21 in scram rate in the U.S. We also recognize there are other
22 countries who have much better numbers than we have been able
23 to achieve. When I say we I mean of course the industry. And
24 it is something that is incremental improvement.

25 Those numbers do reflect I think improvement. Tom, I

1 think you share that view. The Staff does feel it can improve
2 more, and that's just one part. The Staff is still concerned
3 at maintenance issues at numbers of plants across the country.
4 It comes up very frequently in our discussion of plants where
5 performance is not what it should be. It isn't always
6 reflected in trips. It's equipment out, it's getting into
7 LCO's, limiting conditions for operation. And I think it's on
8 that basis that the Staff -- we've looked at maintenance
9 through the years and the Staff definitely thinks there's room
10 for improvement still in the U.S. industry.

11 Tom, do you want to add to that?

12 MR. MURLEY: I subscribe to that completely.

13 CHAIRMAN ZECH: Any other questions? Commissioner
14 Carr, Commissioner Rogers?

15 COMMISSIONER ROGERS: I would rather wait.

16 CHAIRMAN ZECH: Let's proceed.

17 MR. TAYLOR: I will ask Mr. Ed Jordan, AEOD Office
18 Director, to start with his portion.

19 CHAIRMAN ZECH: You may proceed, Mr. Jordan.

20 MR. JORDAN: Thank you. The purpose of our part of
21 the presentation is to give the status of the Staff's
22 maintenance performance indicator development activities. This
23 development has been expedited, and could I have Slide No. 2,
24 please.

25 [Slide.]

1 This development has been expedited and is on a
2 parallel course with the development of the proposed rule. The
3 AEOD Staff effort since July concentrated on the collection and
4 analysis of plant data in a trial program. This trial program
5 was designed to develop and validate maintenance performance
6 indicators.

7 The program included discussions with INPO personnel,
8 support from the Office of Research and from contractors. The
9 AEOD Staff effort is about four person years over this three-
10 month period. We've had some additional inputs. I
11 participated in an IAEA workshop on the use of performance
12 indicators which was helpful.

13 In this program, the Staff examined three to four
14 years of data from 23 reactor units, plus a large sample of
15 component level data from these and other units, and we are
16 only able to give you a glimpse of the analysis that we've done
17 to date in this particular meeting. The work is not complete;
18 these are preliminary results that they show promise in
19 assessing maintenance effectiveness. And Tom Novak will
20 explain the differences between maintenance effectiveness and
21 process and overall performance. So, Tom, I think it's a good
22 time to turn it over to you.

23 MR. NOVAK: Thank you, Ed. As Ed pointed out, we did
24 visit 13 sites. I think it's important to mention initially
25 that the utilities, each one was very cooperative. I asked

1 each of our teams as they came back how did the trip go, and
2 every time we got the answer that the utilities worked as hard
3 as they could to give us the kind of information that we felt
4 was necessary to develop these indicators. And I think it's a
5 point that we should make very early in our presentation, that
6 they were very supportive of our efforts.

7 Ed mentioned that we did go after a number of
8 different kinds of data. We identified in our previous
9 discussion the kinds of initiators that we were looking for and
10 we defined them as process indicators and effectiveness
11 indicators. The report that we provided to you last week has
12 all this information in there in a lot of detail, but very
13 briefly, the process indicators are typically those indicators
14 that utility management uses to manage the programs dealing
15 with maintenance. These are the kinds of information that is
16 routinely provided to INPO and you have seen these in earlier
17 discussions.

18 The other kind of information we were looking for was
19 on component failures. We are interested in knowing just what
20 kind of data we could develop from these site visits to better
21 understand equipment history. We would visit the plants and
22 ask for data regarding rework on certain components, how long a
23 particular component may have been out of service and it was
24 that kind of data that we tried to collect.

25 Now, the report identifies those kinds of information

1 and I won't go into it in very much detail today. May I have
2 Slide No. 3, please.

3 [Slide.]

4 What I'm going to just try to do in a few minutes is
5 give you the high spots of our report. AEOD Report S804 was
6 really broken down into three parts. We thought it was very
7 important to get a firsthand knowledge of how utilities today
8 use maintenance performance indicators; whether their processes
9 were effective, and these indicators are what we refer to as
10 overall indicators and that might be plant availability or
11 capacity factor. How are they used in the day-to-day operation
12 of the plant, what kind of distribution of that information is
13 made throughout the utility's corporation. And we did that.

14 And in our final report we will have each of the
15 plants -- we'll have effectively 13 trip reports, and I think
16 this is very valuable information because it's good firsthand
17 information on how utilities use maintenance data in their day-
18 to-day activities, and we will have a separate section on that.

19 The report also then will cover and does cover the
20 data that we collected. I mentioned in August that we had
21 brought back all kinds of data, some on floppy disks, some in
22 cardboard boxes. That was true. We've put it into a database
23 and we came up with over 7000 pieces of data from which to
24 develop correlations to see if in fact process indicators or
25 effectiveness indicators could in fact be correlated to

1 something like an overall indicator, like a forced outage rate
2 or a capacity factor. So that was done, and it is contained in
3 the report.

4 Also, we have described for you our validation
5 efforts; how did we proceed with attempting to show if in fact
6 there was a relationship between a candidate indicator and an
7 overall indicator. That was discussed.

8 Lastly, and I think probably the key to where we are
9 going in the future, is our review of the NPRDS database.
10 NPRDS, which is the Nuclear Plant Reliability Database, has
11 been in existence for more than 10 years. It's a very
12 comprehensive database. Roughly there are over 60,000
13 component failures which have been reported to INPO which now
14 monitors and operates this program since its inception.

15 Additionally, there are approximately a half a
16 million engineering records on components, so we look at this
17 as a very robust database with the potential of giving us the
18 kind of data from which to see if indicators can be developed
19 to measure maintenance effectiveness.

20 Our final report then will cover all of this and
21 we're expecting to provide this to you in about a month.

22 [Slide.]

23 What we found is that most licensees collect and use
24 process indicators. I have a backup slide which I'll show you
25 in a moment which gives you some feeling for how a utility

1 management would use some of these kinds of information. We
2 saw a variety of management tools used to understand
3 maintenance activity at a plant. But we didn't see is anything
4 that specifically monitored maintenance effectiveness. For
5 example, if you went and asked to see any trend on component
6 rework they could not show it to you. We could develop some of
7 that information by going back to their database and sitting
8 down and saying let's try to develop an understanding of rework
9 on certain components, so it was possible to do it, but as a
10 day-to-day tool that a manager in maintenance might use, he did
11 not have that at his fingertips.

12 They all monitor overall performance. If you go to a
13 plant you'll know the capacity factor, you'll know their
14 availability, you'll know their forced outage rate.

15 Now let me see backup slide No. 4, please.

16 [Slide.]

17 This is not in your handout but I think it's
18 illustrative of a point that I want to make. What you're
19 seeing here is a process indicator. This is the ratio of
20 preventive to total maintenance. Basically, this information -
21 - let me first start with a working definition of what this
22 indicator is. The preventive maintenance includes things such
23 as surveillance, the typical things you would do as part of
24 preventive maintenance. And then total maintenance is just
25 preventive plus corrective maintenance. Now, these maintenance

1 activities are restricted to those things you do in the non-
2 outage condition, so that's important to know as well.

3 Now, what we then have here, and I just put this
4 slide together for illustration, typically if you look at trend
5 charts of preventive to total maintenance of values of 50 or 60
6 percent -- what you have here just for illustration is we have
7 summed up those values so they are cumulative values. So in
8 two quarters, each quarter being 50 percent, the value would be
9 100 percent on that chart.

10 What you see there are some ranges. For example,
11 industry has a goal of about two-thirds PM to total. If you
12 were doing two-thirds preventive to total, then that's probably
13 a good place to be at. It may not be the optimum yet but it's
14 close to being where you want. Obviously, the lower that ratio
15 is, the more problems you're having with corrective
16 maintenance.

17 Now the thing that's interesting here is you can see
18 that that indicator can be managed; you can change the slopes,
19 and there are two indications there -- we're showing three
20 plants just for an example, and the two lower curves you can
21 see that somewhere in calendar year '87, about the second
22 quarter, the maintenance activities changed to where a higher
23 amount of preventive maintenance was being done, where they
24 were more successful in reducing the corrective maintenance.
25 Since it's a ratio you don't know exactly which is changing.

1 But clearly you can see where they're coming back in and
2 running now parallel with more of the optimum or nominal type
3 of performance you would like to see. And I think this is
4 illustrative of how utility management can look at their
5 performance and can affect changes and see if in fact what
6 they're asking for is being reflected in day-to-day
7 performance.

8 May I have Slide No. 4, please.

9 [Slide.]

10 Data acquisition was the second part of our effort
11 and what I want to mention here very briefly is that in each of
12 the cases that we visited you find very sophisticated plant
13 computerized systems for maintenance management. I'm sure this
14 is standard across the country; we work with these systems as
15 best we can. The things that we noticed, though, is that they
16 do work for the kinds of information that maintenance managers
17 use and that corporate management want to see. They track
18 basically all the maintenance work activities. You put in the
19 information on each and every maintenance work request and you
20 can call it up and see where it is in the process.

21 We tried to use those kinds of systems when we could
22 to get equipment history, and in some cases we were successful
23 to some degree. It depends on the flexibility of the software
24 and the knowledge of the people who are operating those
25 systems. But in general, you could not get good equipment

1 histories from these kinds of systems.

2 As I said, there's just a limited amount of on-site
3 equipment failure data available. When we did find it we went
4 to maintenance work requests, operating logs, LCO logs and so
5 forth, so it was only after you really got into the control
6 room and went through some of the operating logs that you could
7 get real firsthand information on equipment performance.

8 [Slide.]

9 We took this data back. As I said, we had about 7000
10 pieces of information. We had a lot more but when we put it
11 into our database and said now we'll start to see if we can
12 correlate any of this information, we had over 7000 pieces of
13 information that could be worked with. What we did -- and I
14 think it's interesting just to take one more backup slide.
15 Would you show backup slide No. 7, please and leave it on until
16 I ask you to move it.

17 [Slide.]

18 Now bear with me. This slide is in the report; a
19 number of these types of figures are there. I want to use this
20 just for illustration. This is basically how we did the
21 validation. What you see here is for a plant. We're looking
22 at the number of automatic scrams that occurred over a three-
23 year period, and then also we're looking at the corrective
24 maintenance backlog for that same plant over that same period.
25 Now, this is the way we put our data together: we would sum up

1 all the data by quarters so along the X axis you'll see 13 or
2 14 quarters of data. Now the data here, the black solid ones
3 as the legend suggests are the automatic scrams that were
4 recorded. So in 1985, third quarters, there were two. In '86
5 first quarter there was one and another one following.

