

UNITED STATES OF AMERICA NUCLEAR REGULATORY COMMISSION

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1 UNITED STATES OF AMERICA
2 NUCLEAR REGULATORY COMMISSION

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4 ANNUAL BRIEFING ON THE STATE OF THE NUCLEAR INDUSTRY

5 ***

6 PUBLIC MEETING

7 ***

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

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13 WEDNESDAY, MAY 4, 1988
14

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

18 COMMISSIONERS PRESENT:

19 LANDO W. ZECH, Chairman of the Commission

20 FREDERICK M. BERNTHAL, Member of the Commission

21 KENNETH CARR, Member of the Commission

22 KENNETH ROGERS, Member of the Commission
23
24
25

1 STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

2

3 S. Chilk

4 R. Campbell

5 G. O'Connor

6 G. Taylor

7 W. Parker

8 S. Smith

9 B. Lee

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P R O C E E D I N G S

[10:00 a.m.]

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CHAIRMAN ZECH: Good morning, ladies and gentlemen. Welcome to our guests this morning. This morning we'll hear from representatives of the American Nuclear Energy Council.

They are to brief the Commission on the state of the nuclear industry from their perspective. This meeting is scheduled to be a part of the Annual Nuclear Power Assembly.

This year's theme for the Nuclear Power Assembly is Nuclear Energy, Meeting Our Needs Now And In the Future. The Commission has recently testified before Congress and we stated that nuclear plant operations appear to be improving.

The number of unplanned trips is being reduced. The number of safety system challenges are dropping. The radiation exposure to workers is decreasing. The volume of radioactive waste generated is decreasing.

These indicators are all positive and we're encouraged to see the overall utility industry showing this sort of improvement.

We recognize that these are gross measures and that they're real nuclear utility leaders whose performance exceeds the industry average and is even higher than these average indicators.

Unfortunately, however, there are some plants which, while they perform in accordance with our regulatory rules and

1 regulations, they do not contribute to the improvement that the
2 industry trends show.

3 This means that there is still room for more
4 improvement. The industry challenge remains the same as it was
5 when the report in 1986 was published -- that report on
6 "Leadership and Achieving Operational Excellence," when that
7 report was published -- and the challenges are still very real
8 and certainly those challenges are still before the nuclear
9 industry.

10 The Commission certainly supports those challenges
11 that were outlined in that report. This morning, Mr. Campbell,
12 Mr. O'Connor and Mr. Smith, we want to welcome you and your
13 colleagues to our new NRC Headquarters.

14 We're still settling in here, but with a few things
15 to still iron out, our new Headquarters certainly appear to be
16 very satisfactory and we welcome you to one of our first
17 meetings in this new facility.

18 Do any of my fellow Commissioners have any opening
19 comments to make? Mr. Rogers will not be with us here this
20 morning. Mr. Roberts, excuse me. Commissioner Rogers is here
21 as you can see.

22 If there are no comments, then, Mr. Campbell, you may
23 proceed.

24 MR. CAMPBELL: Thank you very much, Mr. Chairman. We
25 are very privileged and are very pleased to be here in this

1 beautiful new facility today.

2 I'm Bob Campbell, Chairman of the Pennsylvania Power
3 and Light Company. We're pleased, particularly, to be here as a
4 part of our annual briefing that we have seen over the years as
5 a part, and a very important part, of our annual Nuclear Power
6 Assembly.

7 The past two days during our meeting we have heard
8 from officials, from the Executive Branch and from Congress.
9 We discussed nuclear plant standardization and we've talked
10 about uranium mining and enrichment legislation.

11 We've had discussions on the development of advanced
12 reactor technologies. And we've really covered a wide range of
13 timely and very important issues.

14 We've heard people in Congress acknowledge what you
15 just said, Mr. Chairman, and that is that nuclear energy plays
16 a very vital role in our country's energy future.

17 But we were reminded during the course of our
18 discussions at the Nuclear Power Assembly this week, that even
19 with this understanding and support, political and
20 governmental, uncertainties, of course, remain.

21 So, in spite of a very successful year, and we feel
22 we have had a very successful year in Congress, we've had a
23 successful year, we believe, at the state level, and really
24 most importantly, we've had a successful year in the operations
25 of our plants. We still have challenges aplenty.

1 With me today, as you've indicated, are two senior
2 industry executives, Jim O'Connor, who is Chairman and Chief
3 Executive Officer of Commonwealth Edison, and Jim is going to
4 talk about the state of the industry.

5 As Jim will tell you, we in the nuclear power
6 industry are very serious about our emphasis on excellence,
7 operational excellence.

8 We are deeply committed, also, to maintaining nuclear
9 energy as an option for the nation's energy supply. Sherwood
10 Smith, who is the Chairman, President, and Chief Executive
11 Officer of Carolina Power and Light Company, will discuss the
12 industry's efforts to improve nuclear technology and
13 operations.

14 He will focus primarily on the recent accomplishments
15 of the Electric Power Research Institute, EPRI. Sherwood is a
16 member of EPRI's Board of Directors.

17 But before Jim and Sherwood speak, I appreciate the
18 opportunity to say a few words in my capacity as Chairman of
19 NUMARC.

20 Our industry's commitment to nuclear energy requires
21 us, we believe, to take a very realistic view of the challenges
22 we have before us.

23 We all share in the responsibility to resolve the
24 challenges we have. Over the past few years, though, we
25 believe we've seen some very fundamental and important changes

1 in the way that we all approach our nuclear responsibilities.

2 We have made a strong commitment to achieving
3 operational excellence and we've made great progress in such
4 areas as operating and maintaining our plants and training our
5 people.

6 We don't claim, yet, to be fully satisfied, but our
7 progress has been real and very importantly, it's been
8 measurable. But, of course, we don't operate in a vacuum.

9 Every decision we make is influenced by the
10 institutional and the regulatory environment in which we
11 operate.

12 To be sure that we keep our nuclear power plants
13 operating well, and keep the nuclear option open for the
14 future, our goals must relate constructively to the
15 institutions that shape the environment in which we operate.

16 And, of course, the public must be assured that our
17 nuclear plants are operated well. That is, safely and
18 reliably.

19 It's clearly our mutual objective to provide safe,
20 efficient electricity generated by nuclear power. There are
21 encouraging signs that our shared vision of how to achieve
22 these goals is providing safe and efficient electricity from
23 our nuclear power plants.

24 And we think that our shared vision is coming
25 together and that, as we see that being expressed in Congress

1 and in the NRC and in the nuclear industry itself, and the
2 public, we have a sense that we're all moving in the same
3 direction.

4 On the regulatory front, we are pleased that 14 new
5 nuclear plants received operating licenses last year. We are
6 also gratified by this Commission's constructive approach to
7 addressing such issues as erosion-corrosion, and operator
8 requalification.

9 On erosion-corrosion, the Commission played a strong
10 oversight role as the industry develops specific solutions. On
11 operator requalification, the Commission asked the industry to
12 define specific problems and solutions which resulted in a more
13 comprehensive program to measure operator performance.

14 That is, instead of regulating the problem solving
15 process, the NRC is judging the results of our programs on the
16 basis of our performance.

17 We believe this approach is working well on these
18 issues as it has in the past on issues such as accreditation of
19 training programs.

20 It's a good use, we believe, of our expertise and
21 resources. It preserves the NRC's mission of regulating
22 prescribed levels of safety by monitoring our performance and
23 results.

24 We believe in effective, realistic, and workable
25 solutions. We believe this approach, having the industry

1 develop and implement solutions to problems where they exist,
2 is appropriate.

3 We're encouraged by it. We are dedicated to making
4 sure that our performance on these issues will encourage the
5 Commission to use it more widely in the future.

6 We hope we can use this approach in the maintenance
7 area. Our efforts are not intended to supplement regulation
8 and oversight, but to complement them, thereby advancing the
9 safety goals that both the NRC and the nuclear energy industry
10 share.

11 With that, let me turn to my colleague from
12 Commonwealth Edison, Jim O'Connor, and, again, say just how
13 much, as Chairman of the Nuclear Power Assembly, we appreciate
14 being here today.

15 CHAIRMAN ZECH: Thank you very much. Mr. O'Connor,
16 welcome to you.

17 MR. O'CONNOR: Thank you very much, Mr. Chairman and
18 gentlemen, good morning. Let me please start by endorsing Bob
19 Campbell's statement that the nuclear industry is single-
20 mindedly dedicated to self improvement and to superior
21 performance in operations.

22 Throughout our industry today, from the board room to
23 the control room, we are determined to achieve and maintain
24 exemplary performance in both the management and operation of
25 every one of our plants.

1 In my remarks today, I'd like to review briefly what
2 has been achieved over the past year, and what we hope to
3 achieve in the year ahead.

4 By and large, this past year has been a rewarding one
5 for the industry. Our drive for excellence is bearing fruit
6 and we are much heartened by a number of the positive
7 developments that we see on Capitol Hill.

8 In that arena, as you know, Congress is close to
9 extending and revising the Price Anderson Act. The new version
10 strengthens the Act by raising the public liability production
11 from a nuclear accident more than ten-fold.

12 This industry and its supporters also turned aside an
13 attempt in the House of Representatives to give state and local
14 government effective veto power over the operation of nuclear
15 power plants.

16 We think this is a very key vote in as much as it
17 reaffirms the original intent of Congress to leave the
18 regulation of nuclear energy in the hands of the Nuclear
19 Regulatory Commission.

20 It was encouraging to utilities to know that Congress
21 supports the concept of uniform safety standards and
22 enforcement policies for all nuclear plants.

23 The experience at Shoreham and Seabrook shows just
24 how disastrous it can be if this authority were to be disbursed
25 among the various states.

1 We were also gratified by congressional agreement to
2 redirect the nation's high level nuclear waste management
3 program.

4 Lack of progress in implementing the Nuclear Waste
5 Policy Act of 1982 has really been a source of continuing
6 frustration for all of us these past few years.

7 From a financial standpoint, the utilities have been
8 paying the bill, with our obligation to fund program, yet,
9 until we could see some real progress made on the waste
10 disposal front, the public continues to remain skeptical about
11 the future of nuclear power and our nation's true resolve to
12 deal effectively and aggressively with what continues to be the
13 major concern that they have about nuclear power.

14 We look forward, now, to seeing some progress and we
15 think that that is good news for all of us. That there have
16 been other achievements.

17 We see serious efforts to place the Federal
18 Government's uranium enrichment enterprise on a more
19 businesslike footing, and Congress has taken the first steps
20 toward reforming the licensing process.

21 Finally, we see very clear signs of congressional
22 willingness to give serious consideration to the development of
23 advanced nuclear power technologies.

24 These are all very important steps in their own
25 right, but they have a collective importance that goes far

1 beyond any single individual event.

2 When we step back and look at the last year's events
3 as a whole, we see that we, the industry, the Congress, the
4 Executive Branch, and you, the industry's regulators, are
5 creating the conditions and laying the foundation which was
6 necessary for the next generation of nuclear power plants in
7 this nation.

8 For the nuclear energy industry to succeed, the most
9 important reality and clearly our most important responsibility
10 is to operate the plants that we now have just as well as we
11 possibly and humanly can.

12 As you know, the industry, about ten years ago,
13 launched a comprehensive self improvement program, and this
14 grew out of the results and the lessons learned from Three Mile
15 Island.

16 We realized then, and realize even moreso today, that
17 the performance of our industry as a whole is determined by the
18 least among us, that we are all held hostage to the performance
19 of any one plant.

20 We recognize, as Bob pointed out, that not all of our
21 plants are, today, performing as well as they might. But we
22 recognize and believe, also, that our self improvement efforts
23 have already paid handsome dividends and will continue to do
24 so.

25 And the improvement and the indicators that you

1 mentioned, Mr. Chairman, I think bears this out and perhaps I
2 can define them just a little bit more to give you an
3 indication of the progress that has been made since 1980 in
4 some of the areas that you talked about.

5 For example, in the area of unplanned reactor scrams,
6 they dropped from an average of 7.4 per unit in 1980, to less
7 than 3 per unit in 1987.

8 The lost time accident rate was reduced to one-fourth
9 its level in 1980. And this, among many of us in the industry,
10 is a very key barometer of attitude among our employees, of how
11 they treat with respect the technology that they're dealing
12 with, and is a key criteria by which to measure overall
13 performance..

14 The radiation exposure that you referred to among our
15 plant workers in our boiling water reactor facilities, and
16 measured in terms of man-rem per unit, dropped from 1,230 in
17 1980 to 521 in 1987.

18 And in our pressurized water plants, the exposure
19 dropped from 597 to 368 man-rem per unit. The average volume
20 of low level solid radioactive waste per BWR unit, dropped from
21 1,113 cubic meters in 1980 to 459 in 1987.

22 And the average volume per PWR dropped from 586 cubic
23 meters to 194. In these latter two areas that I've just
24 alluded to, we met what we had established as our goals for
25 1990, several years earlier than anticipated.

1 And we have every reason to believe that some of the
2 other indicators and the goals that we have established for
3 them will be met sometime in 1988 or '89, earlier than our
4 first target dates that were established.

5 Further evidence of operational progress appeared in
6 the recent NRC report on abnormal occurrences which listed
7 three abnormal occurrences in the first three quarters of 1987.

8 And that's significantly lower than what we had
9 experienced in previous years. While we take a lot of pride in
10 this collective progress, we also know that we can never relax,
11 we can never be over confident in our quest for excellence in
12 operations, and that has to be applied at every single nuclear
13 facility in the country.

14 Looking ahead, we hope to see substantial progress in
15 several major areas in the very near future. In responding to
16 the host of inquiries that we receive from members of Congress
17 as to what our priorities on the nuclear agenda are, we point
18 out that our primary goal is to see that Seabrook and Shoreham
19 are brought on-line.

20 These plants are ready to operate. They have
21 developed satisfactory emergency plans, and they are clearly
22 needed to meet electricity demand in the areas that they serve,
23 and especially in those areas where they would now rely on
24 large amounts of imported oil.

25 These units, plants, stand as symbols of governmental

1 unpredictability to which nuclear power has been subjected. If
2 local politics are permitted to override the technical judgment
3 and lawful authority of the NRC, we're quite confident that
4 electric utilities will not ever again be able to consider
5 nuclear energy as an option for the future.

6 Such short sighted manipulation of the regulatory
7 process by local authorities clearly is not in the best
8 interest of this nation.

9 As a corollary to this issue, we hope that the next
10 year brings final resolution to the controversy over emergency
11 planning regulation.

12 This Commission has to be commended for the action
13 that it took last year in clarifying and affirming its
14 congressionally mandated authority over emergency planning.

15 This was an extremely positive first step. Now it's
16 essential that the next steps be taken so that no plant is
17 prevented from operating because of the failure of local
18 governmental units to participate in emergency planning.

19 And we, as an industry, assign an extremely high
20 sense of urgency to this priority. Another priority for us is
21 standardization and licensing reform.

22 It is, again, self evident that no utility in this
23 country would consider ordering another nuclear plant without
24 some assurance that if we go ahead and build the plant as
25 originally designed and approved, that we will then be able to

1 operate it.

2 We simply can't afford to see a \$10 billion
3 investment, like we have on the East Coast, continue to stand
4 idle.

5 The solution must include development of standardized
6 reactor designs, proapproval of nuclear plant designs and
7 sites, and consolidation of the construction permit and
8 operating licensing proceedings into one step.

9 As long as a plant such as Seabrook and Shoreham,
10 which had been built according to, and which have met all
11 regulatory requirements continue to be prevented from
12 operating, the future of the nuclear power industry lacks
13 certainty.

14 With our growing dependence on imported oil, and the
15 rising demand for electricity, the nation is leaving itself
16 open to great risks without the nuclear option.

17 If we look elsewhere around the world, we see some
18 our nation's chief economic competitors, such as in Southeast
19 Asia and Western Europe, ordering, and they'll surely construct
20 and operate new nuclear plants.

21 Almost all of the plants that they are planning are
22 next step evolutions and developments which stem from the
23 United States light water reactor technology.

24 These countries are benefitting from, yet, another
25 technology that we pioneered. Although we might find it

1 difficult to regain the technological leadership that we once
2 held, we must preserve the nuclear option as part of our energy
3 supply, if we're going to compete effectively in the world
4 marketplace, and if we're going to be able to provide safe,
5 reliable, secure electric power for the future.

6 As I mentioned at the outset, our goal in industry is
7 to achieve the highest possible levels of excellence in the
8 operations of our plants.

9 If we achieve that goal, we will have delivered on
10 the promise of nuclear energy as a safe, reliable, economical
11 source of electric power, and earn, in the process, the trust
12 of the public and policy makers at all levels of government.

13 That confidence, then coupled with a credible,
14 predictable regulatory system, will provide the impetus and
15 confidence which are absolutely essential to the future
16 development of nuclear power.

17 Thank you again, Mr. Chairman and members of the
18 Commission, for the opportunity to present our remarks to you
19 today.

20 CHAIRMAN ZECH: Thank you very much, Mr. O'Connor.
21 Mr. Smith, please?

22 MR. SMITH: Thank you, Mr. Chairman and members of
23 the Commission. It is a pleasure, also, to be here with you
24 today and to report to you in a summary fashion upon the
25 electric utility industry's work in nuclear research and

1 development, particularly the work that is now being done
2 through the Electric Power Research Institute.

3 My own company was a founding member of that
4 institute. I currently serve as a member of the Board of
5 Directors and Executive Committee, and as Chairman of the
6 Strategic Planning Committee of EPRI.

7 In my remarks, I will touch on the substantive issues
8 of safety first, accident research, reliability, operating the
9 maintenance expenditures, and the ALWR program, as we call the
10 Advanced Light Water Research program.

11 I note that the Commission has scheduled a meeting, I
12 believe, on June 16th for our Steering Committee of EPRI to
13 report in more detail on the ALWR program.

14 In the nuclear area, EPRI is one organization of our
15 team of organizations that's dedicated to safety and
16 reliability and operational excellence.

17 EPRI works closely with NUMARC, the Nuclear
18 Management and Resources Council, with INPO, the Institute of
19 Nuclear Power Operations.

20 EPRI collaborates with NUMARC in such areas as
21 erosion-corrosion, decay heat removal, severe accident issues,
22 and others.

23 And, EPRI has worked closely with INPO on a variety
24 of technical issues. Equipment reliability, water chemistry,
25 maintenance, human factors guidelines, and in service

1 inspection are some of those.

2 I'd like to review briefly some of the facts about
3 our EPRI research. Our membership consists of over 70 percent
4 of America's generating capacity, and over 90 percent of our
5 operating nuclear plants.

6 The utility industry contributes over \$360 million to
7 those research efforts. Just under 20 percent of the \$360
8 million is devoted to nuclear research.

9 The Nuclear Power Division's research budget is
10 augmented by a number of cooperative co-funded programs,
11 including a number of cooperative programs with the NRC for
12 which we attach a pie value and are very appreciative of the
13 cooperative spirit exemplified through that work.

14 Currently, about 50 percent of the benefits that
15 accrue to the utilities from EPRI research, have come from
16 Nuclear Power Division programs.

17 As to safety first, I wish to stress our commitment
18 to this approach we call safety first, when we set priorities
19 for our nuclear energy research.

20 We take a broad view of safety. In our view, it
21 includes both reactor safety and personnel safety. Two
22 examples of this work would be the recent pipe rupture at a
23 large PWR in December of 1986.

24 When this occurred, EPRI immediately created a task
25 force and a program on erosion-corrosion, in high pressure

1 water, or single phase piping, drawing on experts and
2 materials, water chemistry, thermal hydraulics, and system
3 engineering.

4 We sponsored workshops and distributed reports on the
5 technical aspects of the program, developed a computer program
6 which we called C-H-E-C, or CHEC, to help utilities predict
7 where to look for single phase erosion-corrosion.

8 EPRI also helped, with NUMARC, to develop some
9 recommendations on this issue and we're establishing a parallel
10 code that we call C-H-E-C-M-A-T-E, CHECKMATE, to predict
11 erosion-corrosion in pipes carrying a mixture of saturated
12 steam and water, or two phase fluid.

13 Our EPRI research has also helped reduce occupational
14 radiation exposure, about which Mr. O'Connor reported a moment
15 ago.

16 The collective radiation exposure predictor unit has
17 dropped 50 to 60 percent since 1980, and EPRI's contribution to
18 this has been the LOMI decontamination process, improved
19 control over primary water chemistry, automated inspection
20 techniques, and the development of a new cobalt-free alloy to
21 replace stellite, which has been a major source of cobalt 60 in
22 nuclear plants.

23 In the area of accident research, our utility
24 industry assigns a high priority to severe accident research.
25 In the seismic area, for example, EPRI has developed new

1 analytical tools to perform large scale seismic tasks, and
2 gathered extensive earthquake survivability data to help
3 resolve concerns about the seismic adequacy of our design.

4 We think that this has helped resolve the scientific
5 issues that involve large "possible" earthquakes in the
6 eastern United States.

7 EPRI's work on severe accidents also include
8 emergency diesel generator liability, decay heat removal, the
9 IDCOR program, and extensive experimental work on containment
10 integrity.

11 In the area of reliability, one of goals, of course,
12 must be improved reliability and availability, and EPRI has
13 several valuable programs in this area.

14 A couple of examples are these: EPRI helped develop
15 ways to prevent intergranular stress corrosion cracking in
16 boiling water reactors. This problem had caused major outages
17 at BWR's. Through EPRI, our utility sponsored a 9-year, \$90
18 million program to develop remedies, including crack-resistant
19 materials, new welding procedures, water chemistry guidelines
20 and advanced in-service inspection methods.

21 Also, our research has helped improve the reliability
22 and availability of steam generators and reduced repair and
23 inspection costs. Between 1980 and 1984, the average annual
24 loss capacity from forced and extended outages for steam
25 generator replacements, was 5.7 percent, at an average annual

1 cost of \$196 million. In 1985 and 1986, that loss capacity
2 rate was lowered to 1.7 percent, at an average annual cost of
3 only \$59 million. This was over a threefold improvement, which
4 shows how research geared to the improvement of plant
5 reliability can also reduce costs.

6 In the area of operations and maintenance, we believe
7 fundamentally that we need to learn more about how to spend our
8 money more wisely. We are helping with INPO, the development
9 of practical, cost-effective approaches to improving industry
10 operations and maintenance practices. And we're building on
11 many of the good programs at a number of utilities.

12 The principal focus, of course, remains safety and
13 improved reliability. But because of the rapidly rising O&M
14 costs of nuclear power in recent years, EPRI has been forced to
15 re-evaluate some of its earlier objectives and resources
16 allocations with regard to the benefits of some maintenance
17 programs in terms of reliability and safety.

18 We think that we are spending substantially and very
19 adequate funds in this area, but we believe that those funds
20 can be spent by the utilities more effectively, so that we will
21 be able to stabilize and prevent the continued increase in
22 these O&M expenditures. Other countries -- France and Sweden,
23 for example, have demonstrated that they've been able to do
24 this with excellent operation safety and maintenance

25 Our aim is to introduce a more effective learning

1 curve in all elements of maintenance, not just in key
2 components like steam generators. A rapid review and feedback
3 will result in technical information and practical guidelines
4 for maintenance personnel.