6 Now, those pieces of information were what we called
7 our validation parameter. What we were trying to do through
8 this validation approach was to see if from the candidate
9 maintenance indicators -- and let's assume now and it was
10 assumed that the corrective maintenance backlog was one of our
11 candidate maintenance indicators -- could it predict the number
12 of scrams that you were going to have. So what we did, and we
13 did this for each and every correlation, for each of all our
14 candidate indicators against each of our validation parameters
15 we would show these kinds of curves.

16 So the first thing we did was kind of an engineering
17 analysis. Our people would look at each of these figures and
18 try to understand if there was a logic to it; was there a flow
19 to the data as we saw it.

20 The next thing we would do would be a statistical
21 test, and you'll have to bear with me just a little on this.
22 What we were looking for was -- and this would be a good
23 example -- is corrective maintenance backlog a leading
24 indicator. By that we mean, does the amount of corrective
25 maintenance backlog accumulate in advance of a reactor trip,

1 and can you predict then from looking at your plots of
2 corrective maintenance backlog that eventually you're going to
3 have a reactor trip.

4 What we did then for each of these plots and for each
5 of these tests, we shifted it up to six quarters. So in other
6 words, we would advance the candidate indicator up a year and a
7 half in three-month intervals to see if in fact there is a
8 correlation. And the correlation was -- we picked .75; it just
9 was a low enough threshold that gave us more information to
10 look at. So this example then came out of the statistical
11 test. What this said is if you advance -- in other words, the
12 corrective maintenance backlog was leading the reactor trips by
13 about four quarters. If you shifted it and you make the test,
14 is there a .75 correlation, if it came up yes we got a hit, and
15 then we would get this kind of a printout and look at it and
16 try to understand it one more time. In other words, it was
17 just another screening tool. So the statistical correlation
18 was just another way to look at this attempt to see if in fact
19 some of these indicators were leading.

20 So we did all of this, and really what we found was
21 there was no consistency. As hard as we did try to look for
22 this we didn't find any process indicators that gave you an
23 indication of how your validation parameters -- things like
24 forced outage rates, the reactor trips, -- that you could
25 predict them either in the same timeframe or in advance of it.

1 I think I've answered -- that was the point I wanted
2 to get at it. There are many of these that will be in the
3 final report; information of that type.

4 Now with regard to the effectiveness indicators --
5 again, those are the things that we went after to understand
6 component failure rates. We went through the same process in
7 looking for them. We found substantively fewer correlations.
8 We just did not find enough information from our databases that
9 we collected to show any correlation between the candidate
10 indicators either process or effective that could be correlated
11 to some validation parameters.

12 Now let me have Slide No. 6, please.

13 [Slide.]

14 What we did learn from these site visits was that in
15 a number of cases, the utility would go to NPRDS to give us
16 some of this data. We would sit down and we would call it out
17 and bring it back and look at it. So when we went through all
18 of the data that we had collected through the site visits, we
19 decided to explore NPRDS in more detail.

20 So what we did for the same set of sites, the same
21 plants that we visited, we used NPRDS then. What we did is we
22 constructed a number of indicators, a total of seven, and
23 they're spelled out in the report; four of which were very
24 similar to the same indicators where we went to the plant and
25 tried to collect the information -- for example, rework. We

1 constructed a rework indicator from some definitions you can
2 use in NPRDS. So we went through that and we got a lot more
3 correlations. I would say about a factor of three to four. So
4 we were encouraged that there was more potential there.

5 Now we also recognized there are certain limitations
6 in NPRDS. We've been following this for several years from
7 Commission directives starting in 1983, so we've been looking
8 at the timeliness, the completeness. We also learned a little
9 bit about the limited scope of equipment, and I'll mention that
10 a little bit later if we have time or if there are any specific
11 questions. But overall we were very encouraged by NPRDS, even
12 as it is presently being used. So we are planning to continue
13 efforts in that area. In the final report we will study some
14 of these additional indicators and we'll report that to you at
15 that time.

16 [Slide.]

17 The conclusions are relatively straightforward. We
18 certainly encourage utility management to use the process
19 indicators; things like PM to total, maintenance, corrective
20 maintenance backlog. The things that they have been doing
21 should be used. We would suggest that they try to get a little
22 better in recording the information. We saw a certain amount
23 of variety between how thorough they are in reporting this
24 information, but overall we were very encouraged that it is a
25 very useful tool for management.

1 We're convinced that maintenance effectiveness, the
2 quality of maintenance, can only be really assessed by looking
3 at component reliability. That will be your best test and your
4 only test that we see for judging the true quality of
5 maintenance at a plant. We believe that NPRDS has the
6 potential certainly of providing the database from which some
7 of these maintenance effectiveness indicators can be developed.

8 And lastly, our recommendations. Slide No. 8,
9 please.

10 [Slide.]

11 Our recommendations -- encourage the utilities to
12 work hard at improving and further development of the process
13 indicators. We saw a wide variety of uses. We would certainly
14 then also encourage utilities to utilize NPRDS. We find it a
15 valuable tool. Even before we started this effort we had
16 opportunities to look at NPRDS and it has given us insights
17 into maintenance quality at the plants.

18 And lastly, we do intend to work in this area and see
19 if we can be successful in developing effective maintenance
20 indicators. Thank you very much.

21 MR. TAYLOR: That concludes the Staff's presentation
22 -- excuse me.

23 MR. JORDAN: I would like to make an additional
24 comment. The Staff has provided, through the EDO, a
25 recommended working change to the rule package, and that only

1 came to you this morning, I believe. It does reflect the
2 findings that we've made in terms of encouraging industry use
3 of the process indicators -- I'm sorry, the effectiveness
4 indicators -- in measuring, evaluating the effectiveness of
5 their maintenance programs. So we would be recommending a
6 little stronger words and the use of the NPRDS system by
7 utilities.

8 We also clearly feel that the Staff should continue
9 our work with reviewing the potential for effectiveness
10 indicators from the NPRDS data. We feel encouraged with that.

11 MR. TAYLOR: I was going to mention that we just sent
12 that to the Commission so you may not have had an opportunity
13 to review it, but we did change a few words to reflect the work
14 that has been completed so far.

15 CHAIRMAN ZECH: All right, fine.

16 MR. TAYLOR: Tom, you had something you wanted to
17 add?

18 MR. MURLEY: Yes. In judging this rule, I think a
19 key aspect is going to be the implementation of it, and we
20 probably have some preliminary thoughts that I should mention.
21 This rule, as you know, is not like station blackout or ATWS
22 where you can judge whether a certain piece of hardware has
23 been installed and the reliability of it and so forth. It in
24 many ways deals with subjective judgments of effectiveness of
25 programs. So overall, we believe the effectiveness of the rule

1 is going to be closely tied to how the NRC Staff evaluates
2 compliance at each plant.

3 In the near term, we think there will be no better
4 means for judging compliance than we have done traditionally,
5 and that is by having experienced inspectors go through the
6 plant, look at the history and look at how well maintenance is
7 actually being done.

8 These have traditionally been done, of course, by the
9 regional inspection Staffs and collected in SALP reports. So
10 we think that the SALP evaluations are probably the best
11 indications we have right at the moment of maintenance
12 performance.

13 We've taken that initiative to see if we can collect
14 the experience from the regions and the headquarters Staffs and
15 develop perhaps a better maintenance inspection program. We've
16 conducted three pilot inspections up until now and those are
17 continuing. I'm encouraged to see that these inspections will
18 be, we think, more effective tools to evaluate compliance.

19 If you'd like, maybe we could take about two minutes
20 and have Tony Gody, who is our Branch Chief in charge of this
21 program, summarize the three pilot inspections that we've done.

22 CHAIRMAN ZECH: Please, let's do that.

23 MR. GODY: We conducted pilot inspections,
24 maintenance team pilot inspections, at Diablo Canyon, Oconee
25 and Peach Bottom. We did those in the late summer. The

1 reports will be issued in October.

2 These inspections were six-man team inspections. We
3 have developed a TI, a maintenance inspection guidance package,
4 along with a logic tree to aid as an inspection tool. We've
5 stressed performance-based inspections and observation of
6 maintenance work in progress was concentrated on.

7 No surprises really came out of the inspection
8 findings. In two of the three pilot inspections they
9 concentrated on balance-of-plant systems and came up with some
10 identified strengths and weaknesses in those areas.

11 Several violations were identified but the important
12 thing was the identification of these strengths and weaknesses
13 and the evaluation of the licensees' maintenance practices.

14 We also have been conducting regular inspections;
15 inspections have been going on at Trojan, Wolf Creek, Davis-
16 Besse and Palisades. The regions have already implemented the
17 regular program, and in one case at Trojan they had performed a
18 self-assessment on their maintenance practices over a year ago.
19 The inspection validated several of those findings, identified
20 a few new ones and even identified some that the licensee had
21 previously identified that had not been corrected.

22 These inspections will go on for two years, and we
23 intend to take a look at the majority of the plants in the
24 country.

25 MR. MURLEY: As we go along, of course, we're going

1 to feed back and see if we can continue to improve the
2 inspection programs. If we conclude that we need to make big
3 changes or stop them for some reason we will do that, so we're
4 not totally committed to a program other than to keep going.
5 We think it is a good means for assessing maintenance at the
6 plants and we're going to continue improving.

7 MR. TAYLOR: I might add that without a rule, those
8 inspections of course are directed to whatever programs are in
9 effect and commitments that the licensee itself has made in
10 this area, so that's the way the Staff, the inspection force,
11 has traditionally looked at maintenance; that is, whatever
12 commitments and so forth --

13 CHAIRMAN ZECH: And for the time being you'll
14 continue in that regard.

15 MR. TAYLOR: Yes, sir. Of course we're continuing.
16 Short of a new industry standard, were one to be developed,
17 we'll continue to watch it in that fashion.

18 I believe that concludes the Staff presentation at
19 this point, sir.

20 CHAIRMAN ZECH: Thank you very much, appreciate the
21 presentation. Questions from my fellow Commissioners.
22 Commissioner Roberts? Commissioner Carr?

23 COMMISSIONER CARR: Yes, I've got some of the same
24 problems Commissioner Roberts had with "The Commission intends
25 the scope of the rule to cover all systems, structures and

1 components including those in the balance of plant,
2 commensurate with their importance to safety." I feel that for
3 my purposes I'd put a period after "balance of plant". Who's
4 going to make the judgments as to what is commensurate with?