5 In the area of advanced reactors, although there are
6 a number of very difficult institutional factors which we view
7 as the main impediment to nuclear energy's expansion in the
8 next decade and beyond into the next century, we think that now
9 is the time to determine the technical characteristics of the
10 next generation of reactors. That's the purpose of the program
11 that I mentioned, that we call our ALWR, or Advanced Light
12 Water Reactor Program.

13 We are pleased with its progress, not in the least
14 because it places a responsibility on developing the technical
15 characteristics for the design on the utilities themselves,
16 which will have the responsibility of designing, ordering,
17 building and operating those plants. As a result, EPRI's
18 management of this ALWR program relies extensively on our
19 utility membership, and our growing experience in the operation
20 of our current generation of light water reactors.

21 The ALWR program is a joint program with the
22 Department of Energy, and their support and participation, of
23 course, is vital to the program's success. DOE also has the
24 primary role for longer-range reactor development -- the liquid
25 metal-cooled and gas-cooled systems. In those two areas,

1 EPRI's role is a more modest one of support.

2 Our primary utility focus at EPRI, is on the ALWR.
3 We think that for the ALWR to be a candidate for utility
4 investment, it must meet three fundamental standards. First,
5 and foremost, it must be an excellent power plant in all
6 respects, as to safety, as to its maintainability, as to its
7 compatibility with the environment. And second, it must be
8 economically attractive, as compared with fossil-fired units.
9 Finally, the ALWR must provide a very high protection for the
10 utility investment in terms of predictable construction costs,
11 schedules, assured licensability, predictable operating and
12 maintenance costs, and a very low risk, of course, of a severe
13 accident.

14 Our ALWR program is developing two design concepts to
15 meet these standards. In each case, both the pressurized water
16 reactors and the boiling water reactor designs are being
17 considered. We call these two design concepts the evolutionary
18 plant -- that is for the improvement of our current type of
19 light water reactors, and the passive safety plants. The
20 evolutionary plant design focuses on a 1,000 megawatt electric
21 plant. The passive concentrates upon a 600 megawatt electric
22 reference plant.

23 In the evolutionary ALWR concepts, systems and
24 hardware are conventional, but the designs place increased
25 emphasis on safety, simplicity, increased design margin, and

1 improved human factors. For example, a PWR designed to meet
2 these standards, would use a conventional reactor coolant
3 system, but with much improved reactor coolant pump seal
4 designs, steam generators with greater corrosion resistance,
5 and a larger, secondary side water inventory, and a much larger
6 pressurizer to accommodate a full post-scrum transient without
7 actuation of pilot-operated relief valves.

8 The reactor manufacturers are developing the detailed
9 designs to be consistent with the utility requirements, and are
10 submitting them to the NRC for its certification.

11 The second ALWR design option, which may be
12 potentially more attractive over the longer term, is a passive
13 plant. The ALWR passive plant increases the use of intrinsic,
14 physical characteristics such as gravity and natural
15 circulation, to remove decay heat, provide emergency core
16 cooling, and prevent core damage. The incentives for
17 developing a passive plant are very substantial.

18 The plant protection systems would substitute
19 intrinsic, or passive responses for the active engineered
20 safeguards equipment that we have in our existing plants. The
21 passive plant offers greater opportunity than the evolutionary
22 plant to simplify -- that is, by reducing the number of valves,
23 pumps, tanks, instruments and so forth, with an intended
24 improvement in safety, improvement in construction time and
25 costs, improvement in plant operability, and maintainability.

1 The passive plant may turn out to be more easily
2 licensable than existing plants, because of its simplicity and
3 free safety margins, and improved human factors. We feel
4 confident that ALRW program will yield financially attractive,
5 licensable standardized systems, ready for construction, when
6 they are needed in the next decade. The promise of this
7 program is reflected in the fact that we're joined both
8 financially and technically, by utilities from Japan, Taiwan,
9 Korea, Italy and the Netherlands.

10 In closing, let me say that we appreciate very much
11 the cooperation of the NRC in identifying joint efforts for
12 safety research within our industry. We believe that such
13 joint projects produce more meaningful results than could be
14 provided by independent work. They may be in a more timely and
15 a more effective manner, and importantly, at the least cost to
16 the rate payers. And may I add in closing, that at my age and
17 assuming the indulgence of my board of directors, I would hope
18 to be present when the request is made for the approval of a
19 construction permit for an ALWR in the 1990's. Thank you.

20 CHAIRMAN ZECH: Thank you very much. Mr. Campbell,
21 does that complete your presentation?

22 MR. CAMPBELL: That would complete the statements we
23 have, and it has been our format to invite questions and
24 discussion, so we will turn it back to you, Mr. Chairman.

25 CHAIRMAN ZECH: All right. Thank you very much.

1 Questions from my fellow Commissioners? Commissioner Bernthal?

2 COMMISSIONER BERNTHAL: Well, I appreciate the
3 opportunity to chat with you for what I trust will be the last
4 time. Not because you won't be here again, but perhaps I won't
5 be.

6 I want to pick up for a moment, Sherwood, on comments
7 you've made on the advanced reactor program at EPRI, because I
8 just came back from Seattle where I gave a talk, as did Dr.
9 Stalkoff, the new head of EPRI, on the subject of advanced
10 reactors, and in particular in my case, on the subject of the
11 Commission's advanced reactor policy and the program, the
12 nascent program, I should say, that we have on that subject
13 within this agency.

14 It may be fitting that that could well be the last
15 speech as I gave as a Commissioner, because that's kind of
16 where I started when I came into this agency. When I arrived
17 at the NRC, there was no policy here. In fact, there was
18 decidedly a policy against any kind of early involvement in
19 assessing the safety characteristics of conceptual designs of
20 any kind.

21 With the help of the Congress, and I should say with
22 the very strong support of EPRI, and particularly the strong
23 support of John Taylor, who's sitting in the background there,
24 we turned that policy around, and today we have an active
25 advanced reactor policy and an advanced reactor program in this

1 agency, so that if that program is continued to be nurtured
2 here in the next few years, we're not going to be in the
3 situation that we used be in, where the NRC listened politely
4 when someone spoke of a new design, and then ran off and washed
5 its hands until a construction permit application landed on the
6 table.

7 And at that point, as you well know, the intellectual
8 investment and the financial investment is such that new
9 designs and certainly construction permits take on a life of
10 their own, and that's not in the public interest, it's not in
11 the interest of the NRC as the regulatory body, and it's
12 certainly not in the interest of the industry. So, I just want
13 to give credit here where it's due to EPRI, and particularly to
14 John Taylor and to you, who are on the board of EPRI who have
15 supported this program and I would urge you to continue to
16 support it in the future. We may not have that policy here
17 today, had it not been for the active support of EPRI.

18 I wanted to touch on one other issue that you spoke
19 of only briefly, and that's the issue of maintenance, because,
20 as you know, this Commission is currently in the throws of
21 promulgating a maintenance policy statement. In fact, I guess
22 the -- is the final statement out, or is it a proposed
23 statement? Well, it's out, I guess. And in fact, the question
24 is now before the Commission on whether the Commission should
25 initiate rule-making in this area. The ACRS has looked at this

1 very carefully. It's, I think, a very great credit and help to
2 the Commission that some of the members of the Commission, in
3 fact, the newer members -- Commissioner Carr, in particular --
4 have taken a great interest in the maintenance area.

5 Could you give us some indication, and we'll take
6 advantage of the situation here today perhaps, to give us your
7 thoughts on what form a maintenance rule might take? What
8 areas the Commission might profitably and properly head in this
9 area, if the Commission did decide to undertake rule-making.

10 MR. SMITH: May I begin briefly, and then there are
11 others here that I think would wish to speak to that. And
12 there is some work being done, I believe now, at NUMARC, in
13 this whole area.

14 Maintenance is tremendously important. With the
15 variety of the some 109 plants or units that we have in
16 operation at a number plants, perhaps, I don't know, 65 sites
17 or thereabouts now, around the country, it is important that
18 the maintenance at the plant, regardless of what I say here,
19 what Congressional inquiries may get into, what policy is
20 written -- and I would hope it would be a policy here and it
21 would not be rule-making -- what really is important is, is
22 what takes place at the plant.

23 And that involves the plant management, the company's
24 executive organization, the training and the standards that are
25 applied, both to the operation and the maintenance. And I

1 would hope that whatever is done, takes into account, the need
2 not to be so overly prescriptive that one limits the ability of
3 the trained person there at the site, with the pump or the
4 other pieces of equipment, to do what should be done.

5 A very simple example -- whether that's to put in
6 another drop of oil or change the seal early offsite, or to do
7 something like that -- I would hope that whatever action is
8 taken, that it would be one that incorporates full
9 understanding of the great diversity that we have in this
10 country, that places the responsibility in terms of results, on
11 the people there at the plant, on the company. And as I
12 mentioned earlier, our NUMARC organization has been devoting a
13 great deal of effort through our utility operating personnel on
14 this subject. And Bob, you may wish to comment further on what
15 NUMARC is doing.

16 MR. CAMPBELL: Well, we have, as you know, been very
17 active in this area. And it really deals fundamentally with
18 the point that I was making with respect to looking to the
19 industry to provide solid programs which we think we have
20 underway, and which we think are capable of being monitored.
21 And we think that our results in this area are quite capable of
22 being monitored.

23 So that, in effect, if rule-making is to come about,
24 and we would much prefer the approach that I had mentioned
25 earlier on erosion, corrosion, and in the areas where we had

1 worked together so effectively on dealing with operator
2 training, that we could find a way in which, by careful review
3 of the programs that we have developed within our industry,
4 which we think are going to be very effective, that we can
5 build the regulatory oversight in such a way that we do not in
6 any way supplant that particular element of your
7 responsibility, but that we take full advantage of the
8 expertise that we have developed out there and which we think
9 are part of these management systems that have been put into
10 place which, as Sherwood has mentioned, have a fair degree of
11 site-specific management approach to it.

12 And our concern would be, that if we end up with a
13 rule-making which is prescriptive, we would lose the initiative
14 that we have underway and would not be able to quite reach the
15 highest level of capability in maintenance that we think we are
16 capable of reaching. So again, our feeling would be that we
17 prefer no rule-making. We prefer policies in this area. But
18 to the extent that rules are promulgated, we'd like to see
19 those rules stated as much as possible, in a policy mode, and
20 deal with the nuclear steam supply system as opposed to the
21 balance of plant.

22 MR. O'CONNOR: I may add one brief comment on this.
23 It is in all our self-interests to have an aggressive
24 maintenance program for a lot of reasons, not the least of
25 which is that it is a self-criterion that we are judged on, but

1 more than that we know of the very deep interest that the
2 Commission has in maintenance and preventive maintenance and
3 what it can contribute to increased availability. In the long
4 run the economic argument is going to be a very critical one in
5 assessing the advantages of nuclear power. If our maintenance
6 is improved, our availability correspondingly should also
7 improve.

8 There have been various efforts that Bob and Sherwood
9 mentioned, both within our industry and also looks overseas.
10 Admiral Wilkinson led a team to Japan a few years ago and took
11 a very active look over a several week period at the
12 maintenance practices of the Japanese to see if we could learn
13 from them. At the same time we have looked to the French and
14 their kinds of programs. This exchange of information is
15 becoming more commonplace. It isn't on an ad hoc basis nearly
16 as much as it once was. We are feeling that we are learning
17 and we are taking the process a step back to the preventive
18 area much more aggressively than we did in previous years.

19 I just subscribe to what both Bob and Sherwood said,
20 that it is important that recognition be given the site
21 specific kinds of requirements that are there before we engage
22 in what could be referred to or considered perhaps more
23 proscriptive regulation than we need at this point in this
24 area.