5 MR. TAYLOR: That's part of the standard. One of the
6 things we hope that the industry will participate and develop
7 in because as you know, there are a large number of systems
8 described in the FSAR that in some way or other contribute
9 ultimately to safety, and it is -- I think that's one of the
10 reasons the standard we hope will address that.

11 COMMISSIONER CARR: I guess I'm trying to figure out
12 why don't we put a period there and forget about "commensurate
13 with their importance to safety"? What have you lost if you do
14 that?

15 MR. KING: I guess maybe the best example to use to
16 explain that is if one of the attributes of a good standard is
17 to have a root cause failure analysis program, there are
18 probably some items in the balance of plant where it wouldn't
19 make sense to go do that. You know, if you use the extreme --

20 COMMISSIONER CARR: I can't think of any.

21 MR. KING: Well, you might use the extreme of light
22 bulks or some kind of space heating type system. The intent of
23 putting those words "commensurate with safety" was to try and
24 exclude those kinds of items from having to go through the
25 fullblown engineering analysis that would be required on things

1 that do contribute to safety or things that could challenge a
2 safety system. And again, the standard would have to provide
3 more guidance on how you would make that distinction. That's
4 the reason for the words being in there.

5 MR. TAYLOR: That brings to mind a story that Stello
6 likes to tell about sanitary -- this goes back many years --
7 about sanitary piping in an important space that was
8 inappropriately designed and suddenly became important. But I
9 think the Staff at this point is looking to the industry to
10 help us in that area so the appropriate measures go as far as I
11 think you're concerned.

12 COMMISSIONER CARR: Well, I'm concerned about that
13 and I'm still not easy that I know what's going to happen with
14 it.

15 The second one is on component reliability as a
16 maintenance effectiveness indicator. I think that's a good
17 idea but you've got to avoid the trap of having lemons. I mean
18 there are some components you run across now, men, that you
19 just can't keep running and you have to ultimately make an
20 engineering decision to change it and get rid of that one and
21 buy one that works. So that should turn up in your NPRDS
22 system or in the plant's system somehow, but there is that
23 potential for a possible problem.

24 I'm a little uneasy that nowhere in this have we tied
25 the accountability of the maintenance personnel to the work

1 accomplished, as to whether they are doing good work;
2 otherwise, we're training maintenance personnel. But I think
3 until we get some way of tying the accountability of the guy
4 who did the maintenance, the results of it, we're going to have
5 a hard time improving maintenance. Did you give that any
6 consideration?

7 MR. NOVAK: We didn't specifically look to see if we
8 could establish a link between the worker and his product.
9 This rework was kind of the closest thing we went after; can we
10 see trends where equipment is failing. And then it would be
11 reasonable to go back, -- and through these management systems,
12 they can identify the people, the individuals who are
13 responsible for that activity. That's recorded and can be
14 recovered. So it would be -- I guess you'd go down one more
15 layer and see if you could do it. It's there, if you can
16 establish that there's a correlation between the equipment and
17 the people.

18 COMMISSIONER CARR: I guess as a final comment I
19 would compliment you on hurrying up and getting this work. We
20 pushed you hard, I think you've done a good job. I think also
21 the industry has gotten the message; I think they're beginning
22 to do a much better job. I agree with Commissioner Roberts
23 that the trends are in the right direction. But I think we
24 have a hard time pinning that improvement on maintenance. It
25 could be training or it could be a lot of other reasons

1 including just industry's attention.

2 COMMISSIONER ROBERTS: But the only reason I pointed
3 that out was the Staff was using scrams as a measure.

4 COMMISSIONER CARR: I think we've got a lot of work
5 left to do. I agree, I don't see how you could make a case
6 that maintenance is not important to what we're trying to
7 accomplish, so I encourage you to carry on.

8 CHAIRMAN ZECH: Thank you very much. Commissioner
9 Rogers?

10 COMMISSIONER ROGERS: Yeah, I've got several
11 comments. First, I think it is very timely to compliment the
12 Staff on all of the work that's been done, the maintenance rule
13 and the examination of performance indicators.

14 With respect to the performance indicators work, I
15 think this is really a first class piece of work. It's an
16 example of an NRC leadership activity. When we listened to the
17 comments at the workshop that was held, I certainly didn't get
18 the impression that you were going to get an awful lot of help
19 from industry in developing those PI's at that time -- help in
20 terms of supplying data, yes, but in terms of any kind of
21 conviction that anything would come out of the PI business, it
22 didn't sound to me very hopeful or very encouraging.

23 And I think you folks continued to move ahead and did
24 the job. It's not finished yet, but what you've done is
25 excellent. I think it's not only commendable; it's really

1 first rate. And it is important that you keep pushing on this
2 to really finish the work that you've done in honing in on
3 possible performance indicators. I think you're absolutely
4 right that you're going to have to go to the component failure
5 area. But whatever it is that you've been doing that shows new
6 encouragement based on the statistical results that are coming
7 out, I feel should be pursued assiduously and completed and
8 that we really ought to try to make sure that the resources are
9 there to keep that effort up and completed as quickly as
10 possible.

11 So I really want to compliment you on the first great
12 work that's been done to date.

13 The addition to the rule or additional paragraph that
14 just hit us the last day or so, this morning maybe even, I
15 think is very important and it suggests that perhaps the work
16 that comes out of performance indicators can ultimately be
17 folded into this program as an assessment tool, and I'd like to
18 hear a little bit about your thoughts on that. Because it
19 seems to me that we have the possibility of a longer-range
20 effort here that goes beyond what we've seen so far in just the
21 guidance that comes out of the Regulatory Guide; that there
22 actually might be some measurables that might help to supply
23 some of the concerns that Commissioner Carr has addressed in
24 terms of accountability. That we do need measurables; this is
25 a difficult area to regulate, and it seems to me that if we can

1 come up with performance indicators that the industry accepts
2 and we feel are valid, that provides a reasonable basis for a
3 regulatory action.

4 So that you've written a rule now to include two
5 elements; assess the effectiveness of the maintenance program,
6 and based on this assessment make improvements as appropriate.
7 So an assessment should incorporate quantitative measures -- I
8 think that really is addressed in this other paragraph that
9 you've added.

10 So do you think that these quantitative measures
11 could be identified in time to actually be built into the final
12 rule?

13 MR. JORDAN: I would like to answer that,
14 Commissioner Rogers. I think it's more important for the
15 utilities to have measures of effectiveness and for the NRC to
16 monitor those, so the additional paragraph was aimed at urging
17 industry to collect and use data component failure type data in
18 their assessment program. And I would say incidentally that
19 the NRC would then monitor appropriate measures.

20 But I personally don't believe that we would have
21 indicators that we would recommend putting into a rule. Even
22 though we feel there's great promise in indicators, I also
23 believe that indicators change with time, and the illustration
24 I would give is that if the Japanese applied -- and they've
25 tried -- the U.S. performance indicators to their plants, it

1 doesn't work because they have zeros and ones, and there's
2 absolutely no value to our data or our system applied to their
3 plants.

4 So I think we have to look at flexible assessment
5 methods that change with the time, and to put it into a rule
6 I'm afraid would be locking it forever or until a rule change
7 many years later. So that's an opinion on my part but it's
8 based on what we've done so far and what internationally we've
9 seen in the way of data.

10 COMMISSIONER ROGERS: Well, do you think they would
11 be available to at least be included as suggested elements of a
12 Regulatory Guide when --

13 MR. JORDAN: Yes, sir. The indicators that we've
14 found to be most valuable out of the study, we would certainly
15 propose for NRC use and urge industry to adopt them to the
16 extent practical.

17 COMMISSIONER ROGERS: Just turning to the rule itself
18 where it's constructed with the expectation that there will be
19 industry participation in the development of a standard, I'd
20 really like to know just how much you know about the likelihood
21 that that will be forthcoming. It's a rather short time that's
22 provided in the schedule for this standard to be developed, and
23 I just wonder to what extent industry, whatever that means, --
24 that means somebody outside NRC, I guess -- is ready to step
25 forward and take this on. Have you identified a utility group

1 such as INPO, NUMARC or EPRI, that has expressed any positive
2 response to this expectation on our part that there would be
3 industry stepping forward to help with this?

4 MR. TAYLOR: Commissioner Rogers, I don't believe I'm
5 in a position to say that that is an assured point right now.
6 Tom mentioned that the Staff intends to proceed on its own. We
7 are hoping to get that. My Byron Lee I believe is in the
8 audience from NUMARC and perhaps he would care to comment on
9 that. We are hopeful this will happen. In fact, we'd like
10 that very much, to get the knowledge of the industry.

11 CHAIRMAN ZECH: Mr. Lee, would you care to comment?
12 Please step to the microphone if you would, please.

13 MR. TAYLOR: He didn't know this was going to happen.

14 MR. LEE: Yes, sir. My name is Byron Lee, Jr., I'm
15 the President of NUMARC, the Nuclear Management and Resource
16 Council.

17 I think that, as you are all well aware, we've said
18 it many times, the industry position is, and has not changed,
19 that we think a rule at this point is premature. And I guess
20 nothing I've heard today changes my mind in that regard. It
21 seems to me there are still a lot of open issues,
22 uncertainties. There are a lot of ideas on things that we need
23 to do over and above what we're doing. I've not heard much
24 that says specifically we've got major holes or problems in our
25 area.

1 I think that we need to work on that. We have
2 pledged to work together with the NRC. The question becomes
3 one of do we presume a rule is passed and then will we work on
4 a standard? I guess that's really the question that's being
5 asked. I think we, again, have said obviously, we want to try
6 and make whatever is done the best for the industry and the
7 best for the whole process, the whole regulatory nuclear
8 program in this country. But as I said, I think we feel the
9 timing is not right.

10 We have talked about certification as one of the
11 suggestions that was made at one point in time. I think that
12 industry's position on that is very clear; that certification
13 by INPO of maintenance programs under a rule would not be
14 consistent with their policy. We believe that just puts us
15 into the regulatory process which we don't think is our role.

16 CHAIRMAN ZECH: Thank you very much.

17 COMMISSIONER ROGERS: Well, I take it that you have a
18 fallback position if industry participation at a suitable level
19 of effort is not forthcoming, and that is for NRC to proceed to
20 do it itself. I would hope that we could have industry
21 participation in the development of a standard; that in fact
22 the philosophy that's been expressed here; namely, that this is
23 a rule which is somewhat different from other rules we've dealt
24 with in the past and one which has the intent of not
25 interfering with good maintenance programs but encouraging the

1 experience of good maintenance programs to be transmitted more
2 cross the industry, would in fact be an outcome. I personally
3 feel that is a very laudable objective and an achievable one.

4 With respect to this third party designation to
5 review and certify licensee maintenance programs for
6 conformance with the maintenance standard, just what do you
7 have in mind there as a third party? Are you talking about an
8 industry group or a contractor, that type of organization?

9 MR. TAYLOR: We would have preferred an industry
10 group to do this because of the depth of experience in
11 industry. Tom, do you want to add to that?

12 MR. KING: That's true, we would prefer an industry
13 group. That's what we had in mind when we put the statements
14 in the Notice of Proposed Rulemaking to see if there was any
15 interest out there and to solicit proposals on how this would
16 work. We have no preconceived ideas as to how it would work at
17 this point; we're putting the question on the table.

18 COMMISSIONER ROGERS: Thank you very much.

19 CHAIRMAN ZECH: Let me just say first of all, I
20 disagree with Mr. Lee's conclusion that it's premature for a
21 rule. I think, frankly, it's long overdue, that's my personal
22 opinion. I don't think anybody would disagree that maintenance
23 is very important. Certainly it's important in my judgment to
24 good performance, and good performance in my view relates
25 directly to reliability and to safety. It also relates to

1 economic performance in that plants that are well maintained
2 and end up with a higher capacity factor and less challenges to
3 the safety systems certainly are the plants that we would judge
4 to be safe and reliable and economic. And as I've said before,
5 I think they all go together.

6 But it's clear that a maintenance program, I believe,
7 and maintenance perhaps has not been given -- at least again to
8 my judgment -- the priority that it should have over the years.
9 I'm convinced that maintenance has a very direct relation to
10 safety of operations and to reliability, as well as to economic
11 considerations.

12 Again, if I were a utility executive, I would think
13 that perhaps putting more resources into maintenance would
14 allow me to operate my plant with a higher capacity factor,
15 again contributing to better performance and again, directly to
16 safely, more reliable operations, as well as again, more
17 economic operations. That's the way I look at it. So I
18 disagree that it's premature to focus on maintenance as we're
19 trying to do.

20 I would like to extend my very sincere
21 congratulations to the Staff for a real team work effort in
22 this regard. We've heard this morning from Research, from NRR,
23 from AEOD. I think we've heard some very fine analysis, a lot
24 of hard work has gone into this program. I think Mr. King's
25 presentation, as well as Mr. Novak's and others, the NRR

1 presentation also, show a very responsible action on the part
2 of the Staff.

3 I'd like to point out specifically the AEOD's part of
4 this presentation, and how difficult of course we all know it
5 is to come up with performance indicators and we're still
6 struggling, but I think we are making progress. I certainly
7 agree with the conclusions you've come up with. But I'd like
8 to commend AEOD on taking on a very, very big challenge and
9 moving as far as you have, and to encourage you to continue the
10 efforts that you're undertaking. Just because it's a difficult
11 task that doesn't mean we should stop short of the goal of
12 trying to move ahead, and I commend the AEOD in particular for
13 the efforts that you've made.

14 It is difficult; we're kind of plowing new ground in
15 a sense. But again, in my view maintenance is an area that is
16 clearly in need of improvement and can help us with our public
17 health and safety responsibilities in particular, as well as
18 help the industry with regard to performance of their plants.

19 Let me just say this, too, I think it's a leadership
20 role that NRC is maintaining. We're trying to raise the
21 priority, trying to raise the awareness of the importance of
22 maintenance. It's not as exciting a subject as operations, but
23 it clearly is a big part of operations in my judgment. So for
24 the efforts on the part of the Staff and the leadership role
25 you're undertaking, I commend you for that.

1 I think it's encouraging the trips you've made and
2 the interface you've had with the field at least, with the
3 utilities, that they have been cooperative and willing to work
4 with you. I think that's very encouraging. And so I would
5 just note that the schedule you've put forward as a result of
6 the Commission's encouragement is an ambitious one but it would
7 look to me like it should be a reasonable one.

8 I'd like to encourage my fellow Commissioners to give
9 this important matter their attention, and after due
10 deliberation to act in response to the Staff's request for a
11 Commission decision regarding the Staff's proposed schedule.
12 And I would just conclude by saying again to the Staff, well
13 done; a very important job. We're moving, in my judgment, in
14 the right direction. I commend you for that.

15 Are there any questions from my fellow Commissioners?

16 [No response.]

17 If not, thank you very much for an excellent
18 presentation. We stand adjourned.

19 [Whereupon, at 11:35 a.m., the Commission meeting was
20 adjourned.]

21

22

23

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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 PROPOSED RULE FOR MAINTENANCE OF
NUCLEAR POWER PLANTS

PLACE OF MEETING: Washington, D.C.

DATE OF MEETING: FRIDAY, OCTOBER 14, 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.**

A handwritten signature in cursive script, reading "John Lowbridge", is written over a horizontal line.

Ann Riley & Associates, Ltd.

COMMISSION BRIEFING
ON THE PROPOSED RULEMAKING ON
MAINTENANCE OF NUCLEAR POWER PLANTS

T. L. KING
OFFICE OF RESEARCH
OCTOBER 14, 1988

OUTLINE OF PRESENTATION

- ° SUMMARY OF WORK DONE LEADING TO NPR
- ° SUPPORTING DOCUMENTATION DEVELOPED
- ° CONCLUSION AND RECOMMENDATION
- ° SUMMARY OF PROPOSED RULEMAKING
- ° COMMENTS ON ACRS VIEWS
- ° SCHEDULE AND IMPLEMENTATION OF FINAL RULE
- ° CONTENTS OF NPR PACKAGE

SUMMARY OF WORK DONE LEADING TO NPR

- ° SUBMITTED STAFF PLAN AND SCHEDULE IN
SECY 88-142 (5/23/88)
- ° TRANSMITTED RULEMAKING OPTIONS PAPER
ON JUNE 27, 1988
- ° CONDUCTED PUBLIC WORKSHOP (JULY 11-13,
1988)
- ° REVIEWED FOREIGN COUNTRY AND OTHER
U.S. INDUSTRY MAINTENANCE PRACTICES
- ° NPR REFLECTS RESULTS OF ABOVE TASKS

SUPPORTING DOCUMENTATION DEVELOPED

NUREG/CP-0099 "PROCEEDINGS OF WORKSHOP"

DRAFT NUREG-1333 "MAINTENANCE APPROACHES
AND PRACTICES IN SELECTED
FOREIGN NUCLEAR POWER
PROGRAMS AND OTHER U.S.
INDUSTRIES: REVIEW AND
LESSONS LEARNED"

CONSULTANT REPORT "OBSERVATIONS AND
RECOMMENDATIONS ON THE
PROPOSED RULEMAKING FOR
THE MAINTENANCE OF
NUCLEAR POWER PLANTS" -
DR. K. INABA, XYZYX CORP.

CONCLUSION AND RECOMMENDATION

THE STAFF RECOMMENDS THAT THE COMMISSION
PROCEED WITH A GENERAL RULE WHICH:

- SPECIFIES THOSE ATTRIBUTES IN THE POLICY
STATEMENT WHICH THE COMMISSION CONSIDERS
ESSENTIAL FOR AN EFFECTIVE MAINTENANCE
PROGRAM AND
- PROMOTES INDUSTRY RESPONSIBILITY FOR
DEFINING, MONITORING AND IMPROVING
MAINTENANCE PROGRAMS.

SUMMARY OF PROPOSED RULEMAKING APPROACH

- ° GENERAL RULE (10CFR50.65) REQUIRING
LICENSEES HAVE A DOCUMENTED MAINTENANCE
PROGRAM ADDRESSING ALL ACTIVITIES
LISTED IN THE POLICY STATEMENT
- ° REQUIREMENTS WOULD APPLY TO ALL SYSTEMS,
STRUCTURES AND COMPONENTS COMMENSURATE
WITH THEIR SAFETY SIGNIFICANCE

- ° RULE INCLUDES REQUIREMENT FOR LICENSEES TO ASSESS PROGRAM EFFECTIVENESS AND MAKE IMPROVEMENTS, WHERE WARRANTED, ALTHOUGH REPORTING OF PERFORMANCE INDICATORS IS NOT REQUIRED.
- ° ENCOURAGES INDUSTRY TO DEVELOP A STANDARD WHICH WOULD DEFINE AN ACCEPTABLE WAY TO MEET THE RULE. NRC COULD THEN ENDORSE THE STANDARD IN A REGULATORY GUIDE.

- ° COMPLIANCE DETERMINED BY AUDIT AND INSPECTION.
- ° SOLICITS PROPOSALS FOR THIRD PARTY CERTIFICATION OF PLANT MAINTENANCE PROGRAMS.

COMMENT ON ACRS VIEWS

° ACRS LETTER OF SEPT. 13, 1988:

- NOT CLEAR THAT MAINTENANCE RULE WILL
REDUCE RISK.
- CONCERNED THAT IT MAY DETRACT FROM
GOOD MAINTENANCE AT SOME PLANTS

° STAFF COMMENTS:

- RULE WILL REQUIRE LICENSEE
MAINTENANCE PROGRAMS INCLUDE
THOSE ATTRIBUTES DETERMINED BY
EXPERIENCE AND JUDGMENT TO
CONTRIBUTE TO EFFECTIVE
MAINTENANCE

- STAFF'S REGULATORY ANALYSIS COMBINED WITH QUALITATIVE JUDGMENT INDICATE REDUCTION IN RISK FROM IMPLEMENTATION OF RULE
- NOT DIRECTED SOLELY TOWARD TODAY'S POOR PERFORMERS; PERFORMANCE CHANGES OVER TIME AND RULE WILL HELP ENSURE CONSISTENT PERFORMANCE

- INDUSTRY HAS AN OPPORTUNITY TO
PROPOSE A STANDARD WHICH WILL NOT
DETRACT FROM THEIR INITIATIVES OR
FROM GOOD MAINTENANCE PROGRAMS.

SCHEDULE FOR RULE

- ° PUBLISH FOR COMMENT - 11/1/88
- ° END OF COMMENT PERIOD - 1/1/89
- ° FINAL RULE TO COMMISSION - 4/1/89
- ° FINAL RULE APPROVED - 5/1/89

IMPLEMENTATION OF RULE

- ° RULE REQUIRES FULL IMPLEMENTATION
2 YEARS AFTER APPROVAL.
- ° LICENSEES TO DEVELOP IMPLEMENTATION
PLAN WITHIN 90 DAYS AFTER APPROVAL.

- ° REG. GUIDE ENDORSING INDUSTRY STANDARD
AND/OR PROVIDING NRC GUIDANCE TO BE
ISSUED BY 4/1/90.