25 COMMISSIONER BERNTHAL: Is it possible -- I don't

1 know whether you have any more specific thoughts on this, but
2 my sense is, at least in my case, if we did go to a rule in
3 this area that one would look for a performance-based criterion
4 of some kind. That is a term that was kicked around here at
5 the table the last time we spoke with the staff about this
6 subject. But it is not clear to me that the staff knows
7 either, exactly where we would head with a rule.

8 Do you have any thoughts on the kind of performance
9 criteria that one might consider that would make some sense?

10 MR. CAMPBELL: Yes. Since we have been doing so much
11 work with our members of NUMARC, I thought that I might just
12 ask Byron Lee, who is our president of NUMARC and who was here
13 this morning, if he'd comment on just where we are at NUMARC on
14 that particular issue, and I think -- Byron, if you would.

15 CHAIRMAN ZECH: Byron, would you please come to the
16 table and identify yourself to the reporter again, please.

17 MR. LEE: I am Byron Lee, president of NUMARC.
18 First, I ought to say that we are trying to set up a meeting,
19 Commissioner Bernthal, to brief the Commission, hopefully some
20 time before you leave, on all of the efforts that the industry
21 has underway in the maintenance area. We briefed the staff
22 about a month or so ago on those issues, and we had a briefing
23 last Friday for the technical assistants of the Commissioners.

24 We would like to tell you all the things that are
25 going on. In terms of a combined program between EPRI and

1 INPO, INPO is taking a look at what are the types of
2 indicators, performance indicators. Obviously, the capacity
3 factor is one. They do have a whole series of indicators that
4 are behind the 10 basic performance indicators they have that
5 look at maintenance work load, percent of maintenance that is
6 maintenance man hours that are directed toward preventative or
7 predictive type of maintenance, looking at a variety of
8 maintenance programs.

9 I think that we can say that your policy has
10 certainly given the industry some guidance and some direction
11 and we understand, we believe what you are trying to accomplish
12 or what you'd like to see us accomplish, and we'd like to have
13 the opportunity to work again -- much like the training area.
14 I think the training area and the accreditation programs and so
15 forth are a model for the way that we might be able to develop
16 a program. That doesn't mean that at some point in the future
17 there would not be a rule, when we have a better idea of
18 exactly what can be put into a rule that will not subvert or
19 misdirect our efforts.

20 I think we have to avoid developing again a lot of
21 paper and not maintenance. I think our goal is to maintain the
22 plants. We recognize there is a need to have the capability
23 for the Commission to come in and inspect our efforts and what
24 have you, so I think those are the directions that we are
25 beginning to look at.

1 MR. CAMPBELL: This is a top priority item for us in
2 NUMARC. Thank you very much, Byron.

3 COMMISSIONER BERNTHAL: Thank you. We appreciate it.

4 CHAIRMAN ZECH: Commissioner Carr:

5 COMMISSIONER CARR: Yes. In your '86 report on
6 leadership and achieving operational excellence, the so-called
7 Sillin Report, you had three things in there: (1) improve
8 operational performance in nuclear power utilities; (2)
9 improving the nuclear utility industry interface with the NRC;
10 and (3) establishing a unified nuclear utility industry
11 organization. Two of those are pretty well under control. You
12 haven't commented on a nuclear utility interface with the NRC.
13 Would you -- have we accomplished any of our objectives in that
14 particular area?

15 MR. CAMPBELL: That is the area that our industry
16 reorganizational structure that led to Byron Lee coming in to
17 be president of a full-time NUMARC was intended to direct his
18 attention to. We consider that, and so does Lee Sillin and his
19 coauthors to be a fundamentally important part of the whole
20 recommendation.

21 We believe that the constructive interaction between
22 the NRC staff and NUMARC and NUMARC's approach to issue-
23 oriented involvement of the top senior executives in our
24 industry in problem solving that deals with issues that were of
25 concern to the Commission on safety and reliability of our

1 plants is the way to accomplish that.

2 At NUMARC our management system is to involved the
3 very best we have in our industry in dealing with problem-
4 solving and today in our industry in this country we have some
5 of the very top managers and technical expertise that exists.
6 It is Byron Lee's task as president of NUMARC to mobilize and
7 bring together into an effective management team that
8 considerable capability to solve problems that are on the
9 agenda of the Nuclear Regulatory Commission.

10 That is the organizational response, Commissioner, to
11 the Sillin Report. It is the formation of a strong NUMARC,
12 bringing all the top people in our industry into this problem-
13 solving and working with the staff on such issues as
14 maintenance, which is a crucial issue to the Commission, we
15 understand, and behind Byron Lee's very brief report is the
16 very, very large team of top people in our industry that are
17 working on that problem.

18 COMMISSIONER CARR: I guess my real question was, is
19 the interface working any better?

20 MR. CAMPBELL: How do you feel, Byron, on a day by
21 day basis? How would you comment?

22 MR. LEE: Well, I would say that --

23 COMMISSIONER CARR: I am not looking for compliments.
24 I am looking to solve problems if we've got them.

25 MR. LEE: Yes, sir. I guess my judgment is that I

1 don't know whether I can say better. I would say the interface
2 is working well. I think we have developed the approach that
3 is consistent with all of the Commission's rules and
4 regulations to have our interfaces in public and I think that
5 at least my assessment, and I believe the industry's
6 assessment, the people that I am working with in the various
7 working groups and the various industry organizations feel that
8 our interface has been working very well.

9 I think the secret will be to be sure that the public
10 believes eventually that that interface is working well, in
11 their interest as well as ours.

12 MR. SMITH: Commissioner Carr, if I could add to that
13 on a different subject. It has to do with the interface at the
14 plant level. I think all of realize that a system of
15 enforcement that utilizes fines where fines unfortunately may
16 be deemed to be necessary, is a part of regulation here in this
17 industry as it is in other industries. There is concern,
18 however, I think generally throughout the industry as to the
19 way in which a system utilizing fines may be applied when the
20 industry itself is seeking improvement and the violations or
21 deficiencies are uncovered as a result of a very diligent
22 industry effort and reported. Then rather than be, obviously,
23 criticized if that's needed for allowing the condition to exist
24 that shouldn't have existed, but somehow there needs to be some
25 thought given to whether or not in many case a pat on the back

1 for identifying your problem, bringing it up and fixing it may
2 be more appropriate than a fine.

3 That's just a general observation but I think as we
4 instill in our operators the value of candor or openness, not
5 only cooperation with the NRC and with INPO but actually
6 digging and digging deeper and deeper to find things that need
7 to be corrected -- now it is our company's objective, I'm sure
8 it is the objective of every company to operate so that you are
9 never in a position where you are vulnerable to a fine, but
10 where the utility themselves have real in-depth digging
11 efforts, I think some recognition of that needs to be given by
12 the NRC in its enforcement policy.

13 COMMISSIONER BERNTHAL: I'll just make a comment on
14 that. This business of fines has always been a prickly one. I
15 think the Commission has discussed and over it certainly as
16 long as I have been here -- longer, I'm sure -- and I've got to
17 say I have never been in favor of the nickel and dime sort of
18 fines. I think that they are largely counterproductive. The
19 slowness of our process here very often means that they don't
20 have the intended impact on the utility. I still wonder
21 sometimes whether a point system of some kind isn't a better
22 way to go. By that I mean it seems to me that when you get a
23 fine you ought to really get a fine, one that the Board of
24 Directors hears about, not just a few people and primarily a
25 news clip early on and then another one later on in the

1 newspaper that perhaps creates the impression two or three
2 times over that there are three events, when in fact there is a
3 single event.

4 I don't know whether there is any way out of that.
5 It has never been an easy problem for us to deal with, but I
6 still adhere to the view that small fines probably don't
7 achieve a great deal and I wonder whether we shouldn't go to a
8 system of points or something where there is an accumulation
9 and where, if the track record is bad then you get a fine that
10 will make your hair stand on end. It seems to me that is a
11 better way to go. Just a thought.

12 CHAIRMAN ZECH: Commissioner Rogers?

13 COMMISSIONER ROGERS: Yes. On the EPRI programs, is
14 EPRI giving some consideration to the general problem of
15 maintaining a continuity of research competence in an area of
16 long standing interest to the industry, in some fundamental
17 areas that will always be important and need to be maintained,
18 but may not be the jazziest or most exciting areas of research
19 for young people to go into, and yet, as a nation, we don't
20 want to lose that competence to be able to tap it when we need
21 it.

22 And what comes to mind is the kind of sorry state, my
23 understanding, the sorry state of radiation chemistry of water
24 under the conditions of pressure and temperature at the time of
25 the Three Mile Island accident, that the great deal of

1 difficulty in finding experts to come in and really set that
2 system in the proper perspective.

3 I'm not sure I'm right on that particular point, but
4 it's just illustrative of the type of situation I'm thinking
5 about, that areas of research that need continuing nurturing to
6 maintain a national competence that can be tapped from time to
7 time as unforeseen problems arise, that are really relevant to
8 the nuclear industry.

9 And I wonder if EPRI has given any thought to that.
10 You operate in basically a contract mode, I believe, in which
11 you contract out for research, but once a particular piece of
12 research is completed by a given organization, you may move to
13 another organization for the next time around.

14 And that has advantages in being able to tap what
15 exists but it doesn't necessarily provide a continuity of
16 interest that might be necessary to sustain that kind of
17 expertise over lean periods.

18 I wonder if EPRI has thought anything about that.

19 MR. SMITH: Yes. We have, Commissioner Rogers. And
20 I'd like to ask John Taylor to comment on that in more detail.

21 There is considerable pressure on EPRI for funding,
22 and we always have more work that we wish to do that's valuable
23 than we have funds, even with our \$360 million.

24 In recent years, we've been particularly squeezed
25 because some utilities, large utilities, have dropped out and

1 discontinued EPRI funding because they have had plants that for
2 one reason or another have not been completed, have not been
3 licensed, or if completed and licensed, their state regulatory
4 commissions have not allowed them to put that investment in
5 their rate base.

6 There are probably six to eight major companies
7 around the country that have had to cut all fundings including
8 their EPRI funds.

9 Now, a few of those are beginning to come back, but
10 in recent years, we felt a tight squeeze on our funding. But
11 even within those limits, we've sought to be mindful of what
12 you addressed.

13 MR. TAYLOR: John Taylor, Vice President of Nuclear
14 Power, EPRI. Commissioner Rogers, your comment is very vital.

15 In certain areas such as steam generator reliability,
16 the DWR pipe cracking, we are continuing those programs in a
17 fairly vigorous way.

18 The very high level of effort which Sherwood
19 described to us, which was fostered by supplementary funds from
20 the nuclear utilities, is past us because the crisis is.

21 But we have two major base programs underway to
22 continue to follow those issues. We don't fully understand all
23 the circumstances to this day, we don't expect to for a decade
24 or more.

25 So, those will be focused on in the sense you

1 described. Now, other than that, our response to your concern
2 is through the formation of what we call centers.

3 Recently, we formulated what we call a Seismic
4 Center. The basic idea is to have an intellectual center, not
5 a building per se, in which every element of seismic adequacy
6 is considered from the seismicity issues themselves all the way
7 through the design processes that are associated assuring
8 seismic adequacy.

9 And we intend to keep that center essentially over an
10 indefinite period of time. Another example of center is our
11 effort to form, which is underway and has been approved by our
12 Board, a Nuclear Maintenance Assistance Center.

13 Now, this center will be established. Right now,
14 it's being operated out of our offices. It will, in something
15 like a year from now, be established in the east or mid-west of
16 the country, and will be permanent.

17 In fact, we're putting the whole thing to the test.
18 It's our plan that, over a period of about five years, that
19 center will be self sustaining. It will not be fostered by the
20 EPRI funds, per se, but will be sustained by the utilities who
21 see a real value in it.