- ° INDUSTRY STANDARD NEEDED BY 9/89.

CONTENTS OF NPR PACKAGE

- ° SUPPLEMENTARY INFORMATION
 - ATTRIBUTES OF AN ACCEPTABLE STD.
 - ADDITIONAL ITEMS FOR CONSIDERATION.
 - COMMENTS REQUESTED
- ° REGULATORY/BACKFIT ANALYSIS

ATTRIBUTES OF AN ACCEPTABLE
MAINTENANCE STANDARD

- ° SHOULD DEFINE THE PLANT SYSTEMS,
STRUCTURES AND COMPONENTS INCLUDED IN
THE MAINTENANCE PROGRAM
- ° SHOULD REQUIRE A SYSTEMATIC EVALUATION
("SYSTEMS APPROACH") OF THE FUNCTIONS
AND OBJECTIVES OF PLANT SYSTEMS,
COMPONENTS AND STRUCTURES TO DETERMINE
MAINTENANCE ACTIVITIES AND REQUIREMENTS;

- ° SHOULD PROVIDE CLEAR AND SPECIFIC PROGRAMMATIC REQUIREMENTS THAT CAN BE PRACTICALLY IMPLEMENTED
- ° SHOULD BE COMPREHENSIVE IN ADDRESSING THE ACTIVITIES AND FUNCTIONS INCLUDED IN THE PROPOSED RULE PLUS INCORPORATE PROVISION FOR SELF ASSESSMENT;
- ° SHOULD REFERENCE STANDARDS OR GUIDELINES SUCH AS THOSE DEVELOPED BY ANS, ASME, IEEE, ASTM, INPO OR EPRI, WHERE PRACTICAL

- ° SHOULD ALLOW FLEXIBILITY FOR ADOPTION
OF NEW INNOVATIVE TECHNOLOGIES AS THEY
ARE VALIDATED; AND
- ° SHOULD PROVIDE FOR SUFFICIENT
DOCUMENTATION SO THAT PROGRAM
EFFECTIVENESS AND COMPLIANCE WITH
REQUIREMENTS OF THE STANDARD CAN BE
EVALUATED

ADDITIONAL ITEMS TO BE
CONSIDERED IN MAINTENANCE STANDARD
BASED PRIMARILY UPON REVIEW OF
FOREIGN/DOMESTIC MAINTENANCE PRACTICES

1. FOCUS ON LONG TERM MAINTENANCE OBJECTIVES; ESTABLISH A PROACTIVE MAINTENANCE PROGRAM AS OPPOSED TO REACTIVE MAINTENANCE;
2. USE OF A RELIABILITY CENTERED APPROACH TO MAINTENANCE, INCLUDING CONSIDERATION OF THE MAN-MACHINE INTERFACE;

3. COLLECTION AND ENGINEERING EVALUATION
OF FAILURE DATA (ROOT CAUSE ANALYSIS);
4. USE OF AN INTEGRATED INFORMATION
SYSTEM FOR COLLECTING DATA AND
MONITORING THE EFFECTIVENESS OF A
MAINTENANCE PROGRAM;
5. USE OF MAINTENANCE TECHNICIAN
TRAINING/CERTIFICATION PROGRAMS;
6. DERIVE PLANNING AND SCHEDULING FROM
OVERALL PROGRAM OBJECTIVES;

7. ENHANCE ENVIRONMENT/MOTIVATION OF
MAINTENANCE TECHNICIANS (E.G., THRU
CROSS-TRAINING, "CREW CHIEF" CONCEPT);
AND
8. CLEARLY DEFINE INTERFACES BETWEEN
MAINTENANCE AND OTHER ACTIVITIES
(ENGINEERING SUPPORT, OPERATIONS, QA,
QC, CORPORATE OFFICES, SAFETY REVIEW).
9. EFFECTIVE MAINTENANCE PRACTICES
DERIVED FROM PLANT AGING STUDIES.

COMMENTS REQUESTED IN NPR

- ° IS IT APPROPRIATE FOR THE NUCLEAR POWER INDUSTRY TO DEVELOP A MAINTENANCE STANDARD AND, IF SO, WOULD THE INDUSTRY DEVELOP SUCH A MAINTENANCE STANDARD?
- ° WHAT LEVEL OF DETAIL SHOULD BE INCLUDED IN THE MAINTENANCE STANDARD?
- ° IS TWO YEARS A REASONABLE TIME TO DEVELOP, AND IMPLEMENT A STANDARD?

- ° IS IT APPROPRIATE FOR A DESIGNATED
THIRD PARTY TO CERTIFY PLANT MAINTENANCE
PROGRAMS COMPLY WITH THE MAINTENANCE
STANDARD; AND, IF SO, WOULD AN
ORGANIZATION BE WILLING TO PERFORM SUCH
CERTIFICATION?
- ° SHOULD REPORTING OF MPIS BE INCLUDED
IN THE RULE AND, IF SO, WHAT SHOULD
THEY BE?

SUMMARY OF REGULATORY/BACKFIT ANALYSIS

- ° MAINTENANCE RULE HAS POSITIVE NET
BENEFIT
- ° SUBSTANTIAL REDUCTION IN PUBLIC RISK
- ° NET REDUCTION IN OCCUPATIONAL EXPOSURE
- ° INCREASED COSTS FOR PREVENTIVE
MAINTENANCE, TRENDING AND FAILURE
ANALYSIS, IMPROVED PROCEDURES, ETC.
- ° SUBSTANTIAL COST SAVINGS FROM REDUCED
DOWNTIME, REDUCED CORRECTIVE MAINTENANCE

PRELIMINARY RESULTS OF THE
TRIAL PROGRAM ON MAINTENANCE
PERFORMANCE INDICATORS

OCTOBER 14, 1988

BACKGROUND

- COMMISSION REQUEST TO EXPEDITE TRIAL PROGRAM TO DEVELOP & VALIDATE MAINTENANCE PI AND TO PROVIDE RESULTS ALONG WITH PROPOSED RULE
- STAFF CONDUCTED 13 SITE VISITS (23 UNITS) TO OBTAIN DATA FOR 13 CANDIDATE INDICATORS
- CONTINUED DISCUSSIONS WITH INPO ON DEVELOPMENT OF MAINTENANCE PI
- FOUR STAFF YEARS PLUS NATIONAL LAB, RES SUPPORT OVER 3 MONTHS

AEOD REPORT AEOD/S804 FOCUSED ON 3 AREAS

- CURRENT INDUSTRY PRACTICE
 - HOW MAINTENANCE PERFORMANCE INDICATORS ARE USED
- DATA ACQUISITION, ANALYSIS & VALIDATION RESULTS
- CAPABILITY OF NPRDS TO PROVIDE DATABASE FOR MAINTENANCE EFFECTIVENESS INDICATORS

CURRENT INDUSTRY PRACTICE

- MOST LICENSEES COLLECT AND USE MAINTENANCE PROCESS INDICATORS (e.g. RATIO OF PREVENTIVE TO TOTAL MAINTENANCE)
- NO PLANT-SPECIFIC PROGRAMS WERE FOUND THAT MONITORED DIRECT INDICATORS OF MAINTENANCE EFFECTIVENESS (e.g. REWORK)
- LICENSEES DO MONITOR OVERALL PLANT PERFORMANCE TO EVALUATE MAINTENANCE EFFECTIVENESS (e.g. FORCED OUTAGE RATE)

DATA ACQUISITION

- PLANT COMPUTERIZED SYSTEMS
 - PROVIDE GOOD MAINTENANCE MANAGEMENT INFORMATION AND PROVIDE DATA FOR PROCESS INDICATORS
 - NOT DESIGNED TO PROVIDE COMPONENT FAILURES OR EQUIPMENT HISTORIES NECESSARY TO SUPPORT MAINTENANCE EFFECTIVENESS INDICATORS
- LIMITED ON-SITE EQUIPMENT FAILURE DATA AVAILABLE FROM MAINTENANCE WORK REQUESTS AND OPERATING LOGS

DATA ANALYSIS/VALIDATION

- NO CONSISTENT RESULT WAS FOUND
ACROSS PLANTS FOR ANY SINGLE
MAINTENANCE PROCESS INDICATOR
- LIMITED DATA FOR EFFECTIVENESS
INDICATORS YIELDED FEW RESULTS
AND NO CONSISTENT CORRELATIONS

APPLICATION OF NPRDS AS A DATA BASE FOR
MAINTENANCE EFFECTIVENESS INDICATORS

- NPRDS DATA APPEARS CAPABLE OF SUPPORTING
MEANINGFUL MAINTENANCE EFFECTIVENESS INDICATORS
- CERTAIN ASPECTS OF NPRDS COULD LIMIT ITS
USEFULNESS. THESE INCLUDE:
 - TIMELINESS OF REPORTING
 - COMPLETENESS
 - LIMITED SCOPE OF EQUIPMENT

CONCLUSIONS

- PROCESS INDICATORS HAVE MERIT AS PLANT-SPECIFIC MANAGEMENT TOOLS
- INDICATORS THAT ARE BASED ON ACTUAL COMPONENT RELIABILITY PROVIDE BEST MEASURE OF MAINTENANCE EFFECTIVENESS
- USE OF NPRDS PROVIDES REASONABLE AND ENCOURAGING RESULTS AS A DATA BASE FOR DEVELOPING MAINTENANCE EFFECTIVENESS INDICATORS

RECOMMENDATIONS

- ENCOURAGE LICENSEES TO IMPROVE THEIR
USE OF PROCESS INDICATORS
- LICENSEES SHOULD BE ENCOURAGED TO UTILIZE
INDUSTRY-WIDE COMPONENT FAILURE DATA BASE,
e.g. NPRDS
- STAFF SHOULD CONTINUE TO DEVELOP AND
VALIDATE MAINTENANCE EFFECTIVENESS
INDICATORS USING NPRDS

Plant # 1

85-1 to 88-1

Legend:

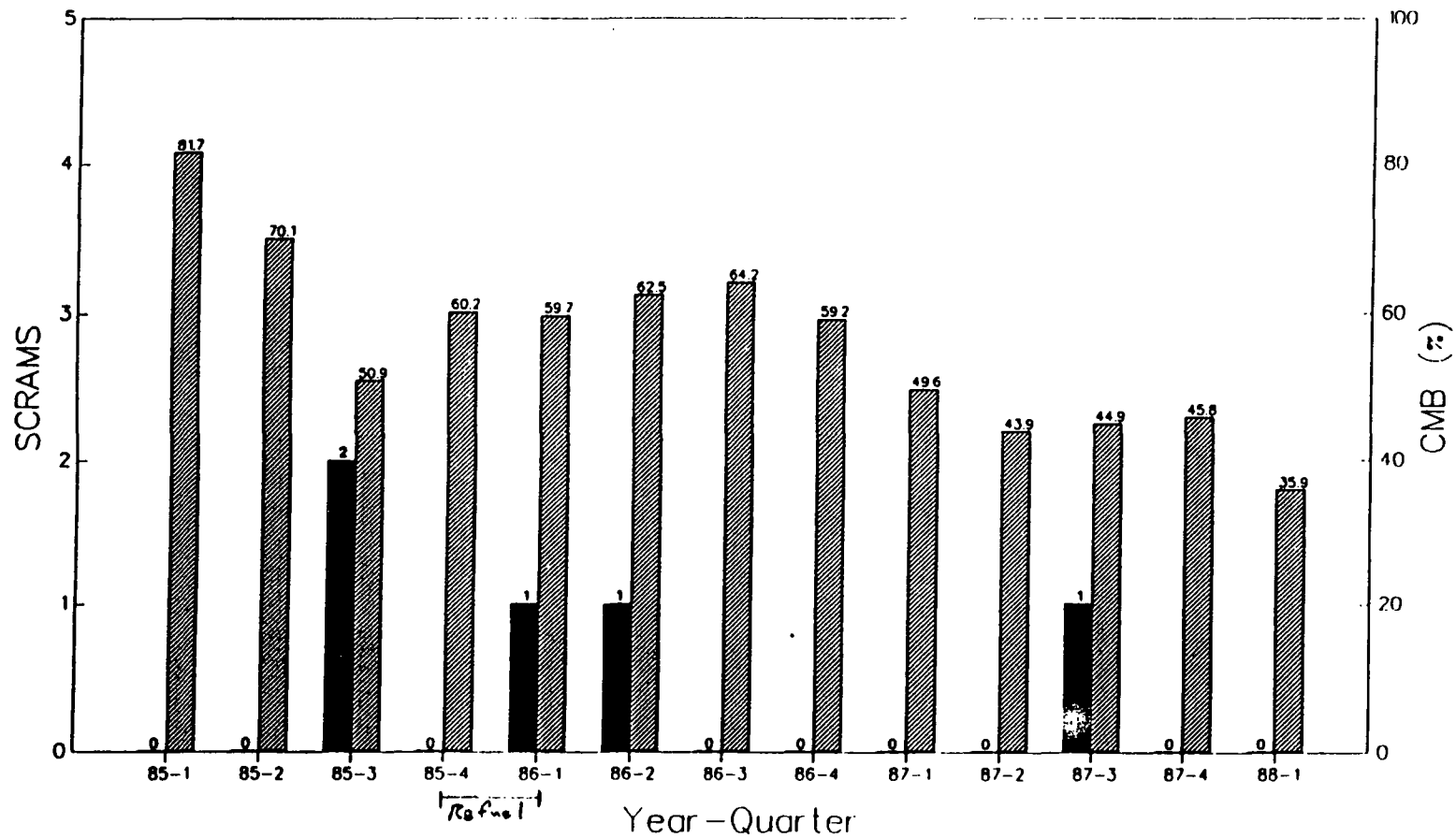


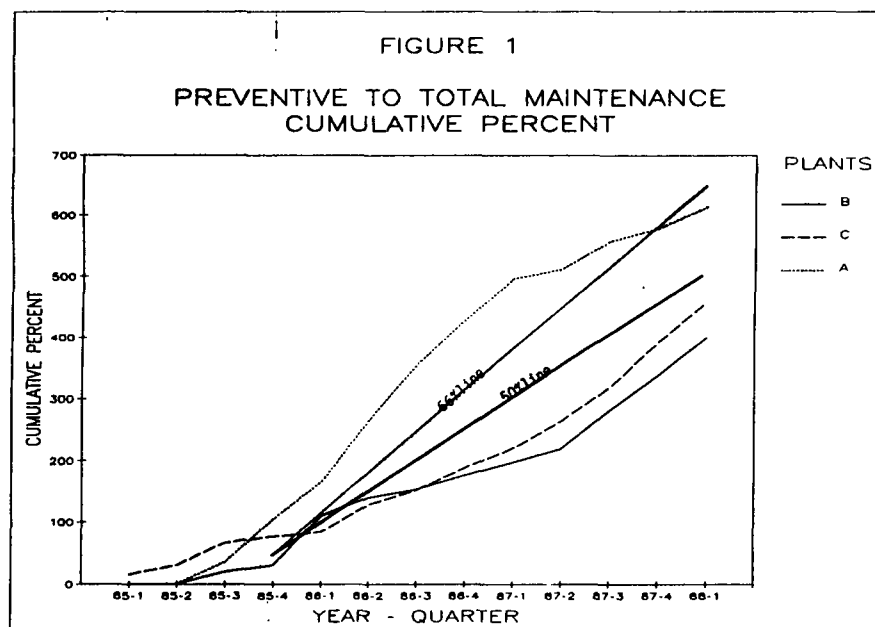
Automatic Scrums



Corrective Maintenance Backlog (%)

TOTAL SCRAMS -- CM BACKLOG





4. NRC will make available to INPO the job/task analysis data tapes containing the results of the NRC control room crew task analysis performed in 1982-83, additional data which may be collected by the NRC for control room crew task analysis, and other data which may be collected for other crafts and technicians associated with nuclear plant maintenance and operation.
5. Unless agreed otherwise, the data collected by INPO and the data collected by the NRC will be kept separated. Every effort will be made by both parties to protect the confidentiality of the data, the names of the nuclear power plants, and the personnel contributing to the data base, and to protect that information covered by the Privacy Act of 1974 (P.L. 93-579).

ACCREDITATION OF TRAINING PROGRAMS

1. Background

The purpose of this plan is to provide for coordination of selected INPO and NRC activities related to the ~~implementation and~~ accreditation of performance-based training programs. This plan also provides for continued industry initiative with NRC monitoring in this area and serves as a basis for NRC recognition of INPO's efforts. This coordination plan is consistent with the Commission Policy Statement on Training and Qualification of Nuclear Power Plant Personnel.

~~There are several underlying assumptions, including the following:~~

moved as
background
statement

- ~~o INPO recognizes NRC's regulatory responsibility.~~
- ~~o NRC recognizes the industry's initiative and commitment to INPO programs that promote high quality training through development of integrated training and qualification systems, including accreditation of key training programs.~~
- ~~o NRC and INPO recognize the need for a period of orderly progress in training activities as utilities implement training improvements, including performance-based training programs and continued additions of training staff, facilities, and simulators.~~
- ~~o NRC recognizes INPO accreditation and associated training evaluation activities (see also Appendix 2, "Coordination Plan for NRC/INPO Appraisal and Evaluation Activities") as an acceptable means of self-improvement in training. Such recognition encourages industry initiative and reduces duplicate program review and appraisal activities.~~
- ~~o INPO recognizes that the NRC requires access to selected INPO documents and information, as well as the opportunity to observe selected INPO activities related to training and accreditation, in order to ensure that the NRC meets its obligations to the public and the Congress.~~

2. INPO Activities

This section outlines current and planned INPO activities related to training and qualification of nuclear power plant personnel and accreditation of performance-based training programs. The INPO point of coordination for the implementation of this Attachment is the Vice [Group Vice] President and Director, Training and Education Division.

- a. INPO will continue to manage the accreditation of utility training programs including:
- o self-evaluations by member utilities, with assistance from the INPO staff;
 - o on-site evaluations of training and qualification programs by teams of INPO and utility personnel;
 - o preparation of a report for each accreditation ~~evaluation~~ [team visit];
 - o follow-up on recommendations developed during the accreditation process, ~~including follow-up as part of the regular plant evaluation program;~~
 - o awarding (or deferring) of accreditation by the ^[National Nuclear] Accrediting Board;
 - ~~o submittal to INPO by member utilities of two-year interim status reports on accredited programs; and~~
 - o ^[Maintenance] ~~re~~ accreditation of utility training programs covered by INPO accreditation approximately every four years.
- b. INPO will continue to conduct periodic performance-oriented evaluations of training and qualification programs as part of its ~~regular plant evaluations.~~ [operating]
- c. ~~INPO will develop a Training System Development Manual and accreditation program description and accreditation criteria, and will provide copies of these documents to the NRC. These documents will be made publicly available.~~
- c. INPO will provide updated copies of the accreditation procedures and criteria document as it is revised. This document will be made publicly available.
- d. INPO will review and consider NRC recommendations regarding INPO-managed training-related programs, documents, and criteria.
- e. INPO will provide periodic detailed briefings on accreditation to appropriate NRC management personnel, including review of the activities described in 2.a above and documentation of ~~the status of~~ industrywide ~~progress toward~~ accreditation. [status.]
- f. INPO intends to brief the Commission periodically on program status.

3. NRC Activities

This section outlines the NRC's continuing efforts to monitor INPO activities as part of NRC's assessment of the effectiveness of industry's training and qualification program improvements. The NRC point of coordination for implementation of this Attachment is the Director, Division of ~~Human Factors Technology~~, Of Licensee Performance and Quality Evaluation.

- a. NRC will not issue documents that duplicate INPO training documents and will not refer to INPO documents as a means of satisfying NRC requirements so as to avoid "codifying" or the appearance of "codifying" INPO documents.
- b. NRC will assess the effectiveness of industry's training and qualification program improvements as follows:
 - o conduct operator licensing exams;
 - o conduct operator requalification exams, consistent with Commission policy [10 CFR Part 50]
 - o include a training summary evaluation as part of each systematic assessment report of licensee performance (SALP);
 - o monitor plant and industry trends and events involving personnel errors;
 - o continue evaluation of industrywide training and qualification program effectiveness; and
 - o conduct performance-oriented training inspections to assess the level of knowledge and qualifications of plant personnel.
- c. NRC will monitor INPO activities in training and accreditation as follows:
 - o receive periodic briefings and/or reports from INPO and review a sample of applicable INPO documents;
 - o [Neminate] [Individuals] [Core] ~~recommend an individual~~ who is not on the NRC staff to serve as a member on each Accrediting Board with full voting privileges; [Numbers] [National Nuclear] [National Nuclear]
 - o have an NRC staff member attend and observe Accrediting Board meetings with the INPO staff and/or the utility representatives;
 - o on request and with concurrence of the utility, have NRC employees observe INPO accreditation team site visits for the purpose of monitoring the effectiveness of the accreditation process. Since accreditation teams are relatively small in number, it is anticipated the NRC would typically send only one observer on any visit. However, in certain circumstances, it may be appropriate to send more than one. INPO will obtain the

necessary concurrence from the host utility. While specifying a maximum number to be observed is not considered necessary by either party, it is anticipated that NRC employees would observe approximately 20 percent of INPO accreditation team visits.