22 If we're successful, that will continue as a center
23 for developing maintenance technology for an indefinite period
24 of time.

25 Other elements in EPRI have established centers of

1 similar nature and we will continue to foster that principal to
2 sustain attention to those fundamental technical issues over
3 the years.

4 COMMISSIONER ROGERS: One of the important features
5 of a center of that sort, I would think, would be not only the
6 conduct of the research, but the training of young people in
7 that area as well, because it's those people who are going to
8 maintain the continuity.

9 After all, we all do get old eventually, and somebody
10 else has got to come along and carry that forward.

11 MR. TAYLOR: The training of the technologists and
12 the training of the utility personnel who use that information,
13 both.

14 MR. O'CONNOR: Toward that end, Commissioner, I'm
15 sure you are aware that the Institute for Nuclear Power
16 Operations does have a very active scholarship program that
17 feathers funds out to virtually every major university with a
18 nuclear engineering program in the country to support students
19 in those programs.

20 We think this has been a major contributor to both
21 our electric utility industry as well as to some of the vendors
22 in continuing the attention and the need for the kinds of
23 technicians that are going to be required in the future.

24 So, it's been a helpful program, we believe.

25 COMMISSIONER ROGERS: And, just one other, on a

1 different area, the maintenance area. We've all heard about
2 how maintenance and -- operations and maintenance costs have
3 been going up.

4 But I wonder if the industry has really tried to peel
5 apart in the maintenance cost area, the catch up cost versus
6 the ongoing cost, steady state cost.

7 Because, we've seen a lot of increased activity in
8 maintenance that represents -- has to represent to some degree
9 catch up of situations that really didn't get enough attention
10 in the past.

11 And until you get through that transient period,
12 you're certainly going to see a big build up, and I wonder if
13 you've really tried to analyze what the components of the total
14 costs are in terms of catch up and steady state, and take a
15 look at that because, obviously, that's an important long term
16 commitment.

17 MR. CAMPBELL: That's a very important question,
18 Commissioner. I thought maybe we could, again, ask if others
19 might comment on that.

20 I think that each of the companies has dedicated
21 enormous financial resources to what might be considered to be
22 capital improvements to their plants.

23 Whether or not these capital improvements are related
24 to older plants being brought to a level of compliance, or
25 newer plants, it's still an enormous capital resource.

1 Beyond that, the question of catch up in maintenance,
2 if you want, I'd like to hear the comments of others on, but
3 it's been my general feeling that in terms of -- the classic
4 expression would be deferred maintenance, we have precious
5 little of that.

6 What we call a refueling outage is really a
7 maintenance in refueling outage. And we take a look at the
8 thousands and thousands of tasks that are done in a refueling
9 outage, most of those tasks, the vast majority of those tasks,
10 almost 90 percent of them, are related to maintenance.

11 And if there is a question of not being able to
12 complete this particular activity until the next refueling
13 outage, a major maintenance item, in all cases, it seems to me,
14 these matters are items that fit into a category that the
15 question of bringing them up to a level can be easily handled
16 by just simply picking it up next time around.

17 I think we're going to see a large amount of money
18 continue to be put into these programs because of our
19 preoccupation to having our plants operate almost perfectly
20 when they're on-line.

21 So, I'd like to hear some comments from anybody else,
22 from either EPRI, also, or from you, too, Byron, with respect
23 to that topic.

24 But it seems to me that down the road, we have to
25 find a way in which we can truncate these costs because we are,

1 today, spending an enormous amount of money on every outage in
2 order to make sure that we pick up every maintenance item that
3 we possibly can do to make sure the plants are going to run as
4 well as they can.

5 MR. LEE: One element of catch-up costs has been, by
6 and large, big reliability programs, both steam generators and
7 pipe cracking, which you can very quantitatively establish.
8 And they're very vast amounts of money that have been spent
9 there. The more subtle elements of catch-up that bear on a
10 large variety of equipment, we've not been able to develop any
11 quantitative evaluation of them. We've looked at costs,
12 Commissioner, and you can't find any correlation with costs
13 versus availability, cost versus any of the tangible
14 performance indicators that exist. My judgment therefore is,
15 as Sherwood has already said, that it isn't so much that we're
16 not spending enough money, it is we're not spending the money
17 as effectively as we could.

18 The EPRI program is trying to address that, and I'd
19 say, in 2 ways. One, to focus attention on the important
20 issues. And the second is to foster the learning curve. In
21 the first, we're trying to bring to bear, methodologies such as
22 what we call reliability-centered maintenance. And it's a
23 merger, really, of the probabilistic risk-assessment methodology
24 that's been evolved in the safety areas, with methodologies
25 that the aircraft industry has utilized to substantial success

1 in maintenance, to give the utilities a means by which they can
2 focus on the most important thing. Provide along with that,
3 human factors guidelines and things that will help them make
4 the best use of their human and physical facilities.

5 The second area, fostering a learning curve -- again,
6 Sherwood's already mentioned. When you get away from the big
7 things like the steam generator, the utilities have no
8 effective way of intercommunicating with each other, so each is
9 learning by each other's experience. And a fundamental step
10 we're taking there, is to try to form this Nuclear Maintenance
11 Assistance Center, which will be the clearing house for that
12 kind of information.

13 We have generator one product that's been through
14 tremendous comments from the utilities. This graph we have
15 today has just been revised with 2,000 comments from people in
16 the field, and it's centered on motor-operated valves -- the
17 motor operators for the motor-operated valves.

18 And it's the comprehensive manual to indicate to the
19 management all the way down to the fellow who is adjusting the
20 valve, what we know about it, how to go about it. It's a first
21 product of this nature. And my feeling is, with that kind of
22 focused effort, and sharing of knowledge, we will improve
23 maintenance, and we'll find the costs coming down. So I
24 wouldn't want to say, costs go up, reliability goes up, safety
25 goes up. We don't see that in the facts, and I'm convinced

1 that that isn't what we should be aiming for.

2 COMMISSIONER BERNTHAL: Do you have any comparison
3 with other countries in that respect? It seems to me that if
4 you look to France, in particular, is there any reason to think
5 that this vector continues to head onward and upward and
6 outward?

7 MR. LEE: Fred, if you look around the world, you
8 find that we spend twice as much on maintenance and operations
9 as any other country when we average things out. And our
10 reliability -- again, our indicators are not as good as
11 their's. So there's not correlation.

12 COMMISSIONER BERNTHAL: So it's either catch-up, or
13 the money is not being spent effectively -- one or the other, I
14 guess that about covers it.

15 MR. LEE: Well, like I say, you can put your fingers
16 on big areas of catch-up. Billions of dollars have been spent
17 on catch-up on the big reliability issues. That's very clear.

18 MR. SMITH: If I could just add one individual
19 company comment, we've sought to do this type of analysis in
20 our own company, and we have both PWR's and BWR's. And we
21 stopped to look at what's going on in other countries, and
22 recently 2 of our senior operating people visited a number of
23 plants in West Germany, and their maintenance costs per KWH are
24 much lower.

25 In some ways, the design of their plants is

1 different, in that, you might say, they were designed to run.
2 They weren't designed to be backfitted. And you just, in some
3 of those plants, are going back to the basic design and the
4 construction. They were designed and built in a way that lent
5 themselves to be operated with lower maintenance costs. And
6 so, that's just a generic thing, particularly with some of the
7 older plants that we've got to live with. And as John said,
8 we've got to find a way to spend the money in the most
9 effective way, with the predictability, reliability, and set
10 priorities. It's a hard task.

11 COMMISSIONER BERNTHAL: Another way of saying the
12 same thing, I think, is it that often helps to have done
13 something second, and not first. That was true in the case of
14 european television as well. But their plants really are a
15 second generation in many respects, and therefore, I suppose I
16 guess it's true that they haven't had to do some of the patch-
17 up and catch-up things that we have.

18 CHAIRMAN ZECH: Mr. Rogers, anything else?

19 MR. ROGERS: No thank you, Mr. Chairman.

20 CHAIRMAN ZECH: Well, I have several comments to
21 make, but first of all, before I do that, let me thank all of
22 you this morning, for an excellent presentation. Mr. Campbell,
23 as the general chairman of the Nuclear Power Assembly, I think
24 you have brought to the Commission this morning, some valuable
25 information, and update on the status, as well as the progress

1 in the nuclear industry, and we're grateful to you for that.

2 And Mr. O'Conner, your comments on the overview of
3 the state of the industry, I think, are very appropriate as
4 always. I think your continuing efforts for the Nuclear Power
5 Assembly and for the leadership role in the nuclear industry is
6 again, commendable. And we appreciate not only your comments,
7 but your continuing active role in these leadership areas.

8 And Mr. Smith, the same for you. Your continuing
9 leadership role across the board, as well as this morning in
10 bringing us your views on the future and the particular
11 development of nuclear energy as it applies to EPRI. And I
12 appreciate particularly, and I think the Commissioners do too,
13 the leadership role that you three gentlemen and others in the
14 technical features of nuclear power, to the extent the many
15 things you've mentioned this morning -- safety considerations
16 for advanced reactors as well as the current reactors,
17 Mr. Taylor's comments on the cracking problem, the BWR's, the
18 steam generator problem, and PWR's, and so forth.

19 I think we should recognize that your involvement in
20 these rather technical issues indicates your willingness to pay
21 attention to details, and to find out the important features of
22 safety, as well as reliability and availability. I think this
23 is indicative of your willingness to get your hands dirty, and
24 to get into areas where, in my view, improvements can be made,
25 and I appreciate your presentations all.

1 Just a few general comments. First of all, yesterday
2 I had the chance to visit the Crystal River Plant near Tampa --
3 just north of Tampa, Florida, a Florida Power Company Plant.
4 It's the 97th plant in our country that I've had the
5 opportunity to visit. And in the past almost 4 years of
6 observing the plants and the people and the management of the
7 nuclear industry, I've developed some of my own comments which
8 I've noted in various media, so they're not anything that
9 hasn't been said before, really. But I just say again,
10 yesterday visiting that plant and hearing you this morning,
11 kind of re-assesses and re-affirms some of the feelings I've
12 had about, for example, NRC's relationship with the industry.

13 And we have different roles to play, but I think we
14 have a common goal. The NRC role, as I see it, is one of
15 providing a regulatory framework that focuses on the Atomic
16 Energy Act and the statutes under which we operate, to provide
17 the benefits of the peaceful use of nuclear power to the
18 American people, with reasonable assurance that the public
19 health and safety will be protected. That's a very real
20 responsibility we have for our government. And we take that
21 responsibility very seriously as I'm sure you're aware.

22 Your role, of course, is to be responsible for the
23 design which we would approve. But you would initiate the
24 design of the plant, the quality construction of the plant, and
25 then the excellent operation of the plant, including

1 maintenance and all the other areas -- training -- that go with
2 that. That's your role and your responsibility. But our
3 common goal -- we do have a common goal, and the common goal is
4 to provide for the safe operation of nuclear power plants.

5 So, even though our roles are different, our goal is
6 very similar. There's where we come together, and for that
7 reason, it's been my view that the NRC's role with industry
8 kind of boils down to 4 points that I keep in mind. And first
9 of all, I think we should encourage excellence on your part, as
10 well as our part. That's a commitment that we really have to
11 encourage -- excellence across the board -- including quality.
12 That's quality people, quality equipment, quality performance,
13 quality training, quality everything. But quality has to be
14 foremost. We encourage excellence.

15 Second is, I believe that the NRC should, where it's
16 appropriate and within the bounds of our regulations, to
17 cooperate with utilities and with industry to improve safety.
18 Why? Because that's our common goal -- your's and our's. So I
19 think we should cooperate when it's appropriate and within our
20 regulations to improve safety.

21 And third, I think our role with your's, is to
22 oversee your operations, to demand compliance with our
23 regulations. That's our responsibility. We ought to carry
24 that out, and be tough regulators -- firm regulators, but tough
25 regulators -- fair, but tough, to ensure that we carry our

1 responsibilities to our government.

2 And fourth then, I think we do have a responsibility
3 to conduct prompt and tough enforcement when it's warranted.
4 Now, I agree with some of the comments made earlier, that that
5 policy can have a negative impact, and that's concerned me too.
6 On the other hand, that's the rules we operate under now, and
7 we ought to carry them out. I do think we probably should look
8 to see whether we can make a better contribution to safety, by
9 making those enforcement rules more constructive, more positive
10 -- encourage safety, rather than perhaps be negative. But
11 that's an important area that I think requires our continuing
12 efforts to see if we can't improve.

13 But those are kind of some of my views as to -- and I
14 think we're doing those things. I think you're doing them. I
15 think we are improving our relationship. This leadership in
16 achieving operational excellence that I referred to in my
17 opening comments, and Commissioner Carr referred to also, does
18 have some very important message, I think -- a very important
19 message signed out by some of the leaders of the industry.

20 Commissioner Carr asked about improving the nuclear
21 utility industry interface with the NRC, and I think that is
22 improving. Mr. Lee has come to me on several occasions, to
23 tell me how he's getting started, and how it's starting to move
24 in that direction, and I think perhaps Mr. Lee, the next
25 session that you have, you might want to expand your call to

1 all the Commissioners, so they will get a feel. I know you're
2 just beginning, but I think the beginning is solidifying now,
3 and I think that would be appropriate to a personal visit to
4 all of the Commissioners, perhaps, and let them know exactly
5 what you are doing, because I think the beginning is there.

6 You talked this morning about some self-improvement
7 initiatives, and NUMARC, INPO, EPRI, EEI, plays a role, as we
8 know, owners groups -- there's a lot of things going on in the
9 utilities themselves that I think is healthy. And I encourage
10 those continued efforts to self-improve, if you will. And
11 think that's something that we can be encouraged by.

12 And I think also that some of things that are
13 important to me, and I think that I have seen at least some
14 improvements as I've visited plants and met more people in this
15 industry -- an improvement in discipline. I think we still
16 need more. Improvement in formality, procedures, attention to
17 detail -- kind of hard-nosed, hard work. Some of the stuff
18 we're involved in isn't all a great mystery, so much as it is
19 the follow-through on what we know we have to do and should do.

20 Root cause analysis is something that can be
21 improved. Some utilities, in my judgment, do it very well,
22 others -- there's room for improvement. Maintenance -- we've
23 talked about maintenance this morning. My first assessment
24 when I first looked at the plants in our country, one of my
25 concerns was maintenance. I didn't think we did it very good

1 in this industry of our's. I still think it needs a lot of
2 improvement. I must say, in the past almost four years, I've
3 been encouraged by what I've seen.

4 I've been encouraged by NUMARC's initiative to take a
5 hold of maintenance and try to recognize it as an important
6 priority. On the other hand, I think there's still room for
7 improvement. My inclination is to go for rule. I hear what
8 you say. I understand what you say, and I would agree that the
9 rules should not be prescriptive, but perhaps it should be
10 performance-based. We need something, I think, to recognize
11 within the NRC, and the industry working together, that
12 maintenance is extremely important.

13 To me it's a mark of professionalism. To those of
14 you who do maintenance very well, it's my view that that's a
15 mark of understanding what it's all about, because if you
16 continue to operate the plants with a minimum of maintenance, I
17 simply don't think that's in your best interest. It's not in
18 our best interests as far as safety is concerned. It's not in
19 your best interest as far as safety is concerned.

20 I firmly believe that a safe plant is a reliable
21 plant, is an economic plant. It will have a good capacity
22 factor. It'll be a profitable plant. That's your business, of
23 course. We come together with the first one -- safety. If
24 it's safe, and you focus on maintenance and other things to
25 make it safe -- good, solid training, competent people -- then

1 you'll have a reliable plant as well as a safe plant. And then
2 you'll have, in my judgment, an economical plant. So it's not
3 only in our best interest, it's in yours.

4 I think maintenance can contribute in a very
5 significant way to safety, to reliability and to economics.
6 Now I recognize it is a challenge that you have to convince
7 your PUC's in some cases that overhauling a pump when it's not
8 broken is the right thing to do. In my judgment, that's a
9 challenge you have and I think you ought to be up to the
10 challenge, because how long do you run a pump before you
11 overhaul it? You want to run it until it breaks? I don't
12 think so. I don't think you should. Certainly you can run it
13 a certain period of time. How long? I don't know, but there
14 are a lot of smart people who have run pumps a long period of
15 time that could give us a pretty good estimate of when should
16 that pump be overhauled. What should you do? Maybe you don't
17 have to have a complete breakdown and take it all apart and
18 start over again but maybe there are certain things you should
19 do. It is not a mystery.

20 It's not been done very well, in my judgment, but it
21 can be done better and therefore I think maintenance -- when I
22 see a utility -- frankly, Crystal River in my judgment had a
23 good maintenance program, one of the best I've seen -- and when
24 I see somebody that understands how important maintenance is,
25 it at least has an impression on me that perhaps they really do

1 understand the importance of safety, reliability and economics,
2 how they all come together, and maintenance plays a very
3 important role in it -- perhaps more important in my judgment
4 than has been seen up until now.

5 But again, I am encouraged by what I hear and what I
6 see improving. I just think there is more room for
7 improvement.

8 For the future -- we talked a little bit about the
9 future this morning, and in my view the one thing we need to do
10 if there is going to be a real future for nuclear power in our
11 country is to continue to operate the plants safety. We must
12 continue to have safe operations. We pointed out some areas, I
13 did in my opening remarks, Mr. O'Connor did too, about the
14 statistics. Results are there. We can show -- you can show
15 where things are improving, and I agree with that. That must
16 continue. If there is going to be a future, we must continue
17 to operate the plants safety. They can be operated safely in
18 my judgment. We must be confident but not over-confident. We
19 must work hard to keep our confidence, but not be over-
20 confident, not be complacent, not be too satisfied -- because
21 there is still room for improvement in my judgment.

22 So for the future I think we need standardization. I
23 think we need pre-selected sites. I think we need single stage
24 licensing. That's what our bill in the Congress has proposed
25 for the past few years, as you know. We need your support for

1 that. I hope it will pass in the Congress. I don't know
2 whether it will or not, but we certainly hope it will. On the
3 other hand, if it doesn't pass, this Commission is working to
4 see what we can do with our own authority to move towards
5 standardization, move towards pre-selected sites and even move
6 within the bounds of our own authority and the regulatory
7 framework that we work under to move even towards single stage
8 licensing to see what we can do to do something ourselves.

9 So we are working on it ourselves, but we would ask
10 for your continued support, and the primary reason we ask your
11 support is for safety. That is our common goal. Safety is our
12 common goal. I believe standardization, pre-selected sites and
13 single stage licensing will increase safety. It really will.
14 It will lay it out in the public ahead of time, make our
15 decisions upfront. Everybody can get involved, make all the
16 decisions possible upfront, and when the decision is made we
17 build the plant, build it safely and reliably so it will
18 operate economically. To me it just makes sense to do that and
19 that is that we are trying to do with our legislative proposal.
20 If that doesn't pass we are trying to do it within our own
21 authority, within the law to see what we can do. That is our
22 effort to improve safety and we need your support for those
23 initiatives.

24 Finally, let me just say that it has been my
25 assessment, conclusion of visiting a number of plants and

1 meeting a number of you leaders that there are several
2 important features to make a successful nuclear power utility,
3 nuclear power industry in our country. First of all, the
4 design of the plant is crucial. It must be a good design. It
5 must be well constructed with quality and it must be operated
6 properly.

7 And then you say, well, beyond that how do you
8 continue to operate it? My view is if there is any one key, it
9 is leadership involvement. I used to say management
10 involvement, but that connoted more resources and less people.
11 I think people are the key. People are the key. So I think if
12 you say leadership involvement, at least to my way of thinking
13 it describes better what I am trying to say -- that is a
14 commitment to excellence, a real commitment to quality:
15 quality people and hard work and attention to detail and the
16 real sincere commitment to doing it right and doing it right
17 the first time. But leadership involvement -- and getting that
18 down the line, all the way down the line, accepting
19 responsibility, accountability and authority. Get it down the
20 line: make everybody feel ownership of the plant, of the
21 diesel engine, of the power plant part that they work on, but
22 that is leadership involvement.

23 I must say I am encouraged by what I see in this
24 regard this morning, your presence and your knowledge of some
25 of the key features. The industry in my view is improving --

1 and it's leadership involvement, your continuing involvement,
2 your continuing efforts to improve. With a lot of hard work
3 and getting your hands dirty and getting in to find out what is
4 going on, and follow through down through your organization --
5 those are the important things, I think.

6 But just remember that our common goal is public
7 health and safety and I think working together with the
8 industry and with the various groups in the atmosphere of
9 cooperation when we can, when it is within our regulatory
10 responsibilities to do so, the legal requirements we have, if
11 we can remember our common goal and work together, then I think
12 we will be better serving the public health and safety and
13 better serving the American people.

14 So those are some of my thoughts this morning, and I
15 would ask you to continue your efforts to bring improvements to
16 this industry. I think they are not only in your best
17 interests of your organizations but they are in the best
18 interest of the Regulatory Commission and in the best interest
19 of the American people.

20 Are there other comments from my fellow
21 Commissioners?

22 Thank you again very much. Appreciate your being
23 with us this morning. We stand adjourned.

24 [Whereupon, at 11:32 a.m., the hearing was
25 adjourned.]

1
2 REPORTER'S CERTIFICATE
3

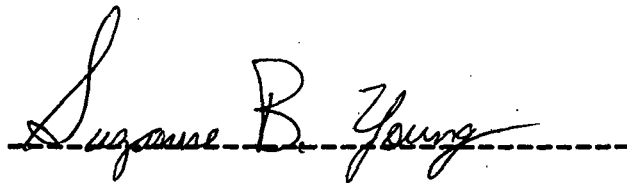
4 This is to certify that the attached events of a
5 meeting of the U.S. Nuclear Regulatory Commission entitled:
6

7 TITLE OF MEETING: State of the Nuclear Industry

8 PLACE OF MEETING: Washington, D.C.

9 DATE OF MEETING: May 4, 1988
10

11 were held as herein appears, and that this is the original
12 transcript thereof for the file of the Commission taken
13 stenographically by me, thereafter reduced to typewriting by
14 me or under the direction of the court reporting company, and
15 that the transcript is a true and accurate record of the
16 foregoing events.

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INTRODUCTORY REMARKS

By

Robert K. Campbell

Chairman, President and Chief Executive Officer

Pennsylvania Power and Light Company

and

General Chairman, Nuclear Power Assembly

before the

U. S. Nuclear Regulatory Commission

May 4, 1988

In Conjunction With The

1988 NUCLEAR POWER ASSEMBLY

NRC Briefing

INTRODUCTORY REMARKS

Robert K. Campbell

GOOD MORNING. I'M ROBERT CAMPBELL, CHAIRMAN, PRESIDENT AND CHIEF EXECUTIVE OFFICER OF PENNSYLVANIA POWER & LIGHT COMPANY AND CHAIRMAN OF THE NUCLEAR POWER ASSEMBLY. WE ARE PLEASED TO BE HERE FOR OUR ANNUAL BRIEFING AS PART OF THE ANNUAL NUCLEAR POWER ASSEMBLY.

IN THE PAST TWO DAYS WE HAVE HEARD OFFICIALS FROM THE EXECUTIVE BRANCH AND CONGRESS DISCUSS NUCLEAR PLANT STANDARDIZATION, URANIUM MINING AND ENRICHMENT LEGISLATION, THE STATUS OF NRC REORGANIZATION, THE DEVELOPMENT OF ADVANCED REACTOR TECHNOLOGIES, AND OTHER TIMELY AND IMPORTANT ISSUES. WE HEARD THEM ACKNOWLEDGE NUCLEAR ENERGY'S VITAL ROLE IN OUR COUNTRY'S ENERGY FUTURE. AND WE WERE REMINDED THAT, EVEN WITH THIS UNDERSTANDING AND SUPPORT, POLITICAL AND REGULATORY UNCERTAINTIES REMAIN. IN SPITE OF A SUCCESSFUL YEAR--IN THE CONGRESS, ON THE STATE LEVEL AND IN OUR OWN NUCLEAR OPERATIONS--WE HAVE CHALLENGES APLENTY.

WITH ME TODAY ARE TWO SENIOR INDUSTRY EXECUTIVES. JIM O'CONNOR, CHAIRMAN AND CHIEF EXECUTIVE OFFICER OF COMMONWEALTH EDISON COMPANY, WHO WILL TALK ABOUT THE STATE OF THE INDUSTRY. AS JIM WILL TELL YOU, WE IN THE NUCLEAR POWER INDUSTRY ARE SERIOUS ABOUT OUR EMPHASIS ON EXCELLENCE IN ALL ASPECTS OF OUR OPERATIONS. WE ARE DEEPLY COMMITTED TO MAINTAINING NUCLEAR ENERGY AS AN OPTION FOR THE NATION'S ELECTRIC POWER SUPPLY.

MAY 2 '88 12:03 FROM PPL TOWER 16

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SHERWOOD SMITH, CHAIRMAN, PRESIDENT AND CHIEF EXECUTIVE OFFICER OF CAROLINA POWER AND LIGHT COMPANY, WILL DISCUSS THE INDUSTRY'S EFFORTS TO IMPROVE NUCLEAR TECHNOLOGY AND OPERATIONS. HE WILL FOCUS PRIMARILY ON THE RECENT ACCOMPLISHMENTS OF THE ELECTRIC POWER RESEARCH INSTITUTE, OR EPRI. SHERWOOD IS A MEMBER OF EPRI'S BOARD OF DIRECTORS.

BEFORE JIM AND SHERWOOD SPEAK, I APPRECIATE THE OPPORTUNITY TO SAY A FEW WORDS IN MY CAPACITY AS CHAIRMAN OF NUMARC.

OUR INDUSTRY'S COMMITMENT TO NUCLEAR ENERGY REQUIRES US TO TAKE A REALISTIC VIEW OF THE CHALLENGES. WE ALL SHARE THE RESPONSIBILITY TO RESOLVE THESE CHALLENGES. OVER THE PAST FEW YEARS SOME FUNDAMENTAL AND IMPORTANT CHANGES HAVE BEEN MADE IN THE WAY WE APPROACH OUR NUCLEAR RESPONSIBILITIES.

WE HAVE MADE A STRONG COMMITMENT TO ACHIEVING OPERATING EXCELLENCE, AND HAVE MADE GREAT PROGRESS IN SUCH AREAS AS OPERATING AND MAINTAINING OUR PLANTS AND TRAINING OUR PEOPLE. WE DON'T CLAIM YET TO BE SATISFIED, BUT OUR PROGRESS IS REAL AND MEASURABLE.

BUT, AS YOU KNOW, WE DON'T OPERATE IN A VACUUM. EVERY DECISION WE MAKE IS INFLUENCED BY THE INSTITUTIONAL AND REGULATORY ENVIRONMENT IN WHICH WE OPERATE. IF WE ARE TO KEEP OUR NUCLEAR POWER PLANTS OPERATING WELL, AND KEEP THE NUCLEAR OPTION OPEN FOR THE FUTURE, OUR GOALS MUST RELATE CONSTRUCTIVELY TO THE INSTITUTIONS THAT SHAPE THE ENVIRONMENT IN WHICH WE OPERATE. THE PUBLIC MUST BE ASSURED THAT OUR NUCLEAR PLANTS ARE OPERATED WELL--SAFELY AND RELIABLY.

MAY 2 '88 11:33 FROM PPL TOWER 1E

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IT'S CLEARLY OUR MUTUAL OBJECTIVE TO PROVIDE SAFE, EFFICIENT ELECTRICITY GENERATED BY NUCLEAR POWER. THERE ARE ENCOURAGING SIGNS THAT OUR SHARED VISION OF HOW TO ACHIEVE THESE GOALS OF PROVIDING SAFE AND EFFICIENT ELECTRICITY FROM NUCLEAR POWER ARE COMING TOGETHER AND THAT THE CONGRESS, THE NRC, THE NUCLEAR INDUSTRY AND THE PUBLIC ARE MOVING IN THE SAME DIRECTION.

ON THE REGULATORY FRONT, WE ARE PLEASED THAT 14 NEW NUCLEAR PLANTS RECEIVED OPERATING LICENSES LAST YEAR. WE ARE ALSO GRATIFIED BY THIS COMMISSION'S CONSTRUCTIVE APPROACH IN ADDRESSING SUCH ISSUES AS EROSION-CORROSION AND OPERATOR REQUALIFICATION. ON EROSION-CORROSION, THE COMMISSION PLAYED A STRONG OVERSIGHT ROLE AS THE INDUSTRY DEVELOPED SPECIFIC SOLUTIONS. ON OPERATOR REQUALIFICATION, THE COMMISSION ASKED THE INDUSTRY TO DEFINE SPECIFIC PROBLEMS, WHICH HAS RESULTED IN A MORE COMPREHENSIVE PROGRAM TO MEASURE OPERATOR PERFORMANCE.

INSTEAD OF REGULATING THE PROBLEM-SOLVING PROCESS, NRC IS JUDGING THE RESULTS OF OUR PROGRAMS ON THE BASIS OF OUR PERFORMANCE. WE BELIEVE THIS APPROACH IS WORKING WELL ON THESE ISSUES, AS IT HAS IN THE PAST ON ISSUES SUCH AS ACCREDITATION OF TRAINING PROGRAMS. IT IS A GOOD USE OF ALL OUR EXPERTISE AND RESOURCES. IT PRESERVES THE NRC'S MISSION OF REGULATING PRESCRIBED LEVELS OF SAFETY BY MONITORING OUR PERFORMANCE, AND IT RESULTS IN EFFECTIVE, REALISTIC AND WORKABLE SOLUTIONS.

- 4 -

WE BELIEVE THIS APPROACH--EXPECTING INDUSTRY TO DEVELOP AND IMPLEMENT SOLUTIONS TO PROBLEMS WHERE THEY EXIST--IS APPROPRIATE. AND WE ARE DEDICATED TO MAKING SURE THAT OUR PERFORMANCE ON THESE ISSUES WILL ENCOURAGE THE COMMISSION TO USE IT MORE WIDELY IN THE FUTURE. WE HOPE WE CAN USE THIS APPROACH IN THE MAINTENANCE AREA. OUR EFFORTS ARE NOT INTENDED TO SUPPLANT REGULATION AND OVERSIGHT BUT TO COMPLEMENT THEM, THEREBY ADVANCING THE SAFETY GOALS THAT BOTH NRC AND THE NUCLEAR ENERGY INDUSTRY SHARE.

WITH THAT, LET ME TURN THE PODIUM OVER TO MY COLLEAGUE FROM COMMONWEALTH EDISON, JIM O'CONNOR.

5/2/88

STATUS REPORT ON
UTILITY RESEARCH ON NUCLEAR POWER

by

Sherwood H. Smith, Jr.
Chairman, President and Chief Executive Officer
Carolina Power and Light Company

before the
U. S. Nuclear Regulatory Commission

May 4, 1988

In Conjunction With The
1988 NUCLEAR POWER ASSEMBLY

NRC Briefing:
STATUS REPORT ON
UTILITY RESEARCH ON NUCLEAR POWER

By Sherwood H. Smith, Jr.

Good morning. It is a pleasure and privilege to report to you on the electric utility industry's work in nuclear research and development—particularly the R&D efforts of the Electric Power Research Institute. My own company was a founding member of EPRI and I serve on the EPRI Board and Executive Committee and as Chairman of the Strategic Planning Committee.

In the nuclear area, EPRI is one part of a team of utility-sponsored organizations dedicated to safety, reliability and operational excellence. EPRI works closely with both NUMARC (The Nuclear Management and Resources Council) and INPO (the Institute of Nuclear Power Operations). EPRI has collaborated with NUMARC in such areas as erosion-corrosion, decay heat removal, severe accident issues and others. And EPRI has worked closely with INPO on a variety of technical issues—equipment reliability, water chemistry, maintenance, human factors guidelines and in-service inspection, among them.

Let me review briefly some facts about EPRI research. EPRI's utility membership represents over 70 percent of America's generating capacity and over 90 percent of our operating nuclear plants. The utility industry contributes over \$360 million to these research efforts; just under 20 percent is dedicated to nuclear power research. The Nuclear Power Division's research budget is augmented by cooperative or co-funded programs, including a number of cooperative programs with the NRC. Currently, about 50 percent of the benefits that accrue to utilities from EPRI research have come from nuclear power division programs.

Safety First. I want to stress EPRI's commitment to a "safety-first" approach when it sets priorities for nuclear energy research. We take a broad view of safety. In our view, it includes both reactor safety and the safety of nuclear plant personnel. Here are just two examples.

After the December 1986 feedwater pipe rupture at Surry, EPRI created a task force and a program on erosion-corrosion in high pressure water (or single-phase) piping, drawing on experts in materials, water chemistry, thermal hydraulics and systems engineering. EPRI sponsored workshops and distributed reports on the technical aspects of the problem, and developed a computer program (called CHEC) to help utilities predict where to look for single-phase erosion-corrosion. EPRI also helped develop a set of NUMARC Working Group recommendations to address this issue, and is now developing a parallel code (called CHECMATE) to predict erosion-corrosion in pipes carrying a mixture of saturated steam and water (or two-phase) fluid.

EPRI research has also helped reduce occupational radiation exposures. You heard Jim O'Connor mention that collective radiation exposure per nuclear unit has dropped 50-60 percent since 1980. EPRI's contribution in this area includes the LOMI decontamination process, improved control over primary water chemistry, automated inspection techniques and the development of new cobalt-free alloys to replace stellite, a major source of cobalt-60 in nuclear plants.

Accident Research. The utility industry assigns a high priority to severe accident research. In the seismic area, for example, EPRI has developed new analytic tools, performed large scale seismic tests, and gathered extensive earthquake survivability data to help resolve concerns about seismic adequacy. This has helped resolve seismic issues involving possible large earthquakes in the eastern U.S.

EPRI's work on severe accidents also includes emergency diesel generator reliability, decay heat removal, the IDCOR program and extensive experimental work on containment integrity.

Reliability. One of our industry's goals is improved reliability and availability and EPRI has several valuable programs in this area. Just a couple of examples:

o EPRI helped develop ways to prevent intergranular stress-corrosion cracking in boiling water reactor recirculation piping, which has caused major outages at BWRs. Through EPRI, the utilities sponsored a nine-year, \$90 million program to develop remedies, including crack-resistant materials, new welding procedures, water chemistry guidelines and advanced in-service inspection methods.

o EPRI research has also improved the reliability and availability of steam generators and reduced repair and inspection costs. Between 1980 and 1984, the average annual lost capacity from forced and extended outages and steam generator replacements was 5.7 percent, at an average annual cost of \$196 million. In 1985 and 1986, that lost capacity rate was lowered to 1.7 percent, with an average annual cost of \$59 million—over a three-fold improvement. This shows how research geared to improved plant reliability has also reduced costs.

Operations and Maintenance. - EPRI is helping INPO develop a practical, cost-effective approach to improving industry operations and maintenance practices, building on the programs already in existence at many utilities. The principal focus remains safety and improved reliability. But the need to address the acute problem of escalating O&M costs forced EPRI to re-evaluate the objectives, resource allocation and benefits of maintenance programs in terms of improved safety and reliability. It seems clear that the industry is spending more than enough money on O&M. U.S. O&M costs are among the highest in the world—higher than France, Sweden, and other countries with excellent operations and maintenance. The U.S. industry needs to spend its money more wisely.

To help utilities optimize their maintenance programs, EPRI is working closely with INPO on several initiatives. EPRI's major new maintenance effort is the Nuclear Maintenance Assistance Center, or NMAC. Modeled somewhat after the Nuclear Safety Analysis Center (NSAC), NMAC will provide a vehicle for timely analysis and dissemination of field experience and the transfer of new maintenance technology.

Our aim is to introduce a more effective "learning curve" in all elements of maintenance, not just in key components like steam generators. This rapid review and feedback will result in technical information and practical guidelines for maintenance personnel.

Advanced Reactors. Although institutional factors are the main impediment to nuclear energy's expansion, now is the time to define the technical characteristics of the next generation of nuclear power plants. That is the purpose of the last program I will discuss, the industry's Advanced Light Water Reactor (or ALWR) program. -

We are pleased with this program's progress—not least because it places the responsibility of developing the requirements for future nuclear plants squarely where it belongs—in the hands of the utilities. The utilities are accountable for the safety and economic performance of these reactors, and must provide the resources for their construction, operation and maintenance. As a result, EPRI's management of the ALWR program relies heavily on the utility executives that serve on the ALWR Steering Committee.

The ALWR program is a joint effort with the Department of Energy, whose participation and support is vital. DOE also has the primary role in long-range reactor development—the liquid metal cooled and gas cooled systems, in which EPRI plays a modest supporting role. The primary utility focus is on the ALWR.

For the ALWR to be a viable candidate for utility investment, it must meet three fundamental standards. First, it must be an excellent power plant in all respects. This means safety foremost, but it also includes reliability, maintainability and compatibility with the environment. Second, it must be economically attractive compared to fossil-fired units. Finally, the ALWR must provide very high protection of the utility investment in terms of predictable construction costs and schedules, assured licensability, predictable operating and maintenance costs and very low risk of severe accident.

The ALWR program is developing two design concepts to meet these standards. In each case, both pressurized water reactor and boiling water reactor designs are being considered. The two design concepts are an evolutionary plant (1,000 megawatt electrical reference design) and a passive safety plant (600 megawatt electrical reference design).

In the evolutionary ALWR concepts, systems and hardware are conventional, but the designs place increased emphasis on safety, simplicity, increased design margin and improved human factors. For example, a PWR designed to these standards would use a conventional reactor coolant system, but with much improved reactor coolant pump seal designs; steam generators with greater corrosion resistance and a larger secondary side water inventory; and a much larger pressurizer to accommodate a full post-scrum transient without actuation of pilot operated relief valves. The reactor manufacturers are developing the detailed designs to be consistent with the utility requirements and are submitting them to NRC for certification.

The second ALWR design option, potentially attractive over the longer term, is the passive plant. The ALWR passive plant increases the use of intrinsic physical characteristics, such as gravity and natural circulation to remove decay heat, provide emergency core cooling and prevent core damage. The incentives for developing the passive plant are substantial. The plant protection systems would substitute intrinsic, or passive, response for the active, engineered safeguards equipment used in existing plants. The passive plant offers greater opportunity than the evolutionary plant to simplify—by reducing the number of valves, pumps, tanks and instruments—with an attendant improvement in safety, construction time and cost, plant operability and maintainability. The passive plant may be more easily licensable than existing plants because of its simplicity, increased safety margins and improved human factors.

We are confident that the ALWR program will yield financially attractive, licensable, standardized systems, ready for construction when they are needed during the next decade. The promise of this program is reflected in the fact that it is being joined, financially and technically, by utilities from Japan, Taiwan, Korea, Italy and the Netherlands.

In closing, let me just say that we appreciate the cooperation of NRC in identifying areas of joint safety research with the industry. We believe such joint projects produce more meaningful results, which are used in a more timely and effective manner, at less cost to both the taxpayer and the ratepayer.

A STATE-OF-THE-INDUSTRY REPORT

by

James J. O'Connor

Chairman and Chief Executive Officer

Commonwealth Edison Company

before the

U.S. Nuclear Regulatory Commission

May 4, 1988

In Conjunction With The

1988 NUCLEAR POWER ASSEMBLY

NRC Briefing:
A STATE-OF-THE-INDUSTRY REPORT

By James J. O'Connor

Good morning, gentlemen.

Let me begin by endorsing Bob Campbell's statement that the nuclear industry is singlemindedly dedicated to self-improvement and superior performance in its operations, communications, our responsiveness to regulation—in fact, in all aspects of our operations. Throughout the nuclear utility industry today, from the board room to the control room, we are devoted to achieving and maintaining exemplary performance in both management and operation at all of our plants.

In my remarks today, I want to review briefly what we have achieved over the last year and what we hope to achieve in the months ahead.

By and large, the last year has been a rewarding time for the nuclear industry. Our drive for excellence in operations is bearing fruit. And we are much heartened by a number of positive developments on Capitol Hill.

Legislative Achievements. As you know, Congress is close to extending and revising the Price-Anderson Act. The new version strengthens the act by raising the public's liability protection from a nuclear accident more than tenfold.

Strong nuclear support also turned aside an attempt in the House of Representatives to give state and local government effective veto power over the operation of nuclear power plants. This key vote reaffirmed Congress's intention to leave regulation of nuclear energy in the hands of the NRC. It was encouraging to utilities to see Congress reaffirming the federal responsibility to assure uniform safety standards and enforcement policies for all of our nuclear plants. Our experience at Shoreham and Seabrook shows how disastrous it could be if this authority were dispersed among the various states.

We were also gratified by congressional agreement to redirect the nation's high-level nuclear waste management program. Lack of progress in implementing the Nuclear Waste Policy Act of 1982 was a continuing source of frustration for us, for two reasons. From a financial standpoint, because the utilities are meeting their obligation to fund the program. And from a public information standpoint, because the public will remain skeptical about our ability to dispose of the waste safely until we can show real progress. Under the new arrangement, we should soon see progress, which is good news for all of us.

And there have been other achievements. We see serious efforts to set the federal government's uranium enrichment enterprise on a more businesslike footing. Congress has taken the first steps toward reforming the licensing process. And we see early signs of congressional willingness to consider support for advanced nuclear power technologies. After a rocky start, the new U.S.-Japan nuclear cooperation agreement breezed through Congress.

These are all important steps in their own right, but they have a collective importance that goes beyond each individual event. When we step back and look at the last year's events as a whole, you can see that we—the industry, Congress, the Executive Branch and you, the industry's regulators—are creating the foundation necessary for successful operation of our current plants and for the next generation of nuclear power plants in this country. All of the nuclear industry's efforts—in Congress and among the states, in our communications programs and our regulatory efforts—are geared toward this objective.

Industry Achievements. For the nuclear energy industry to continue to flourish, one of our primary responsibilities is to operate the plants we have as well as humanly possible. As you know, the industry launched a comprehensive, industrywide self-improvement program almost 10 years ago, as a result of all the lessons learned from Three Mile Island. We realized then that all nuclear power plants are affected by the performance at any one plant.

We recognize that not all of our plants are yet performing to the high standards we expect, but we believe that our self-improvement efforts have already paid handsome dividends and will continue to do so. The improvement in industrywide performance indicators measured by the Institute of Nuclear Power Operations (INPO), and by the Commission, support this conclusion.

You will be hearing a full report from INPO in a couple of weeks, but I'd like to mention some of the most notable performance indicators for 1980 through 1987:

- o unplanned automatic scrams dropped from an average of 7.4 to less than 3;
- o the lost-time accident rate improved from 1.36 to 0.34;
- o radiation exposure among plant workers (measured in man-rem per unit) dropped from 1,230 to 521;
- o the average volume of low-level, solid radioactive waste per BWR unit dropped from 1,113 cubic meters to 459; and
- o the average volume per PWR unit dropped from 586 to 194.

The last two have already exceeded the goals set for 1990, and some of the other indicators may do so this year or next.

Further evidence of operational progress appeared in last month's NRC report on abnormal occurrences for the third quarter of 1987, which listed only two incidents. That brought the total number of abnormal occurrences for the first three quarters of Fiscal Year 1987 to only three, less than previous years.

Future Challenges. We are proud of our collective progress, but we know that major challenges remain. Looking ahead, we hope to see substantial needed progress in several major areas in the next year.

- o One of our primary goals for the year is to see Seabrook and Shoreham on-line. These plants are ready to operate, have developed satisfactory emergency plans, and are clearly needed to meet electricity demand and to replace imported oil use in their regions. They stand as symbols of the government unpredictability to which nuclear power is subject.
- o As a corollary to this issue, we hope the next year brings final resolution of the controversy over emergency planning regulation. We commend the Commission for its action last year in clarifying and affirming its congressionally-mandated authority over emergency planning.
- o Another high priority for us is standardization and licensing reform. It's self-evident that no utility in this country would consider ordering another nuclear plant without some assurance that, if we build the plant as approved, we will be able to operate it. No industry can afford to see a large investment—like two nuclear plants on the East Coast—standing idle. The solution must include development of standardized reactor designs, pre-approval of nuclear plant designs and sites, and consolidation of the construction permit and operating license procedures into one step.

- o In addition, we would like to see the question of the organizational structure of the Commission resolved. Let me acknowledge our awareness that reorganization of the Commission would not be a panacea. We also believe strongly that the licensing process should be reformed at the same time Congress tackles organizational change.

The nuclear industry's position on this issue is shaped, first of all, by the need to assure that any change in the Commission's structure is compatible with its safety responsibilities. And second, any reorganization should recognize that we must have a credible, effective regulatory agency if we are to have a viable nuclear program.

The nuclear industry has urged that any changes be considered in light of their consequences for the entire agency and its regulatory program, not merely as a reaction to the problems of the moment or as piecemeal changes in individual offices or functions. Any changes must avoid dispersing or dissipating the agency's regulatory resources, and avoid duplication of the Commission's regulatory functions. Finally, change should not produce confusion of regulatory authority. The NRC, or any successor agency, must be maintained as the sole body responsible for safety regulation of nuclear power activities.

As long as plants like Seabrook and Shoreham—which have been built according to and have met all regulatory requirements—are prevented from operating, the future state of the nuclear power industry looks bleak. With our growing dependence on imported oil and our rising electric power demand, the nation is leaving itself open to great risks without the nuclear option.

Elsewhere around the world, some of our nation's chief economic competitors, in the Far East and Western Europe, are ordering—and will surely build and operate—new nuclear plants. Almost all of the plants they are planning are next-step evolutions and developments stemming from U.S. light water reactor technology. Those countries are benefitting from yet another technology that we pioneered.

We must preserve the nuclear option as part of our energy supply if we are to compete effectively in the world marketplace and if we are to provide secure, reliable electric power for the future.

As I mentioned earlier, our goal as an industry is to achieve the highest possible levels of excellence in nuclear plant operations. If we achieve that goal, we will have delivered on the promise of nuclear energy as a safe, reliable, economical source of electric power, and earned the trust of the public and policymakers in all levels of government. That confidence, coupled with a credible, predictable regulatory system, will provide the impetus necessary for the next nuclear generation.

This brings me to our next presentation. The next nuclear generation is, at the moment, a research and development task and Sherwood Smith will brief you on the work underway at EPRI in this and other areas.