- o accompany INPO on selected plant evaluations (see Appendix 2).
- d. NRC will provide INPO copies of NRC's performance-oriented inspection program, including applicable inspection guidelines in advance.
- e. NRC will coordinate any team inspections with INPO accreditation team visits and evaluations so as to minimize the impact on the utility involved. On request and with concurrence of the utility, an INPO employee may occasionally observe an NRC inspection in this area.
- f. Since INPO has its own system for obtaining member corrective action, NRC's role in pursuing corrective action of INPO-identified training and qualification recommendations will involve only significant safety problems for which NRC has no other reasonable alternative in meeting its legislated responsibilities. The NRC intends to exercise discretion in enforcement matters related to training as described in the Commission Policy Statement on Training and Qualification of Nuclear Power Plant Personnel.

**MEMORANDUM OF AGREEMENT
BETWEEN
THE INSTITUTE OF NUCLEAR POWER OPERATIONS
AND
THE U.S. NUCLEAR REGULATORY COMMISSION**

This memorandum between the Institute of Nuclear Power Operations (INPO) and the U.S. Nuclear Regulatory Commission (NRC) reflects the desire for a continuing and cooperative relationship in the exchange of experience, information, and data related to the safety of nuclear power plants. Mutual and complementary activities, as defined in appendices to this Agreement, will help ensure that the goals of both organizations are achieved in the most efficient and effective manner without diminishing or interfering with either party's responsibilities or authorities.

It is intended that this Memorandum of Agreement and its companion appendices complement one another. Appendices are utilized to delineate detailed and specific areas for cooperative agreements which exist between the parties of this Agreement and which may be amended from time to time. The appendices are not interpreted as restrictive to only those areas specified in the document, but serve as keystones of the Agreement for the exchange of information to support the common goals of both organizations.

INPO and the NRC agree to consult with each other with regard to the availability of technical information which would be useful in areas of mutual interest; and to promote and encourage a free flow of such information. In this regard, INPO will provide plant specific information on a case-by-case basis consistent with ADDED

RETAINED
A the other provisions of this agreement. Both parties recognize the need for excluding from this Agreement fragmentary information related to work in progress and/or which has been received on a privileged basis. However, as information is verified and found to be necessary or important to findings upon which significant safety-related conclusions and recommendations are based, the party holding such information will take appropriate and timely steps to remove it from the fragmentary, privileged or otherwise restricted status. However, the NRC cannot provide information to INPO that is required by law to be withheld. ADDED

Each party recognizes the need, on some occasions, to be able to accept and protect privileged information where such information could not be made available otherwise. It is recognized that the parties to this Agreement may not be fully aware of the extent of each other's knowledge and thus, this Agreement requires only the parties' best efforts and a reasonable degree of care in assuring that significant safety-related information is provided in a timely manner to the other party.

The parties to the Agreement will meet periodically to exchange information and keep each other apprised of the major activities underway and planned in each area of agreement. The meetings are an effort to avoid unnecessary and unintentional duplication of activities, while providing a means to identify those areas where independent activities by another organization may be warranted.

Memorandum of Agreement
Between INPO/NRC
Page Two

Coordination meetings are for information exchange only. Meetings are not to be construed as requests or opportunities for (or used by the NRC for obtaining) the advice or recommendations of INPO or its personnel on policy or regulatory issues within the scope of the NRC's responsibilities. INPO advice or recommendations to the Commission on regulatory or policy matters, if any, are to be made through established procedures of the Commission and will be considered by the Commission in the same manner as other offers of advice or recommendations made through established Commission procedures.

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[Minutes of all coordination meetings will be placed in the NRC Public Document Room. These minutes will include a list of the meeting participants and agenda items discussed at meetings, with brief summaries of the discussions held by meeting participants.]

ADDED

In addition to meetings, it is expected frequent, informal communications will exist among the parties that will be limited to exchanging information and providing updates on the status of activities in progress or planned.

The appendices to this agreement provide for NRC access to selected INPO proprietary documents and information. Such documents and information provided to the NRC will be appropriately identified as Limited or Restricted Distribution. Consistent with previous legal decisions sanctioning the exchange of proprietary information between INPO and NRC and in the interest of improving nuclear plant safety, NRC will control distribution of INPO proprietary documents and information within the agency and will exert best efforts to protect it from unauthorized disclosure. Exceptions to this policy for control of INPO proprietary documents and information will be addressed by the parties to this agreement on a case-by-case basis.

ADDED

This Agreement supersedes the previous Agreement dated December 18, 1985.

Victor Stello, Jr.
Executive Director for Operations
U.S. Nuclear Regulatory Commission

Zack T. Pate
President
Institute of Nuclear Power Operations

Effective Date:

APPENDIX NUMBER ONE
COORDINATION PLAN FOR NRC/INPO
EXCHANGE OF OPERATIONAL EXPERIENCE DATA

1. BACKGROUND

The purpose of this plan is to coordinate selected NRC and INPO activities related to the collection and feedback of operational experience, information and data related to the safety and reliability of nuclear power plants. There are several underlying assumptions, including the following:

- ° NRC and INPO share the common objectives that reporting of operational experience information and data be efficient and that duplicative or inconsistent reporting be minimized.
- ADDED ° NRC and INPO agree that the validity of analysis results may depend upon the completeness and quality of input information.
- ° NRC and INPO agree that the effectiveness of operational data feedback is dependent upon a proper understanding of the significant lessons learned from industry operating experience.

2. OVERALL COORDINATION

- a. NRC and INPO will regularly exchange, on a timely basis, the results of completed and formally documented generic analysis and event evaluation of operational data.
- b. INPO will provide the NRC with timely listings of the significant events which have been identified by the SEE-IN screening process as significant events for analysis. Similarly, the NRC will provide INPO in a timely manner with the results of its significant event screening procedure which identify events for engineering evaluation or case study and for Information Notices or Bulletins.
- c. Information and data obtained by the NRC from foreign sources, that do not include restrictions on further distribution, will be entered into a computerized data bank and will be made available for INPO analysis activities. Foreign information and data obtained by INPO that does not include restrictions on further dissemination will similarly be entered into an INPO data base and will be made available for NRC analysis activities.
- d. INPO will provide the NRC access to and use of the Nuclear Plant Reliability Data System (NPRDS) operated and maintained by INPO. Additional agreements regarding NPRDS access and usage are contained in a contract between NRC and INPO that is separate from this agreement.

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Appendix Number One
Coordination Plan for NRC/INPO
Exchange of Operational Experience Data
Page Two

- e. NRC and INPO intend to have periodic informal technical discussions on generic or event-related studies in progress that are of mutual interest.
- f. Prior to issuing to the industry an Information Notice or other completed and formally documented analysis of a specific event at a nuclear power plant, the NRC agrees to make reasonable efforts to review available INPO SEE-IN products to determine if the Information Notice or other analysis is needed and, if so, that it is technically accurate. Similarly, INPO agrees to make reasonable efforts to review available NRC Information Notices or other completed analysis to determine if an INPO SEE IN product is needed and, if so, that it is technically accurate. Unless a compelling safety concern dictates otherwise the party identifying technical inaccuracies, if any, will give the other party reasonable advance notification of the inaccuracies and seek resolution before formally issuing the information to the industry.

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ORIGINAL CA
ADDED BY INPO.

Victor Stello, Jr.
Executive Director for Operations
U.S. Nuclear Regulatory Commission

Zack T. Pate
President
Institute of Nuclear Power Operations

Effective Date:

APPENDIX NUMBER TWO
COORDINATION PLAN
FOR
NRC/INPO APPRAISAL AND EVALUATION
ACTIVITIES

1. BACKGROUND

The purpose of this plan is to coordinate selected NRC and INPO utility appraisal and evaluation activities. It is also intended to provide a mechanism and a basis for NRC to recognize INPO efforts in this area.

There are several underlying assumptions, including the following:

- ° INPO recognizes NRC's regulatory responsibilities.
- ° NRC recognizes INPO's efforts to promote safety in nuclear plant operations.
- ° NRC desires to recognize INPO evaluation activities to the extent that these activities are effective in helping meet NRC's responsibilities as well as lessen the burden imposed on the industry by duplicative appraisal activities.
- ° NRC requires access to selected INPO documents and information as well as the opportunity to observe selected INPO activities to meet NRC's obligations to the public and the Congress.

2. INPO ACTIVITIES

This section outlines current and planned INPO evaluation activities.

- a. INPO will conduct evaluations of operating nuclear plants on a periodic basis. The interval between plant evaluations will average about 16 months.
- b. INPO will conduct evaluations related to corporate support of nuclear stations. This phase of INPO activities will usually be conducted coincident with (in close time proximity to) an evaluation of the utility's plants. In general, corporate evaluations will be conducted following every other plant evaluation.
- c. INPO will prepare a written report for each evaluation. These reports will include appropriate utility responses in each area identified by INPO as needing improvement.
- d. Each succeeding evaluation will include follow-up on the responses developed during the preceding evaluation.

Appendix Number Two
Coordination Plan for NRC/INPO
Appraisal and Evaluation Activities
Page Two

- e. INPO will conduct appropriate visits to Near Term Operating License plants and their corporate organizations to assist in their preparation for operations.

3. NRC REVIEW OF INPO ACTIVITIES

- a. INPO expects its member utilities to make operating plant evaluation reports available to the NRC for review or reading. Further, INPO will make final evaluation reports available to the NRC for review or reading by appropriate NRC management personnel at the INPO offices in Atlanta.
- b. Current copies of, and any changes to, INPO evaluation criteria will be provided to NRC.
- c. NRC may, on request have a representative observe an INPO evaluation. INPO will obtain the necessary concurrence from the host utility. While specifying a maximum number to be observed is not considered necessary by either party, it is anticipated that an NRC representative may observe each type of INPO evaluation several times annually. Where NRC Regional personnel are utilized as observers, they would not normally accompany an INPO team on an evaluation in their own Region.
- d. INPO will brief personnel of the NRC Division of Reactor Inspection and Safeguards, Office of Nuclear Reactor Regulation (NRR) periodically, on all aspects of INPO's evaluation and assistance program.
- e. NRC review of INPO evaluation activities will be coordinated by the NRC Division of Reactor Inspection and Safeguards, Office of NRR. Since INPO has its own system for obtaining member corrective action, NRC's role in pursuing correction of INPO evaluation findings will primarily involve only those potentially significant safety problems for which NRC has no other reasonable alternative in meeting its legislated responsibilities. Any other NRC follow-up enforcement action would be in accordance with paragraph 4.c. below.

4. NRC RECOGNITION OF THE INPO EVALUATION PROGRAM

- a. Subject to the continued development and success of the INPO program as outlined above and NRC's ability to effectively review the program, NRC intends to recognize INPO evaluations and to minimize NRC-sponsored evaluations or appraisals, referred to as Performance Appraisal Team inspections (PAT).

Appendix Number Two
Coordination Plan for NRC/INPO
Appraisal and Evaluation Activities
Page Three

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- b. NRC and INPO will coordinate NRC inspections (involving two or more inspectors) and INPO evaluations to minimize the impact on the utility involved. [Where feasible, NRC and INPO will coordinate event related or other emergent onsite activities such as augmented inspection teams (AITs), incident investigation teams (IITs), diagnostic evaluation teams (DETs) and INPO event investigations, although each party recognizes that it may not be possible to coordinate all of these efforts.]

The NRC will apply the established Commission enforcement policy for licensee identified noncompliances to those noncompliances identified by utilities as a result of INPO evaluations. [

DELETE DETAILS IN
FAVOR OF SIMPLIFICA-
TION.

Victor Stello, Jr.
Executive Director for Operations
U.S. Nuclear Regulatory Commission

Zack T. Pate
President
Institute of Nuclear Power Operations

Effective Date:

APPENDIX NUMBER THREE
COORDINATION PLAN
FOR
NRC/INPO TRAINING-RELATED ACTIVITIES

1. BACKGROUND

The purpose of this plan is to coordinate selected NRC and INPO activities related to nuclear power industry training. It is also intended to provide a mechanism and a basis for information sharing and NRC recognition of INPO efforts in this area.

There are several underlying assumptions:

- INPO and NRC share the goal of improving and maintaining the quality of nuclear training.
- INPO recognizes NRC's regulatory responsibility.
- NRC recognizes the industry's initiative and commitment to INPO programs that promote high quality training through development of integrated training and qualification systems, including accreditation of key training programs.
- NRC and INPO recognize the need for a period of orderly progress in training activities as utilities implement training improvements, including performance-based training programs and continued additions or training staff, facilities, and simulators.
- NRC recognizes INPO accreditation and associated training evaluation activities (see also Appendix 2, "Coordination Plan for NRC/INPO Appraisal and Evaluation Activities") as an acceptable means of self-improvement in training. Such recognition encourages industry initiative and reduces duplicate program review and appraisal activities.
- Coordination of NRC and INPO training-related activities and sharing of information will increase overall effectiveness as well as lessen the burden imposed on the industry by duplication of activities.

2. OVERALL COORDINATION

In order to promote overall coordination of NRC and INPO training-related activities, the following actions will be taken:

- a. NRC/INPO Coordination Meetings will be held periodically with representatives from NRC's Division of Licensee Performance and Quality Evaluation (NRR), and INPO's Training and Education Group. At these meetings, information on ongoing projects and plans will be exchanged. Written reports of progress and results may be exchanged.
- b. INPO will provide the NRC with access to selected INPO documents and information and will provide updated copies of the INPO training guidelines and Training System Development Manual. INPO will also provide the NRC, on a case-by-case basis, with access to the job and task analysis data stored in the INPO computer data base.
- c. Coordination regarding accreditation of training programs is covered by Attachment 1.

Victor Stello, Jr.
Executive Director for Operations
U.S. Nuclear Regulatory Commission

Zack T. Pate
President
Institute of Nuclear Power Operations

Effective Date:

ACCREDITATION OF TRAINING PROGRAMS

1. BACKGROUND

The purpose of this plan is to provide for coordination of selected INPO and NRC activities related to the accreditation of performance-based training programs. This plan also provides for continued industry initiative with NRC monitoring in this area and serves as a basis for NRC recognition of INPO's efforts. This coordination plan is consistent with the Commission Policy Statement on Training and Qualification of Nuclear Power Plant Personnel.

2. INPO ACTIVITIES

This section outlines current and planned INPO activities related to training and qualification of nuclear power plant personnel and accreditation of performance-based training programs. The INPO point of coordination for the implementation of this Attachment is the Group Vice President Training and Education.

a. INPO will continue to manage the accreditation of utility training programs including:

- ° self-evaluations by member utilities, with assistance from the INPO staff;
- ° on-site reviews of training and qualification programs by teams of INPO and utility personnel;
- ° preparation of a report for each accreditation team visit;
- ° follow-up on recommendations developed during the accreditation process;
- ° awarding (or deferring) of accreditation by the National Nuclear Accrediting Board;
- ° follow-up to accreditation as part of the operating plant evaluation program;
- ° maintain accreditation of utility training programs by repeating the accreditation process approximately every four years.

b. INPO will continue to conduct periodic performance-oriented evaluations of training and qualification programs as part of its plant evaluations.

- c. INPO will provide updated copies of the accreditation procedures and criteria document as it is revised. This document will be made publicly available.
- d. INPO will review and consider NRC recommendations regarding INPO-managed training-related programs, documents, and criteria.
- e. INPO will provide periodic detailed briefings on accreditation to appropriate NRC management personnel, including review of the activities described in 2.a above and documentation of industrywide accreditation status.
- f. INPO intends to brief the Commission periodically on program status.

3. NRC ACTIVITIES

This section outlines the NRC's continuing efforts to monitor INPO activities as part of NRC's assessment of the effectiveness of industry's training and qualification program improvements; The NRC point of coordination for implementation of this Attachment is the Director, Division of Licensee Performance and Quality Evaluation.

- a. NRC will not issue documents that duplicate INPO training documents and will not refer to INPO documents as a means of satisfying NRC requirements so as to avoid "codifying" or the appearance of "codifying" INPO documents.
- b. NRC will assess the effectiveness of industry's training and qualification program improvements as follows:
 - ° conduct operator licensing exams;
 - ° conduct operator requalification exams, consistent with Commission policy and 10 CFR Part 55;
 - ° conduct reviews of a sample of utilities' to ensure use of performance-based training principles;
 - ° include a training summary evaluation as part of each systematic assessment report of licensee performance (SALP);
 - ° monitor plant and industry trends and events involving personnel errors;
 - ° continue evaluation of industrywide training and qualification program effectiveness; and
 - ° conduct performance-oriented training inspections to assess the level of knowledge and qualifications of plant personnel.

- c. NRC will monitor INPO activities in training and accreditation as follows:
- ° receive periodic briefings and/or reports from INPO and review a sample of applicable INPO documents;
 - ° nominate individuals who are not on the NRC staff to serve as members of the National Nuclear Accrediting Board with full voting privileges;
 - ° have an NRC staff member attend and observe National Nuclear Accrediting Board meetings with the INPO staff and/or the utility representatives;
 - ° on request and with concurrence of the utility, have NRC employees observe INPO accreditation team site visits for the purpose of monitoring the effectiveness of the accreditation process. Since accreditation teams are relatively small in number, it is anticipated the NRC would typically send only one observer on any visit. However, in certain circumstances, it may be appropriate to send more than one. INPO will obtain the necessary concurrence from the host utility. While specifying a maximum number to be observed is not considered necessary by either party, it is anticipated that NRC employees would observe approximately 20 percent of INPO accreditation team visits.
 - ° accompany INPO on selected operating plant evaluations (see Appendix 2).
- ADDED
- d. NRC will continue to provide INPO copies of NRC's performance-oriented inspection program including applicable inspection guidelines.
- e. NRC will coordinate any team inspections with INPO accreditation team visits and evaluations so as to minimize the impact on the utility involved. On request and with concurrence of the utility, an INPO employee may occasionally observe an NRC inspection in this area.
- f. Since INPO has its own system for obtaining member corrective action, NRC's role in pursuing corrective action of INPO-identified training and qualification recommendations will involve only significant safety problems for which NRC has no other reasonable alternative in meeting its legislated responsibilities. The NRC intends to exercise discretion in enforcement matters related to training as described in the Commission Policy Statement on Training and Qualification of Nuclear Power Plant Personnel.

APPENDIX NUMBER FOUR
COORDINATION PLAN

FOR

**INPO/INDUSTRY PARTICIPATION IN
NRC INCIDENT INVESTIGATION TEAMS**

ADDED COMPLETE
NEW APPENDIX
FOUR

1. The purpose of this plan is to establish guidance for INPO or other industry representatives involvement with NRC Incident Investigation Teams (IITs). It is also intended to minimize duplication of event investigation efforts to reduce the impact on the affected utility and to promote dissemination of accurate operating experience information to the industry.
2. NRC and INPO recognize the importance of NRC's incident investigation activities in identifying significant operational experience information. Participation by industry representatives on an IIT should result in a more complete and thorough understanding of the factors contributing to the incident and actions needed to prevent recurrence.
3. In view of these considerations, INPO and NRC agree on the following:
 - a. INPO or other industry representatives' participation on an IIT will be coordinated between the Director of the Office for Analysis and Evaluation of Operational Data (AEOD) for the NRC and the Group Vice President for Industry and Government Relations, INPO. A request for participation by an industry representative can be initiated by either party to this agreement.
 - b. The NRC will provide INPO with a reasonable number of copies of the current Incident Investigation Manual and any other procedures which apply to the operation of an IIT.
 - c. The NRC will notify INPO promptly when an IIT is being activated and provide all necessary information to enable INPO to facilitate industry participation.
 - d. INPO will serve as the central point of contact for coordination of all issues and procedures regarding industry participation on IITs.
 - e. INPO will recommend industry participants to the NRC.

**Appendix Number Four
Coordination Plan for
Incident Investigation Activities
Page Two**

- f. INPO will request each industry nominee to sign a statement regarding proprietary information, conflicts of interest, and waiver of compensation. In addition, each industry nominee will be requested to comply with the procedures established for the operation of IITs, which include procedures for handling differences in professional opinion and the release of investigation information. The signed statement will be provided to the NRC as part of the nomination process.
- g. INPO will provide assistance in coordinating with the affected utility to obtain site access for the industry representative(s).
- h. INPO will work with the affected utility and the IIT so that the Significant Event Report (SER), if any, being prepared by INPO on the event under investigation by an IIT is factually correct. To this end, INPO will request that the affected licensee coordinate a review of the draft SER with the IIT and provide comments to INPO.

Victor Stello, Jr.
Executive Director for Operations
U.S. Nuclear Regulatory Commission

Zack T. Pate
President
Institute of Nuclear Power Operations

Effective Date: