

ORIGINAL
UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Title: **MEETING ON CENTER FOR STRATEGIC AND
INTERNATIONAL STUDIES REPORT "The
Regulatory Process for Nuclear Power
Reactors-a Review"
PUBLIC MEETING**

Location: **Rockville, Maryland**

Date: **Wednesday, September 22, 1999**

Pages: **1 - 54**

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1 UNITED STATES OF AMERICA
2 NUCLEAR REGULATORY COMMISSION
3 OFFICE OF THE SECRETARY

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5 MEETING ON
6 CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES REPORT
7 "The Regulatory Process for Nuclear Power
8 Reactors-a Review"

9 ***

10 PUBLIC MEETING

11
12 Nuclear Regulatory Commission
13 One White Flint North
14 Rockville, Maryland
15 Wednesday, September 22, 1999

16 The Commission met in open session, pursuant to
17 notice, at 9:00 a.m., Greta J. Dicus, Chairman, presiding.
18

19 COMMISSIONERS PRESENT:

20 GRETA J. DICUS, Chairman of the Commission
21 NILS J. DIAZ, Commissioner
22 EDWARD MCGAFFIGAN, JR., Commissioner
23 JEFFREY S. MERRIFIELD, Commissioner
24
25

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1 STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

2 ANNETTE L. VIETTI-COOK, Secretary of the
3 Commission

4 KAREN D. CYR, General Counsel

5 JOSEPH GRAY, Associate General Counsel

6 JOHN F. AHEARNE, Project Chair, CSIS Nuclear
7 Regulatory Process Review Steering Committee

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P R O C E E D I N G S

[9:00 a.m.]

CHAIRMAN DICUS: Good morning, everyone. I would like to welcome you all to today's meeting regarding the report by the Center for Strategic and International Studies (CSIS) entitled "The Regulatory Process for Nuclear Power Reactors, a Review."

The report, which is a product of the CSIS Nuclear Regulatory Process Review Steering Committee, of which Commissioner McGaffigan and former Chairman Jackson were members, examined NRC's operational practices and regulation of nuclear plants specifically in areas related to reactor and plant operations.

It focused on those policy and process issues it considered to be central to the interactions among the NRC, the industry and the public and where appropriate provided recommendations for improvements or changes.

To present the observations and recommendations of the report, I am particularly pleased to welcome Dr. John Ahearne, the CSIS Project chair of this effort, who also happens to be a former Commissioner and Chairman of the NRC.

With your considerable experience since your days with the Commission prior to Three Mile Island, we look forward to your presentation and insights that you can give us as to what has or has not changed, where we are as an

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1 industry today, and where we can go from here.

2 Do any of my fellow Commissioners have any opening
3 remarks that they would like to make?

4 COMMISSIONER MERRIFIELD: Chairman, I have one
5 brief comment I would like to make. I want to join the
6 Chairman in thanking our former Chairman and colleague for
7 taking the time to come before us today. I know he has a
8 very busy schedule, and we appreciate getting the benefit of
9 a small part of our time.

10 This was quite an effort. I haven't taken the
11 opportunity to review the entirety of the report and there
12 are a number of very helpful recommendations made by the
13 panel. Having spoken about it with the other members of the
14 Commission, I think we take very seriously the effort that
15 was put into this by you and the other members of your
16 panel.

17 I also want to make a last comment. I know there
18 was a very strong effort on your part as Chairman of this
19 particular project to include a variety of non-industry
20 participants and bring them to the table -- David Lochbaum,
21 Thomas Cochran at NRDC; Paul Portney of Resources for the
22 Future.

23 I know you also had to work hard to try to ensure
24 that some of their dissenting views were documented in the
25 report, which is contrary to standard CSIS practices. I

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1 think that clearly shows the amount of effort that you put
2 into making this a useful document, and I look forward to
3 the interchange this morning.

4 CHAIRMAN DICUS: Thank you very much.

5 Dr. Ahearne, welcome back.

6 MR. AHEARNE: Thank you. Several opening
7 comments.

8 As we mention in the report, we froze our work at
9 the end of January so that the material presented was as we
10 understood it, as was understood many months ago.

11 We also mentioned in the report several times we
12 understood the NRC was taking steps in the direction of many
13 of the recommendations and in some cases had done major
14 improvements. I understand that this kind of progress has
15 continued. So I recognize that the report as it stands is a
16 time photograph and consequently there may well have been
17 many changes since then, although I think most of the
18 recommendations still are solid.

19 I would like to acknowledge, as was mentioned, the
20 contributions of Chairman Jackson. Commissioner McGaffigan
21 worked very hard. He was a diligent, constant member of our
22 group. Ashok Thadani provided significant assistance.
23 Steve Crockett was also of immeasurable help. Ray Durante,
24 who is somewhere in the audience, who was the project
25 director for this, was someone who worked much harder than I

1 did. I don't know if Lisa Highland is here this morning,
2 but she was a staff person at CSIS who also put in an
3 enormous amount of effort.

4 This is, as was mentioned already by Commissioner
5 Merrifield, slightly different than the usual CSIS document.
6 It is a consensus report except in those instances where
7 there is a comment mentioned that there was a disagreement,
8 and a disagreement in almost all cases was by the public
9 interest group representatives. They did agree with most of
10 the report, and in particular Dave Lochbaum was one of the
11 group leaders of the effort and contributed significantly in
12 moving this report forward.

13 What I would like to do is cover what I see as
14 some of the most important points. This is a relatively
15 informal meeting, so interrupt me any time that you would
16 like to. I assume that you have at least gone through the
17 report, and there aren't any major surprises and issues.

18 As you know, underlying the report, the reason for
19 it, was a concern not only in the Congress, but I'm sure in
20 the NRC and also very much in the utility industry that as
21 the utility industry moves towards the area of deregulation,
22 de-economic regulation of the utility industry where plants
23 are being sold, other plants are being closed for economic
24 reasons, the number of utilities running nuclear power
25 plants are decreasing and non-utilities are getting into the

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1 business of running nuclear power plants.

2 All of this is a sufficiently changing environment
3 that there is a real concern that the Nuclear Regulatory
4 Commission is going to keep abreast of all of those changes.
5 The NRC is a major factor in the economic success of the
6 nuclear industry. It's critical, obviously, for the safety,
7 but the actions taken by the NRC can have a major economic
8 impact. As the world is changing so rapidly, there was a
9 concern as to whether NRC was going to be changing rapidly
10 enough.

11 We broke these issues into areas of
12 implementation, the inspection, assessment, and enforcement
13 area. We call them emerging issues. Not that they are new,
14 but that they are becoming more important to license
15 transfer, license renewal, decommissioning, and we stress
16 consistently through here the need for a clearer definition
17 of the safety philosophy; clear, concise definitions of
18 adequate safety. This was a major issues stressed not just
19 by the utility members but also by the public interest group
20 members.

21 We recognize the NRC has made changes and taken
22 steps to address many of the issues.

23 I noticed on my way in that the NRC is having a
24 seminar by Vince Cavello, who is a leading expert on risk
25 assessment. We point out that building risk insights into

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1 the regulatory framework is going to be quite difficult. We
2 endorse it as being a very strong and positive movement, but
3 we also comment that it's going to be quite difficult to do
4 that.

5 We urge the NRC to continue to pursue and complete
6 many of the proposed programs that we were told about.

7 We note that, for example, moving into very few
8 specifics, the assessment process, as you all know, can have
9 a major impact on the financial community. What the NRC
10 says about plants does have a ripple effect as far as the
11 financial side of the nuclear regulatory system impacting
12 upon the nuclear power plant industry.

13 We raise the question, is the NRC inspecting the
14 proper areas? There is a mutual concern. On one hand, as
15 we say, excessive or misguided inspection may result in
16 distraction of resources from safety issues. Inadequate or
17 misfocused inspection may result in the NRC failing to
18 detect activity or trends that compromise adequate
19 protection.

20 The largest set of criticism came from the
21 stakeholders -- in our terminology here, that meant both the
22 utility and the public interest groups -- that some
23 inspections don't maintain a sharp safety focus but deal
24 primarily with administrative details.

25 We come back many times to the question of what is

1 the safety philosophy that the NRC wishes to embed in its
2 processes. For example, how is the NRC safety philosophy
3 embodied in the enforcement program? Is the enforcement
4 action, or the many actions, directly related to safety
5 significance of violations?

6 As you know, decommissioning is becoming a more
7 prevalent issue, because obviously older plants are going to
8 be decommissioned, and some plants are being decommissioned
9 before the end of their lifetime. There are many issues we
10 address that are outside the direct purview of the Nuclear
11 Regular Commission, but we urge the NRC to get involved in
12 some of those discussions with either Congress or other
13 federal agencies.

14 License transfer, as you well knew, is coming to
15 be a more common feature as plants are being bought by other
16 companies. So far the NRC seems to have been doing a very
17 effective job on that. We essentially urge you to continue
18 to be effective on it.

19 License renewal probably was the issue that was
20 most talked about before our study began, a concern
21 obviously being, are plants going to renew their licenses?
22 The Energy Department and the White House have had studies
23 done pointing out the need for the continuation of the
24 operating nuclear power plants, and these become even more
25 important as one understands the ramifications of such

1 proposals as the Kyoto proposal: how can the United States
2 significantly reduce or at least maintain without increasing
3 the amount of greenhouse gas emissions if a larger number of
4 nuclear power plants were to be shut down? So the
5 recognition is now more widely spread of the need to keep
6 the power plants open.

7 Of course this is a national interest; it's not a
8 utility interest. The utilities, looking at the economics
9 of those plants, are looking at sort of a different book.
10 As you well know, a major question is, will license occur on
11 a reasonable time scale and will a set of requirements be
12 imposed by the NRC that are able to be lived with by the
13 utilities? These were very sensitive issues.

14 As far as we knew at the time we wrote this, the
15 NRC was doing a very good job with the Baltimore Gas &
16 Electric and Duke Power proposals, but there still were a
17 large number of concerns raised by the utility side.

18 We talk a bit about risk-informed regulation. I
19 will get back to that and I will go into a little more
20 detail.

21 The backfit rule probably was the most contentious
22 and, as Commissioner McGaffigan knows, probably the most
23 difficult one for us to work through and actually get into
24 the report in a way that people would sign off on.

25 Now let me hit a couple of the points that I would

1 like to stress.

2 We don't want to minimize, and I hope we don't,
3 the need for the safety focus of the NRC. As we say, safety
4 considerations must remain the primary focus. However, the
5 NRC must find a way to work with its licensees and
6 stakeholders in a more constructive and open manner.

7 I will quote several times, but let me expand on
8 it. We say, the change from prescriptive deterministic
9 regulation to risk-informed, performance-based regulation is
10 a potentially dramatic one. It requires a change in the
11 procedural cultural of the NRC and the licensees. Also the
12 availability of resources and budget will have an impact.

13 I've looked at research programs for many years.
14 A couple of years ago in association with a couple of other
15 university colleagues I participated in a study that looked
16 at could the research program of the NRC and the research
17 program of DOE somehow cooperate more closely because both
18 were declining in dollars.

19 I spend a lot of my time now looking at the
20 long-range structure of the nuclear energy research program
21 for the Energy Department. I also work a lot in science
22 policy type issues. Research is integral for the economic
23 health of a country like the United States. The United
24 States is a technological country. It runs on the basis of
25 high technology. High technology doesn't magically appear.

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1 It requires a lot of research effort, which takes time to
2 develop.

3 A regulatory system, particularly one that is
4 moving in a new direct direction, this risk-informed,
5 performance-based regulation, has to be based on solid
6 understanding, and that's research. I must admit I'm
7 appalled by the continuing reduction in the research budget
8 in the NRC.

9 I'm not sufficiently familiar with the
10 interactions between the NRC, OMB and the Congress. Having
11 played in that game myself many years ago, I know those are
12 not simple. But unless there is a base of research to
13 support this new trend, sooner or later a major problem is
14 going to arise and you will find that the foundation is very
15 weak. Research, I think, has to be supported, but that's an
16 issue that you folks have to decide.

17 We said that PRA can be applied widely. We raised
18 a concern -- are the techniques of PRA sufficiently well
19 understood? Our conclusion was they are not. We have seen
20 enough PRAs that are done poorly. We believe that both the
21 industry and the NRC staff are going to have to work hard to
22 be brought up to a level of technical understanding so that
23 they can apply PRA consistently.

24 The concept of risk-informed, performance-based
25 regulation is excellent, but it really is a challenge to

1 make sure people have the competence to apply it, and we
2 express a concern that both the industry and the NRC staff
3 are not yet there.

4 The application of risk insight will be wonderful
5 if the competence is developed. As we say, a major
6 education task will be to develop competence in both NRC and
7 industry.

8 For implementation, as I mentioned, we keep coming
9 back to a concern that the safety philosophy is not clear
10 enough. Many years ago the NRC developed safety goals. We
11 recognize there is a PRA policy statement and the strategic
12 plan has a statement of the safety philosophy, but our
13 consensus was the NRC does not have a clearly defined safety
14 philosophy that is consistently applied for all nuclear
15 power plants.

16 Our conclusion is there is little controversy
17 between advocates and adversaries of nuclear power that is
18 not rooted somehow in differences of opinion as to what
19 adequate protection really means. Most of your regulations
20 were developed in an era of determinism, so they are based
21 upon deterministic analysis. If you are to really move down
22 this path of risk-informed, performance-based regulation, a
23 lot of the regulations are going to have to be revised.

24 The current safe operations of plants, as we say,
25 is a tribute to the skill and professional judgment of the

1 individuals who framed the regulations that they have worked
2 as well as they have, but there will have to be a lot of
3 changes made, and that is going to be difficult.

4 We concluded that the boundary where the issues of
5 regulatory change come is where you define the issues and
6 activities that, however important to the efficiency of the
7 utility or to production of electricity, create no or very
8 minimal levels of risk. Therefore, those are areas where
9 the NRC, in our conclusion, has no regulatory function, and
10 there is a criticism that in many cases the NRC has
11 continued to operate in a regime where it can have a major
12 impact on the utility but not have any significant effect on
13 the health or risks.

14 The seven cornerstones that the NRC developed we
15 endorse. As we understood at the time you wrote this, you
16 were moving forward to develop a safety philosophy around
17 those seven cornerstones.

18 On the assessment process we ran into, as I'm sure
19 all of you have, there were concerns that the assessment
20 process is different as you go across the regions of the
21 NRC. That is a problem, if that is correct. The argument
22 is that the assessment process is subjective and based on
23 unclear standards without a safety focus. We urge that
24 there be more work put in in trying to develop clearer
25 guidelines that would be understood by all of your

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1 inspectors.

2 The criticism that I'm sure you've heard we heard
3 strongly, and in this case both from the utilities but also
4 very strongly from the public interest groups, that the NRC
5 inconsistently applies the criteria for putting out a
6 removal from the watch list.

7 A concern was raised that in some cases plants
8 seemed to have been not put on when, if you applied the
9 criteria consistently, they should have, and in some cases
10 they were put on, where if you applied the criteria
11 consistently they should not have. As I say, the unique
12 thing there was that both the public interest groups and the
13 utility representatives saw this.

14 On the inspection process, we agreed, as you well
15 know, that the law assigns the NRC the responsibility for
16 establishing the regulations, but it's the responsibility of
17 the licensee to operate the facility safely. We also
18 understand that the inspection process is an audit process.
19 Consequently what you do is inspect on an a periodic basis
20 certain areas.

21 We note that there is criticism that the
22 inspection has two kinds of weaknesses. One weakness is
23 that inadequate or misfocused inspection could lead to the
24 NRC failing to detect trends that compromise adequate
25 protection. On the other hand, misguided inspection may end

1 up focusing on areas where the utility puts resources in
2 that are not significant additions to safety but, since
3 utility resources are finite, detracts from their ability to
4 put those resources in areas that are.

5 Criticism that in an area that indicates degraded
6 performance the inspection process sometimes stops short of
7 going to the root cause. Some stakeholders have criticized
8 the NRC, on the other hand, for using the inspection process
9 as a mechanism to impose new requirements, and I will get
10 back to that.

11 The concern on the enforcement process was
12 somewhat similar. We say sanctions imposed at a higher
13 severity level than warranted by the safety implications
14 have tangible and intangible consequences. The tangible
15 ones, obviously, are the amount of a civil penalty. The
16 intangible ones include the perception of a troubled
17 performer and therefore impacting the plant's ability in the
18 financial community.

19 However, there are adverse consequences when the
20 NRC puts lower sanctions on than are warranted.
21 Artificially lowered sanctions can mask the safety
22 significance of a violation.

23 We concluded that, at least at the time we looked,
24 the enforcement program had several problems: lack of a
25 clear safety focus; use of undefined subjective criteria;

1 tendency to use different staff interpretations; and the
2 lack of timeliness.

3 A criticism was that many times, or at least
4 sometimes, an inspection will turn up something that is
5 going to lead to a a violation and enforcement process, and
6 six months later the enforcement action will be taken, which
7 is far too long.

8 The current policy allowing the staff to double a
9 civil penalty when the violation of a similar severity level
10 in the past two years has occurred and the policy allowing
11 the staff to mitigate a civil penalty when the licensee has
12 avoided a similar violation in the past two years, we
13 concluded both of those should be dropped.

14 The argument is if you are concerned about
15 repeated offenses, it has tools other than boosting the
16 civil penalty, and you shouldn't overlook a performance
17 problem simply because the owner has not recently
18 experienced the same problem. So our argument is that
19 inflating or deflating civil penalties in that manner
20 artificially widens the gap between good and bad performing
21 plants.

22 On the other hand, we agree that you should allow
23 the staff to dismiss the civil penalty for severity 3
24 violations when the licensee self-identifies and corrects
25 the problem, because we don't believe you should ever give

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1 the licensee a disincentive to be undertaking
2 self-assessment.

3 On the decommissioning side, we recognize that
4 there are many issues that are not directly under the
5 licensing authority of the NRC, but nevertheless we do raise
6 the issues.

7 For example, the tax treatment of decommissioning
8 funds. We expressed a concern that the way the IRS code
9 currently was written, it had the assumption that the power
10 plants would remain under the control of a utility. The tax
11 code doesn't allow for the changes the industry is making as
12 it moves to this competitive market. The concern is that
13 the tax code doesn't allow a tax free transfer of
14 decommissioning funds, which could significantly impact on
15 the ability of a new owner to operate the plant.

16 The bankruptcy code doesn't ensure that the
17 obligation to fund decommissioning will continue to be met.

18 The AEC was formed under the Atomic Energy Act.
19 As you know, that is then carried over, as amended, to you,
20 but it doesn't give you explicit authority to retain
21 jurisdiction over a licensee that transfers their licenses
22 and other interests in nuclear power plants but retains
23 responsibility for decommissioning funding.

24 These are issues that we believe should be
25 addressed, recognizing that this requires congressional

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1 action. When talking about the IRS code, it's an action by
2 the Treasury Department to take that issue up with them.
3 The bankruptcy protection also requires a change in the
4 statute. The obligations for non-licensees would require an
5 amendment to the Atomic Energy Act. So there are a number
6 of issues that relate to other agencies.

7 A contentious issues which we debated in our
8 committee and didn't reach any resolution other than saying
9 it is a significant issue, and I know the NRC is well aware
10 of that, is the overlap in radiation standard setting
11 authority between the NRC and the EPA. It's something that
12 you are very familiar with.

13 As we say, the majority of the Project Steering
14 Committee members felt the NRC was in the best position to
15 establish safety standards. It is recommended resolution of
16 the matter be agreed upon and decision be made as soon as
17 possible. This is one where the public interest group
18 representative definitely disagreed. One of the issues they
19 took up was they believe that the Part 50 which is now used
20 for decommissioning isn't the one that should be applied;
21 they believe that Party 72 should.

22 On license transfer, we concluded that you were
23 moving fairly smoothly in that direction. We just wanted to
24 encourage that to be continued. We note that this is both
25 an NRC and industry issue and you both must work together so

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1 that there can be this.

2 We do recommend, and you may have taken action on
3 these, a series of actions to improve the process for
4 reviewing financial and technical qualifications:

5 Clarify to the extent possible the federal tax and
6 antitrust implications;

7 Develop policy options with respect to foreign
8 ownership or control, and we note this may require amendment
9 to the Atomic Energy Act;

10 Develop standard review plans;

11 Issue lessons learned from completed transfers and
12 develop a road map.

13 We point out NRC has achieved much progress and
14 continues to strive for greater efficiency and
15 standardization.

16 As a personal note, it said NRC is considering
17 dropping the antitrust reviews. I don't know if you have
18 done that. That was the most painful thing I had to go
19 through. Reading through those cases, all the antitrust
20 material, that was a monster.

21 COMMISSIONER MCGAFFIGAN: We've only done it for
22 license transfers. For the initial operating license, the
23 statute requires it.

24 MR. AHEARNE: I'm not a lawyer.

25 COMMISSIONER MCGAFFIGAN: The lawyer is laughing.

1 COMMISSIONER MERRIFIELD: I don't like it any more
2 than you do. I am a lawyer.

3 MR. AHEARNE: On license renewal, as we point out,
4 we say it's important that any plant that can economically
5 justify extending its plant life should be able to do so and
6 to expect a predictable, fair, efficient and timely
7 licensing process.

8 There are several issues that we raise that we
9 thought would have to be looked at with more care.

10 The question on whether the structured systems and
11 components regulations that already exist, we argue that
12 those should be enough and you need not have a major review
13 of those; if they are meeting the current regulations, that
14 should suffice.

15 The generally applicable renewal issues, both
16 technical and process, we urge those be completed on a
17 generic basis rather than being left open for the individual
18 plant cases.

19 We recognize that it's both an NRC and an industry
20 issue on the side that the industry could well use working
21 more closely with itself to try to see if they couldn't
22 reach some agreement on a uniform approach for license
23 renewal.

24 We suggest eliminating the requirement to perform
25 an aging management review for those that it can be shown on

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1 a generic basis manage aging effects currently.

2 The public interest group people disagreed. They
3 contend that the license renewal unfairly prohibits
4 meaningful public participation and recommended the NRC
5 revise its procedures so that public comment doesn't begin
6 until all the responses for additional information have been
7 received.

8 COMMISSIONER MERRIFIELD: Chairman, on that
9 particular point, since I wasn't part of the process as
10 Commissioner McGaffigan was, I think I might benefit from
11 having a better understanding of the interchange among the
12 members as it relates to that point, because I know that
13 issue has been raised to us directly by some of the public
14 interest groups. I'm wondering what some of the discussion
15 was among some of your members.

16 MR. AHEARNE: As indicated here, in any of our
17 sections where you have a set of recommendations and there
18 is no statement on the public interest group, that means
19 that they agreed with what was said. In this particular
20 case they are pointed out as disagreeing. Everybody else
21 had a different position.

22 Their conclusion was that the current system of
23 moving towards a more streamlined approach for license
24 renewal, which clearly the industry strongly supports, the
25 administration is interested in having license renewal be

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1 done in an efficient and timely fashion and in a way that it
2 doesn't impose major obstacles to going for license renewal.
3 All of that is focused on streamlining the process.

4 The public interest group members raised the issue
5 that in that push towards streamlining the process major
6 safety-significant issues may be submerged, and in
7 particular they felt that the process for the public comment
8 shouldn't begin until the NRC has said, now we have all the
9 information that we need from the licensee, and then the
10 public comment period could begin. They are interested in a
11 greater opportunity to participate in the license renewal.

12 COMMISSIONER MERRIFIELD: Did that resonate at all
13 with the majority? Were there any suggestions about how we
14 might be able to ameliorate some of those concerns without
15 unnecessarily slowing down the process?

16 MR. AHEARNE: Probably the two areas would be one
17 point that I stressed many times here. In the absence of a
18 better definition of what is meant by adequate protection,
19 it is difficult to resolve a number of these issues on a
20 generic basis, and it ends up being a case-by-case basis.
21 It also brings in more subjective judgment.

22 I think both sides of these debates would like to
23 get as clear a statement as possible so that one has a more
24 obvious standard against which to judge. Industry is not
25 interested in having significant safety issues swept under

1 the rug, because that only will later come back to be a
2 problem for them. Public interest groups are concerned that
3 that will happen. I'm sure the NRC doesn't want that to
4 happen.

5 Another point we do make fairly consistently is
6 that the more transparent the NRC can make its processes,
7 the more likely you are going to be able to avoid the
8 distrust and the opposition.

9 COMMISSIONER McGAFFIGAN: If I could just add.
10 I'm having a hard time finding it in the chapter. That last
11 point that Chairman Ahearne made is in here, that we welcome
12 the involvement of the public interest groups throughout the
13 process. There is an involvement through the environmental
14 impact statement process that they have. It's a very public
15 process; the safety evaluation report process with the ACRS
16 involvement. So we try to stress there is a larger role for
17 the public, if they choose, in making sure that safety
18 issues are not missed.

19 On the issue of mining the requests for additional
20 information, I made the point, and others, that that is
21 inconsistent with the way we conduct hearings. The National
22 Whistleblower Center in this case had six months in which to
23 come up with a viable contention and failed to do so during
24 that period, and it's inconsistent with the entire history
25 of our hearing process that you wait to the end of the

1 drafting of the SER before hearing would begin. They have
2 to be bringing something to the table, and they should be
3 able to examine the license on their own.

4 That is before the court at the moment. That
5 issue is before the federal appeals court. That is the
6 heart of the case that will be judged on October 10. But
7 there are a lot of ways to be involved in our license
8 renewal process other than through a formal hearing.

9 MR. AHEARNE: This expands beyond a particular
10 point here, but let me make a couple of comments.

11 Mark Shields once wrote, "In D.C. perception is
12 reality." He also said reality is reality. If your process
13 is perceived as being unfair, the fact that you can make an
14 argument that it's really fair doesn't go too far. You've
15 got to worry about how is it perceived if you are worried
16 about whether it's going to be judged as unfair treatment.

17 In the end, many people in the nuclear industry
18 want to avoid what an old army general used to call the
19 hassle factor. If they perceive moving into an arena with
20 the NRC that is going to lead to a lot of heated arguments
21 by strong public interest groups, they'd just as soon avoid
22 it, and that "just as soon avoid it" may mean they'll shut
23 their plants down. You really have to worry about that.
24 You may win in the courts.

25 COMMISSIONER MERRIFIELD: As you know when you

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1 were Chairman, it's a careful balance that we have to
2 bridge, on the one end fully satisfying the public's desire
3 for us to protect public health and the environment, at the
4 same time not imposing an undue burden on industry and the
5 operation of those reactors.

6 MR. AHEARNE: It's not easy. I certainly wouldn't
7 say that all objections raised by the public interest groups
8 are sound.

9 COMMISSIONER MERRIFIELD: Nor are those by
10 industry either.

11 MR. AHEARNE: That's right.

12 COMMISSIONER MERRIFIELD: Chairman, I had a
13 related question that was brought up by the former Chairman.

14 CHAIRMAN DICUS: Go ahead.

15 COMMISSIONER MERRIFIELD: This resonates
16 throughout the report. It's the issue on the vision for
17 adequate protection. It's salted throughout the report that
18 that it is an important criterion. As you mentioned, it was
19 shared by both the public interest groups as well as
20 industry.

21 MR. AHEARNE: Right.

22 COMMISSIONER MERRIFIELD: I don't know whether the
23 task force grappled with this or whether you can articulate
24 it, but going from the theoretical sense of having that
25 definition to a more practical route, trying to come up with

1 a definition that will satisfy ourselves, the industry that
2 we regulate, and the public interest groups and the public,
3 how do we get there? How do we come up with a useful
4 definition that we can grab on to, yet one that is going to
5 satisfy these groups that have united in their opposition to
6 the fact that we don't have that definition?

7 MR. AHEARNE: If it were easy, it would have been
8 done.

9 CHAIRMAN DICUS: They'd have done it in the
10 report.

11 COMMISSIONER MERRIFIELD: Some would assert that
12 it's easy. By reading this report, some would assert that
13 it's easy.

14 MR. AHEARNE: It's very hard. I think as we all
15 know, particularly some of the people sitting in the
16 audience, we in this regulatory framework have been
17 struggling with that for decades.

18 I think as you are moving more towards the risk
19 and performance you may have a better chance, but you are
20 going have to try to probably set up some kind of a task
21 force, committee, composed of regulators, stakeholders, both
22 public interest groups and utilities, and to try to work
23 through that.

24 It's missing, and its absence continually came up
25 as the fundamental reason why so many of these other

1 problems exist. We did not attempt to try to do that. We
2 had a hard enough time putting together what we have here,
3 but to actually try to develop that, that's a whole other
4 study and it really would have to be done by the combination
5 of people that I mentioned.

6 CHAIRMAN DICUS: Let me interrupt just for a
7 moment. I'm in the situation this morning that I have
8 overlapping meetings and I'm going to have to represent the
9 Commission at the other meeting. So I need to leave in a
10 couple of minutes. I want to ask you a question.

11 I very much appreciate your taking the time to be
12 here and to go through this and try to explain some of these
13 things and interact with us. I very much appreciate it.
14 I'm sorry I'm going to have to leave.

15 The report states that risk-informed regulation
16 must be accepted and utilized by all levels of the NRC
17 organization, which we certainly recognize, and it is going
18 to be one of our challenges to do that. Could you give me
19 your views to what degree you think the risk-informed
20 regulation has been accepted and will be accepted and
21 utilized by the industry?

22 MR. AHEARNE: I think in words it's quite widely
23 accepted. If you start at the top of the organizations, you
24 will find that people use the words well. As you begin to
25 move down to middle management you probably still find

1 acceptance of the words. When you move down to the worker
2 level, I don't think they really understand what it means.
3 This is compounded by the fact that in a number of instances
4 when the worker level and the utilities deal with the
5 inspector and the NRC, neither of them really understand
6 what it means. It's going to take a long time.

7 CHAIRMAN DICUS: It will take time. I think we
8 recognize that. It is going to be a challenge to the
9 industry as well as to the NRC.

10 MR. AHEARNE: Absolutely. As we say, it's both
11 sides.

12 CHAIRMAN DICUS: One other quick question. The
13 NRC has as one of its performance goals to maintain safety.

14 MR. AHEARNE: I would have thought that is the
15 most important.

16 COMMISSIONER MCGAFFIGAN: It is.

17 CHAIRMAN DICUS: But many of our international
18 colleagues have been quite vocal in voicing their views that
19 the role of the regulator is not to maintain safety but
20 rather to improve safety. Given your experience as a former
21 regulator, I would be interested in your philosophy on this
22 subject.

23 MR. AHEARNE: On the one hand, there are many
24 countries, the ones particularly with whom I spent time, the
25 Ukraine and Russia, that have to improve safety very

1 definitely. I think that in the United States the concept
2 of regulation is to establish a floor. If you fall below
3 that floor, if you have a gray band, you then come under
4 increased scrutiny, and if you go below the bottom of that
5 gray band, you get shut down. This is quite consistent
6 with, for example, the safety case philosophy in the United
7 Kingdom.

8 If you run into people who say that the role of
9 the regulator is to improve safety, I guess I would disagree
10 with that, unless you are in a situation where the safety is
11 inadequate, in which case you close it down.

12 CHAIRMAN DICUS: I think France has been very
13 concerned about that statement.

14 COMMISSIONER MCGAFFIGAN: If I could follow on
15 with that. Monsieur La Coste was here, the chief French
16 regulator, and we all talked to him a bit about this. He
17 believes that his job is to improve safety. He will require
18 corium spreaders and containment liners and God knows what
19 else, and EPR.

20 He says the difference between us French and you
21 Americans is we believe nuclear power has a future. We
22 invest in research; you don't. In order to gain the
23 public's confidence that the future is going to be better
24 than the present, we're going to make them better, and we
25 are going to require that beyond any safety necessity.

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1 He links that there is a future to the nuclear
2 industry to his desire to improve safety beyond health
3 requirements.

4 MR. AHEARNE: As we all recognize, in France there
5 are bleary lines between the industry and the government and
6 the regulator.

7 COMMISSIONER McGAFFIGAN: They are trying to make
8 them clearer.

9 MR. AHEARNE: In this country it's obvious that
10 many in the industry, that is, the vendor side of the
11 industry, and the Energy Department do believe that new
12 designs ought to be seen as safer. That is part of the
13 philosophy that if nuclear power is to be reestablished in
14 this country, changes have to be made, and the safer concept
15 is not necessarily because the current plants are unsafe;
16 it's just that the industry has concluded, DOE has concluded
17 that that is one of the criteria that will have to be
18 applied for new plants. That is different than the role of
19 the regulator.

20 COMMISSIONER DIAZ: [presiding] Why don't we
21 finish with your comments, and then I think we all want to
22 go back to adequate protection, risk-informed, and all those
23 small issues.

24 MR. AHEARNE: Okay.

25 On the risk-informed, the point that we stress

1 several times is we see this as a major challenge to the NRC
2 to take these bodies of regulations and transform them into
3 a risk-informed, performance-based set. As we say, what has
4 not been looked at well and needs attention are the
5 regulatory requirements established immediately following
6 the accident at TMI-2 that were not based primarily on risk
7 insights. I can well endorse that since I was heavily
8 involved in setting up many of those, and risk insights were
9 not an issue that we were looking at at that time.

10 We do have the concern that was reflected by
11 industry that the NRC process is not well adapted to
12 incorporating new technologies. As we say, the NRC
13 historically has been slow to respond to industry-wide and
14 plant-specific requests for plant modifications and process
15 improvements based on PRA analysis and incorporation of
16 advanced technology or both. We urge moving forward with
17 the risk-informed approach.

18 The public interest group representative
19 disagreed. Their argument is that the quality of the
20 existing PRAs really doesn't support further progress. They
21 thought that the NRC should establish minimum standards for
22 PRAs and then conduct audits to ensure those are being met
23 before there is any further movement towards risk-informed
24 regulation.

25 On the license amendment, again we recognize that

1 the NRC has been making some major changes in the license
2 amendment process, but we urge further work to be done. We
3 did not see the Arthur Andersen report, but our
4 understanding was that it identified significant room for
5 further improvements that the NRC could make.

6 In the license amendment, again we comment that
7 the risk aspect did not seem to be incorporated into the
8 approach on license amendments.

9 We realized that as you move in these new
10 directions it would be useful to remove as much detail as
11 possible from the license and tech specs while it retains
12 the objectives. We know that the improved tech spec
13 approach, which has not yet been incorporated by all plants,
14 is a step in that direction, and we urge you to try to urge
15 the licensees to move in that direction.

16 On the hearing process, which was another area we
17 spent a lot of time discussing, we discussed the difference
18 between the adjudicatory and the legislative hearing. As we
19 point out, we use the term "adjudicatory hearings" as trial
20 type hearings that make use of cross-examination and
21 discovery.

22 We urge the NRC to take advantage of the
23 flexibility allowed to it under the Atomic Energy Act to use
24 more legislative hearings. We thought it offered potential
25 advantages. This was not something that the public interest

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1 group representatives agreed with. They thought the current
2 requirement for formal hearings, discovery and
3 cross-examination is critical for the public to have an
4 appropriate involvement.

5 2.206 was an issue we discussed at some length.
6 The 2.206 process, we grant, is something that is more
7 expansive than is necessary to satisfy the statutory
8 requirements, but the public interest side of the world does
9 not believe that the way the NRC implements 2.206 is doing a
10 fair job of it. In fact, the term they frequently used was
11 "it's a sham." So we made some significant recommendations,
12 including that the director's response be written in a way
13 that is more technical:

14 The director's decisions could describe the
15 issues, the facts, the safety significance, corrective
16 actions, additional actions that should be taken, and a
17 conclusion regarding the overall adequacy.

18 We note that many times the decision will say that
19 they are rejecting the petition, but actually the licensee
20 or the NRC are taking most of the actions.

21 We also recommended that just as when a licensee
22 submits a vague application, the NRC staff will go back and
23 ask for clarification, when a 2.206 petition comes in that
24 is vague the NRC, rather than just rejecting it, should ask
25 for more information.

1 The rule-making process. You've been doing a good
2 job of improving it. We see that the efficiency in the
3 rule-making process will be even more important as you go
4 through the process of trying to redo a lot of regulations.

5 Finally, on the backfit rule, a very contentious
6 issue, I think that is one in which the NRC staff strongly
7 objects to the criticisms that are raised by the industry on
8 the backfit rule, but the industry is just as strong in
9 belief that the staff has taken many actions to
10 inappropriately impose requirements without going through
11 the analysis required by the backfit rule.

12 Industry believes that misuse of the compliance
13 exception is a major problem;

14 Imposition of requirements by informal statements
15 during inspections, enforcement and assessment;

16 And then the inappropriate use of averted onsite
17 costs. The case that is brought up is that averted onsite
18 costs that are not safety significant should not be used in
19 the cost-benefit analysis of the backfit rule.

20 In this particular case we did not recommend any
21 changes, but we did recommend as a reconsideration, as we
22 say, the primary mechanism for improving the situation will
23 be continuation of the reform process that the NRC has
24 begun. Changes in the assessment and enforcement processes
25 to make them more objective, safety focused and risk

1 informed can eliminate many of the informal interactions
2 that result in the imposition of backfits.

3 Risk-informing Part 50 should reduce the volume of
4 regulatory guidance, and the use of the compliance exception
5 should be significantly reduced.

6 Then we suggest the NRC review its guidance for
7 considering averted onsite costs.

8 Again, here is an area where the public interest
9 group people disagreed. Their argument is the industry has
10 not provided the data to support the allegations of backfit
11 rule abuses.

12 That is a very lengthy in time but short in detail
13 summary.

14 COMMISSIONER DIAZ: Thank you very much. It is
15 really good of you to come and share your thoughts with us.
16 I think I will take a stab at a couple of minor issues and
17 then I'll ask my colleagues to pound on you -- I'm sorry.
18 To ask you some questions.

19 The issue of adequate protection. I'm sure you
20 struggled with that for many years, as you said, and all the
21 Commissions have struggled. I think everybody agrees that
22 further definition is required in that area.

23 From your experience and from the complexity of
24 the issue and all of the relationships between adequate
25 protection and what the nation wants or what the national

1 interest is, wouldn't it be a little simpler -- not that it
2 will be simple, but a little simpler process to address the
3 issue of the assurance of adequate protection which can be
4 bound at some level in which you might have adequate
5 protection, still not exactly defined with numbers and
6 things, but still be able to establish the processes with
7 assurance of adequate protection, which is really what we
8 can work at? We cannot really define what adequate
9 protection is because the nation might want to define what
10 that level is.

11 MR. AHEARNE: Two answers to that. First,
12 obviously the NRC's major regulatory function is, as you
13 say, to provide the assurance that this is being done. What
14 our report kept coming back to and the discussions kept
15 coming back to is that if you could in a process that would
16 have to be widely encompassing come up with a better
17 definition of what is the adequate protection, then your
18 systems of assessing and enforcing and inspecting could do a
19 better job of assuring that that is met. If one doesn't
20 know the standard against which you are measuring assurance,
21 it is quite difficult to make a convincing case that you are
22 ensuring that amorphous standard is met.

23 Also, as was pointed out many times, the industry
24 believes that, given an amorphous standard, the NRC can
25 force changes that are unnecessary, and the public interest

1 group believes that, given an amorphous standard, the NRC
2 can avoid taking actions that should be taken.

3 I think it is the consistent view of this group
4 and also my view that it would be well worth another attempt
5 to see if one couldn't come up with some acceptable
6 definition of what is adequate protection.

7 As I said, it's not something that you can do
8 yourself. It really has to involve a broader set of
9 participants, and most likely if you were able to come up
10 with some strong definition like that, you would have to get
11 it validated by the Congress.

12 COMMISSIONER DIAZ: My point on that is that
13 because that is going to be a very difficult and long
14 process, we might be able to work in the shorter term to
15 establish the basis in which adequate protection can be
16 established or defined. Rather than coming from the top
17 down and getting something that really might be a very hard
18 case to sell, come from the bottom up in the same open
19 process, trying to establish what the assurance actually
20 represents today.

21 I think I am going to open it up to my colleague,
22 Commissioner Merrifield.

23 COMMISSIONER MCGAFFIGAN: I wanted to get to this
24 point too. I participated in this report heavily. One of
25 the sentences I'm most proud of getting into this report is

1 in the safety philosophy chapter where it says in a
2 prescriptive deterministic framework, this, having a clear,
3 consistent, well understood statement of safety philosophy
4 and meaning of adequate protection, may be impossible.

5 That is in the report.

6 It then goes on in the next sentence to say, a
7 risk-informed framework that makes use of risk insights
8 together with engineering judgment and operational data can
9 narrow the difference and provide greater clarity. Not
10 perfect clarity.

11 Then in the risk-informed chapter, as you pointed
12 out, it states that the majority of the report, not just the
13 public interest groups who would say that we should go whole
14 hog, but the majority view says that all the improvements
15 necessary to move to a risk-informed approach will not come
16 to pass unless there is a significant effort to upgrade the
17 capability of both NRC staff and licensee staff to do PRAs.
18 Currently many of the PRAs are poorly done. It will take
19 several years to bring the staff to the necessary level if
20 such an upgrade is emphasized.

21 When you get back to safety philosophy, the only
22 thing that was actually said in here other than this call
23 for doing what may be impossible, according to one of the
24 sentences, is in a deterministic framework.

25 MR. AHEARNE: But you're moving away from a

1 deterministic framework.

2 COMMISSIONER McGAFFIGAN: We are moving away from
3 it. Like Commissioner Diaz just said, from the top down, do
4 you suddenly mandate ten to the minus four core damage
5 frequency, ten to the minus five LERF is how we are going to
6 judge whether a plant is safe enough, when you have PRAs
7 that you say are poorly done and couldn't sustain that?

8 MR. AHEARNE: I said two things. First, I tried
9 to stress it's going to take several years to get to the
10 understanding of how to do good risk analysis. It's not
11 easy. It's easy to do it badly. It's not easy to do it
12 well. But if you don't get started, you'll never get there.

13 The second is, as I tried to say also, it is
14 because you are moving towards this different regulatory
15 framework that there may be a better opportunity to try to
16 get greater clarity into adequate protection. It is going
17 to have to be an iterative process.

18 As you know, probably as strong a consensus as we
19 had on anything across the spectrum of the participants was
20 the need to get better clarity into what is adequate
21 protection.

22 COMMISSIONER McGAFFIGAN: The frustration for this
23 Commissioner was that aside from saying you are probably on
24 the right track with the cornerstones and the performance
25 indicators from the cornerstones which everybody agreed on,

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1 there was zero consensus as to how to get that clear,
2 consistent statement.

3 MR. AHEARNE: But as you know, we didn't try to
4 get consensus on how to get to that, because that's an issue
5 that really has to come out of the Commission working with
6 all of these other groups. Realistically, our small effort
7 here pales in comparison to the power and might of the
8 Commission.

9 COMMISSIONER DIAZ: I can't resist saying that I
10 believe state-of-the-art risk analyses are quite adequate to
11 get us to a different level. What is missing is the
12 commitment to get them done and use them.

13 MR. AHEARNE: I agree.

14 COMMISSIONER DIAZ: Now I turn to my colleague,
15 Commissioner Merrifield.

16 COMMISSIONER MERRIFIELD: We engaged in this
17 discussion about adequate protection. As you walk through
18 the difficulties it would take to get there in terms of
19 having external groups and ultimately having Congress make a
20 decision, we have enough difficulty getting Congress to act
21 on things which -- I worked up there, so I guess I can say
22 this -- are relatively noncontroversial, let alone something
23 of this nature, which I would imagine would engender some
24 greater degree of difficulty.

25 I am reminded of an old joke. We had three

1 individuals fall into a very deep hole in the ground. One
2 was a civil engineer, one was a mechanical engineer, and one
3 was an economist. The civil engineer tries to create some
4 ramp so they can climb their way out. The mechanical
5 engineer is thinking about fashioning some sort of staircase
6 with materials in the bottom of the hole. And the economist
7 says, well, imagine if we had a ladder.

8 This discussion almost reminds me of that.
9 Imagine if we could find adequate protection. Given all the
10 inabilities of this Commission and others to come up with
11 that over such a long period of time and all the other
12 hurdles we have to get there, it's a tough battle.

13 MR. AHEARNE: It is a tough battle, but let me
14 point out some years ago, right after Three Mile Island,
15 Dave Okrent, who was on the ACRS at the time, said, it might
16 be really useful if somehow we could achieve a safety goal.
17 It took six years to get the safety goal policy put in
18 place, but it was able to be done. It was a step forward.
19 It's hard to get there. It takes a lot of effort, and it
20 doesn't come quickly.

21 COMMISSIONER DIAZ: Other comments?

22 COMMISSIONER MERRIFIELD: I've got some other
23 questions in another area.

24 COMMISSIONER DIAZ: Let's finish adequate
25 protection and then go forward. Anything else on adequate

1 protection?

2 COMMISSIONER McGAFFIGAN: One of the frustrations
3 for me is there are 13 chapters and lots of recommendations,
4 but this report doesn't prioritize those recommendations.

5 MR. AHEARNE: As you well know, we did that
6 deliberately.

7 COMMISSIONER McGAFFIGAN: Right. Since you didn't
8 prioritize, where do we put this?

9 MR. AHEARNE: I think if you were to run a phrase
10 check through the document, you could probably reach the
11 conclusion that developing a clearer definition of a safety
12 philosophy and adequate protection is integral to a large
13 number of the recommendations.

14 COMMISSIONER DIAZ: We will go to another subject.
15 Commissioner McGaffigan.

16 COMMISSIONER McGAFFIGAN: Maybe I am staying on
17 the same subject. We talked earlier about Monsieur La Coste
18 and the Europeans.

19 MR. AHEARNE: Some Europeans. Not the UK.

20 COMMISSIONER McGAFFIGAN: The UK is unique, but
21 the Germans and the French, say. We talked to ACRS earlier
22 this year about safety goals and core damage frequency goals
23 and LERF goals and that sort of thing. I mentioned to them
24 that I read in Nucleonics Week they had FRAMATOME bemoaning
25 the fact that the Americans had not required of Westinghouse

1 and GE and CE things like corium spreaders and containment
2 liners. Dana Powers, the head of our ACRS, said, well,
3 that's because the Europeans de facto have a LERF goal close
4 to zero, ten to the minus seven or something.

5 Are we ready for a debate? Should our LERF goal
6 be ten to the minus seven, ten to the minus six, ten to the
7 minus five? De facto in Reg Guide 1.174 for small changes
8 -- we don't believe the absolute numbers in these PRAs, but
9 for changes in PRAs we have a delta LERF that is ten to the
10 minus six; we will approve license amendments if they are
11 below ten to the minus six; if they are above that, we are
12 skeptical, although the LERF goal is ten to the minus five
13 as a whole. Just like CDF, we will approve things up to ten
14 to the minus five in a risk-informed license amendment. We
15 won't consider the range in between ten to the minus four
16 and ten to the minus five.

17 Are we really ready? If we have that debate, I
18 could well hear Mr. Lochbaum or others say, well, ten to the
19 minus seven sounds pretty good. If that's the French goal,
20 the German goal, why can't it be the American goal?

21 That would require enormous changes even for the
22 next generation of reactors that we have already approved.
23 We didn't have that in the back of our head. We had the
24 policy statement of 1986 and the PRA policy statement and
25 things are not as constraining, but we have not had a big

1 national debate about how safe is safe enough for nuclear
2 reactors in many years.

3 MR. AHEARNE: All I think you are pointing out is
4 maybe it is time.

5 COMMISSIONER MERRIFIELD: Let me take a little
6 different tack. One of the things you mentioned was the
7 issue of research. I am almost wondering if Ashok Thadani
8 paid you a little bit to say that.

9 MR. AHEARNE: The only person who paid me anything
10 is somebody bought me a cup of coffee.

11 COMMISSIONER MERRIFIELD: I say that facetiously.

12 MR. AHEARNE: I didn't even get paid for my Metro
13 ticket.

14 [Laughter.]

15 COMMISSIONER MERRIFIELD: I'm sure the
16 Commissioners will be glad to chip in for that one.

17 I understand the point that you are making, that
18 we need to have sufficient research as we move forward.

19 MR. AHEARNE: We need to have more research.

20 COMMISSIONER MERRIFIELD: We are in a budget
21 atmosphere right now where Congress is not going to give us
22 any more money. We are faced with an industry from whom we
23 receive our fees that is making a very strong attack against
24 the current amount of dollars that we receive. From the
25 Senate this year, unlike last year, we were able to get our

1 full funding. Last year we had threats, as you know.

2 This year we have not yet gotten the full amount
3 from the House. We received a \$10 million cut from our
4 request.

5 We hope and expect in the end as we come through
6 conference we will receive the amount necessary to do what
7 we need to do to protect public health and safety.

8 Despite the fact that this nation has relatively
9 large budget surpluses, there is significant pressure on all
10 agencies, including ours, to keep down our dollar levels.
11 So to the extent that one were to say we need more money for
12 research, we are to a certain extent in a zero sum game
13 situation here, and that is, if we are to give more money to
14 research, where are we to take that from?

15 The other issue is there are a lot of things that
16 we do research on. We have recently as a Commission gone
17 through the early steps of our FY-2001 budget debate. We
18 looked at a lot of things in that budget debate, including
19 issues associated with research. There are an awful lot of
20 things that our research folks do very, very well. We have
21 excellent research, probably the best in the world. There
22 are other areas where I think the Commission had some
23 questions: Do we need to be focusing on these areas?

24 The report says and you have repeated today that
25 we need to have more money for research. What areas

1 specifically do you believe we need more money for research?
2 Are there areas right now that we are spending money for
3 research that perhaps we don't need to be spending money on
4 research, and where do we get that money?

5 MR. AHEARNE: Let me give you a number of answers.

6 To start with, there are some areas that are
7 obviously outside of your direct control. I thought it was
8 a great mistake when the Congress said, unlike most of the
9 other regulatory agencies, NRC has to be fully funded by its
10 licensees. I think that at least on research the Congress
11 ought to take that as part of the general budget and not
12 charge it to the licensees, because it's really protecting
13 the public, just as EPA.

14 As far as getting more money out of the Congress,
15 you worked in the Congress, and Ed, you worked in the
16 Congress, and I've dealt with the Congress for 25 or 30
17 years. It's very hard to get money out of the Congress.
18 It's very hard to get money through OMB. It can be done,
19 but you have to really believe it's very important.

20 I've got to be careful how I say this, but my
21 sense is that there has been a lack of appreciation at the
22 senior levels of the NRC of the longer term need to maintain
23 a strong research capability.

24 You said what areas should you put money into that
25 you are not and where are you putting money that shouldn't

1 be. I'm not that familiar with the NRC research program
2 other than it has been declining significantly at the same
3 time that the issues that are being faced by the nuclear
4 power plants and therefore by the NRC are changing. That
5 is, aging questions which are so significant for license
6 renewal; the development of the regulations that are going
7 to be on a different basis. All of these are questions
8 which need better understanding underlying them, and that is
9 going to be done through the research programs.

10 I just think you need more money in research.

11 COMMISSIONER McGAFFIGAN: We had a discussion
12 about this at the steering committee meeting. I remember
13 Chairman Ahearne turning to the industry and asking if any
14 of the members supported our research budget, and I think we
15 were greeted by deafening sounds, at which point I piped up
16 and said not only do they not support our research budget,
17 but in NEI's annual comments on our fee rule they question
18 the value of the research program every year. When Tim
19 Martin Associates did its series of viewgraphs that
20 profoundly affected the Congress a year ago, they implied
21 that the ideal NRC research budget should be zero.

22 I don't think there is not appreciation at the top
23 of the NRC for a research fund. You had people like Shirley
24 Jackson, Nils Diaz, and lots of people who come out of the
25 research community. I've looked at defense and DOE research

1 for years. Dana Powers, the head of our ACRS, who is an
2 employee at the Sandia National Laboratory, says that the
3 quality of our small research effort dollar for dollar is
4 much above that of DOE's.

5 MR. AHEARNE: Not necessarily a good standard.

6 COMMISSIONER McGAFFIGAN: He will add the same
7 things even though he is a DOE employee, and I don't want to
8 get him in trouble.

9 I think you hit the nail on the head. I've had
10 this discussion with the ACRS members. So long as the
11 research budget is within the fee base it is going to be
12 squeezed. Everything pushes it to be squeezed.

13 I wish we had had more discussion in this report
14 as we were doing it about potentially putting it in the
15 general fund. The Congress told us to get 100 percent of
16 our fees, and even in the bills that are currently pending
17 that would take some of the fees off the fee base and put
18 them in the general fund, it's a question of is a benefit
19 received by licensees from the program for international,
20 for site decommissioning management, for Agreement State
21 support. It's hard to say our licensees get the benefit.
22 So some of that might be taken off the fee base.

23 We haven't raised the issue in research as a
24 public good. Yet we cannot under those terms say it's a
25 fairness and equity issue because, by God, the industry

1 benefits from our research program. The heart of it really
2 is to get the research budget treated like the DOE budget
3 and the EPA budget, as a general fund appropriation.

4 MR. AHEARNE: Part of the difficulty is the
5 industry has a long record of shooting itself in the foot.
6 As the industry moves so strongly towards a competitive
7 environment, it is becoming like so many other industries,
8 looking at the quarterly report, the quarterly return, the
9 near-term bottom line. As the former professor well knows,
10 research doesn't work on that time schedule. As many
11 industries are now doing, they are shutting down their
12 research labs, because it doesn't show the near-term profit.
13 Research is a long-term profit.

14 COMMISSIONER McGAFFIGAN: When you read the
15 report, there is a tone that we may need more resources in
16 many places, license renewal, license transfer,
17 decommissioning, rule-making to risk-informed regulation
18 itself. Yet we all know that the budget environment we are
19 in at the moment is to cut or to get no inflation or
20 increase, go down every year at the rate of inflation. That
21 environment for the industry, the first five I mentioned are
22 more important than research.

23 The dynamic again, looking ahead the next several
24 years, is in order to do risk-informed regulation, in order
25 to do license renewals and deal with the onset of additional

1 license renewal applications, in order to honorably
2 decommission the plants that are prematurely retiring, in
3 order to do all the other rule-making, unless we can get
4 budgetary increases or we do something, it's going to
5 continue to get squeezed, and Mr. La Coste is going to be
6 right. We may say there is a future, but maybe there isn't.

7 COMMISSIONER DIAZ: Commissioner Merrifield.

8 COMMISSIONER MERRIFIELD: Speaking of
9 decommissioning, that raises one of the final questions I
10 have. Right now we are in the middle of working on
11 SECY-99-168 in which the staff is proposing a schedule for
12 an integrated rule-making on decommissioning. While I think
13 it's desirable to have an integrated set of regulations to
14 govern these facilities, obviously doing this is going to
15 require no small amount of commitment of staff time and
16 financial resources.

17 In light of the fact that we are proceeding down
18 this road, we have at this point, for better or for worse, a
19 lower demand for those regulations than perhaps one might
20 have thought of three years ago. We have far fewer plants
21 that are making the choice to choose early decommissioning.

22 Given the resource load, given the number of
23 plants that are involved, did the group discuss at all
24 perspectives on the priorities that the NRC should be giving
25 to that part of the process?

1 MR. AHEARNE: No.

2 COMMISSIONER MERRIFIELD: Do you have any
3 individual thoughts in that regard?

4 MR. AHEARNE: I think the one thing that the group
5 did raise several times is the need for the NRC to try to do
6 some of what you just said. That is, look ahead and try to
7 understand what might be coming in and make sure that you
8 are positioned to handle that as effectively as possible.
9 That would need probably reallocation of where your effort
10 is put.

11 COMMISSIONER DIAZ: Let me just say personally
12 that I agree with many of the directions. One thing that I
13 gather from today's discussion, and maybe that explains why
14 you didn't establish priorities, is that this is really more
15 of a holistic look and trying to emphasize those areas, and
16 that we need to take those into consideration.

17 I appreciate your comments on research because
18 sometimes we do forget that the basis for the technical
19 decisions that will need to be made need to be well
20 grounded.

21 On behalf of the Commission, I would like to thank
22 you for your presentation today. I know that your office is
23 in North Carolina, which was kind of wet last week, and you
24 probably did not have the peace of mind you normally require
25 to prepare. We appreciate that very much. Your insights

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1 are appreciated very deeply. We know that you put a lot of
2 effort into coming here and getting it to us.

3 Periodic introspective reviews of everyone's
4 programs, policies and procedures are necessary for the
5 continuous improvement of any organization. External
6 reviews, too, are very helpful when they bring a different
7 perspective, and the effort undertaken by the CSIS is such
8 an example.

9 We recognize that the report was frozen at the end
10 of January and that we have taken many actions that are
11 already being recommended, and I think you have seen that
12 the Commission takes all of these things very seriously. We
13 will continue to follow up on these activities.

14 As with any study of this nature, there are bound
15 to be different views, and of course you have seen many of
16 those, over the conclusions reached for any of the various
17 issues investigated, and this study is no different, given
18 the different perspective of the participants and the
19 different composition of the Commission.

20 Public interest organizations have taken issue
21 with certain conclusions and recommendations, and certainly,
22 as you have heard today, so has the NRC. However, the value
23 of studies such as the CSIS study is not measured by the
24 number of areas in which there is agreement or disagreement
25 but rather by the degree to which it stimulates ideas for

1 improvement and contributes to the overall motivations of
2 all parties to do better, to listen better, to understand
3 one another better. Under your leadership, Dr. Ahearne, I
4 believe the CSIS report does just that, and we appreciate
5 the hard work by all of those who contributed to the success
6 of this effort, including Commissioner McGaffigan.

7 Again, I thank you for coming today.

8 Do my fellow Commissioners have anything to add?

9 COMMISSIONER McGAFFIGAN: No. I think you just
10 got a sense today of the vigorous debate that occurred in
11 some of the steering group meetings.

12 COMMISSIONER MERRIFIELD: It's very helpful and I
13 think coming here and having this opportunity to go through
14 the report in this kind of atmosphere will really enhance
15 our ability to understand where the project was coming from
16 and perhaps use it to an even greater extent.

17 COMMISSIONER DIAZ: Very good. If we don't have
18 any additional comments, we are adjourned. Thank you.

19 [Whereupon at 10:30 a.m., the meeting was
20 concluded.]

CERTIFICATE

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

TITLE OF MEETING: MEETING ON CENTER FOR STRATEGIC AND
INTERNATIONAL STUDIES REPORT "The
Regulatory Process for Nuclear
Reactors-a Review"
PUBLIC MEETING

PLACE OF MEETING: Rockville, Maryland

DATE OF MEETING: Wednesday, September 22, 1999

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

Transcriber: Mike Paulus

Reporter: Mike Paulus

The Regulatory Process for Nuclear Power Reactors

A Review

A Report of the CSIS Nuclear Regulatory
Process Review Steering Committee

Project Chair

John F. Ahearne

Congressional Cochairs

Senator Pete V. Domenici
Senator Bob Graham
Representative Joe Knollenberg
Representative John M. Spratt Jr.

Project Director

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James Howard
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Dale Klein
David Lochbaum
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Paul Portney
John Rowland
Steven Specker
James Sullivan

AUGUST 1999



Executive Summary

In 1999, 103 operating nuclear power plants generate approximately 20 percent of the total U.S. electricity supply. As the electric utility industry moves toward deregulation and restructuring, it is becoming more important to keep operating costs low enough to be competitive with other forms of generation, and utilities are exploring all possibilities for cost reduction. External regulation, including that by the U.S. Nuclear Regulatory Commission (NRC), is one area that can have a significant impact on the operating costs of a nuclear plant.

This report examines NRC operational practices and regulation of nuclear plants specifically in areas related to reactor and plant operation. It focuses on 13 issues that are considered to be significant and have in the past proved to be central to the interactions among NRC, industry, and the public. Each issue is examined individually and, where appropriate, recommendations are made for improvements or changes. The premise of these suggestions is that it is the NRC's responsibility to assure the protection of the health and safety of the public.

The issues were categorized into three groups: implementation, emerging issues, and process. Because all issues were considered important individually, no attempt was made to assign priority. Considerable interdependence exists among specific issues with similar objectives, resulting in groupings that take on increased importance.

- Inspection, assessment, and enforcement are the direct links between the NRC and operating nuclear plants and will have enormous impact on the economic and operational performance of a plant in the eyes of stakeholders and investment communities. This report points out that the NRC is moving toward a more efficient and effective way of conducting these responsibilities and is working closely with its stakeholders to establish equitable procedures while it protects the health and safety of the public. The report strongly recommends that maximum effort and attention be directed toward these issues.
- License transfer, license renewal, and decommissioning are emerging issues critical to the competitive position of utilities, particularly in the restructured business environment that all utilities face. The NRC is in the early stages of developing procedures for each action. This report suggests it will be necessary for the NRC to take corrective actions in its operating procedures and modifications to enabling legislation to be ready for increased activity in each of these areas. Although some actions are not direct NRC responsibility—other state and federal agencies, as well as the public, will need to be involved—the report points out the need for the utilities and the NRC to prepare for these actions and communicate with all stakeholders as the procedures evolve.
- Safety philosophy and the need for the NRC to establish clear, concise definitions of adequate safety to be consistently applied to all nuclear power plants and all

NRC regulatory actions is of enormous importance. The move to risk-informed regulations and the change in the NRC culture will be based on the ability of the NRC to establish policies based on defining and articulating adequate protection and on creating a clear, consistent, and well-understood statement of safety philosophy.

The NRC has made many changes recently and has begun steps to address many of the issues raised by critics. This report concludes, however, that the changes under way should be accelerated.

Project participants sought to develop conclusions and recommendations that represented a consensus of all the participants. There were however, several areas where individual members, particularly those representing public interest groups, held alternate views regarding the specific actions the NRC should undertake. These views are included in the main body of this report in the appropriate sections.

It has been apparent that the NRC is engaged in a number of internal efforts to improve and streamline its operations and regulatory activities. As a result, many of the recommendations and conclusions made here were arrived at independently by the NRC and are already under consideration or in place. Although NRC personnel participated in the preparation of this report, it was not possible to be current with improvements made as a result of new programs instituted by the commission. It was necessary to freeze input at the end of January 1999 and make our assessments as of that time.

Implementation

Safety Philosophy

Safety philosophy constitutes and defines the basis for the NRC to promulgate, administer, inspect, assess performance, and enforce compliance with its regulations, which then results in adequate protection of public health and safety. The safety philosophy also provides the basis for licensees to design, construct, operate, and maintain nuclear power plants. Because no human activity is absolutely safe, it is important and entirely appropriate to establish a clear, consistent, and well-understood statement of safety philosophy and the meaning of adequate protection.

This has proved extraordinarily difficult for 40 years in the traditional regulatory framework because that framework is based on deterministic engineering judgment coupled with defense in depth. Building risk insights into the regulatory framework is important because in current practice there is a legal presumption that substantial compliance with the deterministically based regulations provides adequate protection of public health and safety. However, using risk insights in formulating risk-informed regulations ensures that the body of regulations reflects a safety focus. Without a definition of adequate protection, there is continued controversy among stakeholders.

The NRC is examining how risk insights might be further used within the regulatory process to remove unnecessary burden. Recent discussions among the NRC, the industry, and other stakeholders regarding the assessment process did result in substan-

tive discussion of partial descriptors of adequate protection. The NRC introduced the concept of seven cornerstones as a basis for defining scope in the new oversight model.

It is agreed that the NRC build its safety philosophy by defining objective thresholds for the seven cornerstones. The NRC should continue to pursue and complete on a priority basis its proposed program to move to risk-informed regulations in parallel with the development of a clearly defined safety philosophy that can be consistently applied to all nuclear plants, and eliminate situations where there are inconsistencies between the regulations and the safety they are intended to ensure.

Assessment Process

The results of the NRC's assessment process have substantial influence on the perceptions of key stakeholders as to the financial and technical status of the operating facility. Given the practice of making these assessments publicly available, it is important that NRC assessments meet the highest standards of accuracy and objectivity and provide clear, consistent, safety-focused, objective, and meaningful appraisals of plants' safety performances. The NRC is exploring improvements to its inspection, assessment, and enforcement programs.

The NRC and the Nuclear Energy Institute (NEI) have jointly proposed a plant-assessment model that features three tiers of performance expectations that relate to public health and safety. The model is focused on safety and makes use of risk insights, objective performance indicators, graded inspection findings, and regulatory action thresholds.

The NRC is evaluating this approach along with the seven cornerstones as a possible replacement for the systematic assessment of license performance (SALP) process that, until recently, was the primary vehicle for all NRC assessments. The NRC, industry, and appropriate other stakeholders should expeditiously conclude the development of this model and subject it to a pilot program. The NRC should communicate the assessment results to its stakeholders via the Internet and public meetings.

Inspection Process

Is the NRC inspecting the proper areas from a safety perspective and are the inspection findings evaluated in the proper context? The NRC is responsible for establishing a clear and comprehensive definition of adequate protection of public health and safety; it must have an inspection program in place that provides for effective oversight of licensee activity to assure that its mandate is achieved. Inadequate or misfocused inspection may result in the NRC failing to detect activity or trends that compromise adequate protection. Excessive or misguided inspection may result in distraction of resources from safety issues, which, in turn, can lead to degraded safety performance and is certainly wasteful of both public and licensee resources.

Foremost among criticisms by stakeholders is that some inspections do not maintain a sharp safety focus but deal with administrative details not directly related to safety. The NRC is also criticized for using the inspection process as a mechanism for imposing new requirements and overwhelming a licensee's resources and creating a

distraction to safe operation. An effective inspection program must be developed in concert with other changes now under way in the regulatory process.

The NRC is working with the industry and other stakeholders on an improved inspection process. It consists of two elements: independent verification and risk-informed audits. Risk-informed core inspections offer several advantages over current practice. NRC revisions should, whenever possible, provide objective acceptance criteria that account for the risk-informed basis underlying the inspection. An objective acceptance criterion, which accounts for the risk-informed basis underlying the inspection, will be necessary. The new processes also should be used to identify regulations that need to be amended. The NRC should periodically solicit feedback on the inspection process from its external stakeholders to determine if the substantive changes being implemented have met stated objectives.

Enforcement Process

How is the NRC's safety philosophy embodied within its enforcement program for nuclear power plants? Is the NRC enforcement action directly related to the safety significance of a violation based upon objective criteria? Does the NRC's enforcement program provide clear, consistent, and meaningful response to plants' safety performance problems? Notwithstanding unique plant design and the appropriate consideration of specific details of each violation, it is important that the enforcement program be as predictable and as consistent as possible. Sanctions imposed at a higher severity level than warranted by the safety implications of the problem carry both tangible and intangible adverse consequences. Artificially lowered sanctions can mask the safety significance of a violation. The issue is also important because misapplied enforcement action diverts licensee and NRC resources from potentially more significant activities.

Enforcement action should be taken only for clear violations of a law, a regulation, the license, or the technical specifications. Enforcement should not be based on subjective criteria such as regulatory significance, regulatory concern, changing staff interpretations, or expanding views of compliance.

In designing the new enforcement process, the commission should address the criticisms that have been levied against the current process and should periodically solicit feedback from its external stakeholders to determine if changes have met stated objectives. The NRC should continue its policy of open predecisional enforcement conferences and should post all plant enforcement actions on its Web site.

Emerging Issues

Decommissioning

Competitive and restructuring forces are bringing a new focus to decommissioning issues. Some plants have been shut down before their operating licenses have expired; the same competitive forces will cause others to extend the licensed life. Some utilities may sell their plants and others may face bankruptcy in the competitive and restruc-

ture market. These factors will challenge the integrity of decommissioning plans established in a regulated cost of service market.

Experience with early decommissioning efforts provides opportunities for improved efficiency in the regulatory process that involves decommissioning. A risk-informed approach may be most beneficial here because a body of regulations pertaining to decommissioning does not exist and there is not a legacy of deterministic regulations.

The report recommends action by the NRC, Congress, and federal agencies other than the NRC, but the NRC has a vested interest in all the recommendations. Issues involve the accrual and maintenance of decommissioning funds, tax considerations, a more efficient use of resources by the NRC in the decommissioning process, and dual regulation by NRC and the Environmental Protection Agency (EPA). Finally, the report recommends that the NRC facilitate public involvement to be certain that there is confidence that the plant and all the radiated materials will be disposed of in a safe manner. The public interest groups felt that, in order to protect the workers and the public properly, decommissioning must be carried out under regulations in 10 CFR 72, which pertain primarily to the on-site storage of spent fuel.

License Transfer

Section 184 of the Atomic Energy Act of 1954 requires that no license for any nuclear facility may be transferred without the review and consent of the NRC. The NRC has considerable experience in license transfer activities and has handled about 50 transfers efficiently. Restructuring of the utility industry in the wake of deregulation is resulting in increased demand for consideration of license transfer requests; in all cases, the parties to the transaction need to seek a timely resolution of the license transfer request. The license transfer considerations should be focused on issues relating to the NRC's mandates under the Atomic Energy Act.

The report recommends that the NRC be sufficiently flexible to transfer licenses expeditiously between parties whose qualifications are well known to the NRC, and allow expeditious review of transfers that do not involve control or substantial ownership. At the time of this report the NRC was already involved in taking many of these actions and the report recommends that this effort be continued with periodic and frequent reviews with all stakeholders.

The report recommends that the NRC establish ground rules and procedures for dealing with the question of ownership and disposition of low-level waste and spent fuel; develop policy options with respect to foreign ownership domination or control; and develop a road map to provide guidance about which other federal agencies are required reviewers and at what stage and to what extent they will be involved.

License Renewal

Under the Atomic Energy Act and NRC regulations, the NRC issues 40-year licenses and approves 20-year renewals to commercial nuclear power plants operating in the United States. Although the first two license renewal applications submitted in 1998 are moving forward, the current process may still be unnecessarily complex and resource intensive, may not be able to establish sufficient confidence in a predictable

and efficient path for follow-on applications, and may not be able to accommodate the overall large number of applicants anticipated to apply for renewal in the next 5–10 years.

Confidence in the license renewal process—whether it will be fair, predictable, and efficient—is essential for justifying the cost and risks associated with license renewal as contrasted with pursuing nonnuclear options for future generation. The scope, process, and acceptance standards for license renewal are still in a state of flux, and they need to be resolved expeditiously to facilitate future applications and to enable the creation of an efficient and predictable renewal process.

The current approach provides no milestones for resolving issues, leaves open the possibility that issues will be reopened, and adds to the uncertainty of future reviews. Both NRC and industry agree that the license renewal process can and must be streamlined and NRC has done a commendable job in many areas.

The license renewal review scope is not risk informed. Although progress is being made to meet the commission's objectives of a fair, effective, and efficient process, much is needed on a timely basis to achieve these objectives fully and to achieve a high percentage of nuclear plant license renewals. Note that the necessary improvements are not just for the NRC; industry bears significant responsibility, especially in the area of standardizing processes.

The process must be seen by all as fair, effective, and efficient. NRC should establish a firm schedule and formal process for resolving all open generic issues for license renewal. Once resolved, NRC must commit to a very high threshold (e.g., significant new safety information) to permit issues to be reopened for future applicants. NRC and industry should actively pursue means to simplify and standardize the process, both for industry submittals and for NRC reviews. The public interest groups contend that the present license renewal process prohibits meaningful public participation and the NRC should revise this procedure to permit public input.

Risk-Informed Regulation

The move toward risk-informed regulation is a significant transition taking place at the NRC and has the support of the commission and senior NRC staff as a high-priority activity. A risk-informed approach may better focus licensee and regulatory attention on design and operational issues commensurate with their importance to public health and safety. This may also result in a reduction in unneeded expenditure of resources on matters that are not safety significant. The challenge is to accomplish this transition while maintaining the basic objectives of adequate protection of the health and safety of the public.

The report examines how risk-informed regulations may benefit all stakeholders, recommends that the changes be introduced in a carefully controlled way with pilot applications, and notes that acceptance of this change by licensees will be on a voluntary basis. Although risk-analysis tools are valuable for understanding relative importance of issues, there are limitations in those tools and, thus, research and analysis must continue so that NRC can adequately understand the risk effects from aging of components and structures as well as the impact of technology advances and human performance.

The report suggests that, as a first priority, definitions must be established for key reference terms such as "safety-related" and "important to safety." Finally, all improvements necessary to move to a risk-informed approach will not come to pass unless there is a significant effort to upgrade the capability of both the NRC staff and the licensee staff to do probabilistic risk assessments (PRAs). Because many PRAs are poorly done, it will take several years to bring the staffs to the necessary level. The public must remain confident in the NRC's ability to move to this and still protect health and safety. The public interest groups disagreed with the conclusions reached by the steering committee and felt that the NRC should establish minimum standards for PRAs and conduct audits to be sure these standards are met.

NRC Processes

License Amendment Process

Maintaining and updating the elements of an operating license are necessary and ongoing functions of plant management that consume a significant amount of licensee and NRC resources. An ineffective licensing amendment process affects the ability of the licensee to make the changes necessary to operate the plant in a safe, productive, and cost-effective manner.

Regulatory requirements state that any applications must be submitted and approved before detailed changes can be made to the license. Some changes can be made without prior NRC approval and the NRC is moving to expand the changes within licensee control. Some past license amendments have taken considerable time and a large volume of correspondence to win approval. The NRC, over the past year, has made progress in some of the most important license amendment areas. NRC has done a good job on several complex power uprate license amendments. NRC has undertaken initiatives to gain efficiencies more broadly in its license amendment process. A number of NRC initiatives now under way may result in increased demand for license amendments, heightening the need for greater efficiency in this area.

The report notes that there is considerable room for improvement on the part of both licensees and the NRC. It is important to maintain dialogue between the NRC and industry to identify lessons learned and to streamline the license process. Recommendations are made to improve clarity of communications, management accountability, considerations of the introduction of new technology and address the amount of detail embodied in licenses and technical specifications.

Hearing Process

The Atomic Energy Act of 1954 provides an opportunity for a hearing to any person whose interest may be affected by commission proceedings on the granting, suspending, revoking, or amending a reactor license. The central question is whether there is a broad requirement demanding adjudicatory hearings and whether it is efficient or in the interest of the regulatory process to select adjudicatory hearings preferentially. All hearings attract criticism from various stakeholders and continue to insert substantial uncertainty, particularly with respect to timeliness. Issues include hearings' protracted

nature, the apparent inability to limit broad and nonspecific issues, and the tendency to permit unnecessary or protracted discovery. It is important that the hearing process be modified to provide the efficiency now demanded.

Although the NRC has used less formal hearings in some contexts, it has for the most part continued to use the adjudicatory hearing as the principal format for reactor actions other than reactor license transfer matters. The commission should fully embrace the notion that the Congress intends for the NRC to have extraordinary control over the duration, subject matter, and nature of the hearings that they consider appropriate to meet their mandate unless Congress itself chooses to be specific. With this principle in mind, the NRC should ensure that hearings are conducted only when necessary, but, when they occur, they should be efficiently run with decisions announced expeditiously and in a clear and succinct manner.

The commission should make legislative-type hearings the norm except those required for enforcement issues or where otherwise demanded by law or special circumstances. The public must perceive a transparent and open process; and there must be a proper context for public participation in important issues that affect the public, especially when issues are novel. It is inappropriate to either shut out the public or resort to the courts to hear issues ignored in the regulatory process. The public interest group representatives on the project steering committee maintained that the public cannot meaningfully participate in the regulatory process without the availability of formal hearings with rights of discovery and cross-examination.

Petitions under 10 CFR 2.206

Public groups believe that the 10 CFR 2.206 process does not afford members of the public a viable means for affecting NRC actions against a licensee. NRC's regulations and procedures under Section 2.206 are more expansive than is necessary to satisfy statutory requirements under the Atomic Energy Act. The opportunities afforded by the 2.206 process, although not required, are viewed as important adjuncts to the opportunities for public participation provided by statute.

To help prevent the impression to petitioners that the NRC is summarily dismissing their petitions without giving serious thought to the issues raised by them, NRC director's decisions should adopt a style that is more technical and less legalistic in nature. In the case of petitions that are vague or do not provide supporting data, NRC should formally contact the petitioner to clarify ambiguous issues. If new issues or information is identified, NRC should formally notify the licensee to enable it to supply NRC with any relevant information. NRC should assure that no internal organizations inhibit or otherwise place unwarranted obstacles in the path of public petitioners who use the 2.206 process.

Rule-Making Process

Many of the proposals for changes in the way the NRC regulates the industry can be accomplished administratively by NRC management. The nuclear electric power industry is undergoing rapid change in practices, technology, and risk assessment. The industry must make decisions on the sale or retention of facilities, extension of operating licenses, and closing and decommissioning plants.

Although significant reductions in the time required to publish a rule in final form have been achieved, further reductions should be a continuing goal within the requirements of legislation governing NRC rule making and with due regard to the complexity and controversial nature of the subject matter. Failure to amend existing regulations or adopt new ones to reflect current technology and new economic forces disservices the regulators' obligations, the interest of the regulated industry, and the broader public interest. The commission should maintain the capability to make independent technical conclusions to support the rule changes it proposes.

This report recommends that NRC interact with both the public and the industry before it issues a proposed rule: get input for the content of the proposed rule; strive for simple, as opposed to complicated, rules; issue draft implementing guidance for comment at the same time as issuing the proposed rule; improve discipline in the internal management of comment periods; and meet with stakeholders to reach resolutions of comments on proposed rules.

Backfit Rule

The backfit rule—intended to restrict the types of changes that the NRC may impose on a licensee's facility, procedures, and organization to those that meet defined criteria—states that, except in cases involving compliance with existing regulations or adequate protection of public health and safety, NRC may not impose backfits unless it first performs a backfit analysis demonstrating that the backfit would result in a substantial increase in safety, and that the costs of the backfit are justified in view of the increase in safety.

Although the concept is admirable, in practice the rule frequently has not achieved its purpose. Industry believes three major problems have arisen: the misuse of the compliance exception in the rule; imposition of informal backfits through the inspection, enforcement, and assessment process; and inappropriate consideration of averted on-site costs.

The industry believes that one mechanism for voiding the intent of the backfit rule is the improper invocation of the compliance exception of the rule; a second mechanism occurs during inspection, enforcement, and assessment through frequent informal imposition of backfits by NRC personnel; and a third is that backfit rule provisions are sometimes misused through improper application of averted on-site costs as a reduction in the cost figures that enter into the determination of the value of a new requirement. Licensees contend that averted on-site costs are a matter of economic concern to the licensee only; the NRC has argued that consideration of averted costs is necessary to assure balanced analysis of costs and benefits and that public health and safety are affected.

The primary mechanism to improve the current situation will be the continuation of the regulatory reform process recently begun. Changes in the NRC's assessment and enforcement processes to make them more objective and risk informed may eliminate many informal backfits. Nevertheless, in the transition period, the NRC should restrict use of the compliance exception to significant safety issues requiring short-term resolution. Finally, the NRC should review its guidance on averted on-site costs and carefully consider the arguments of the industry against the NRC's practice of

considering such costs.^{*} The public interest groups disagreed with the conclusion reached by the committee. They felt that there was not enough data to show widespread abuses of the backfit rule and therefore it should not be altered.

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In addition to the analysis provided by the working groups, there was recognition of other factors that, because of their nature, would have an impact on many or all of the issues described. Many of these are discussed in the chapter Crosscutting Issues, beginning on page 4. Because of the broad scope of NRC activities, it was necessary to limit the field of interest to those areas having to do directly with nuclear electric power generation. This does not minimize the importance of such issues as high-level and low-level waste disposal, transportation of nuclear materials, isotope applications, dry cask storage, and other activities that come under the responsibility of the NRC. Because of the time available to produce this report, it was decided to concentrate on the most immediate concerns of the electric power industry.

Conclusions

An important conclusion reached by this study was that the NRC decisions and processes will continue to have a significant impact on the cost of operations for the nuclear power industry, and, therefore, NRC must continue to update and improve its operational procedures to keep up with the changing times. Although the report suggests changes and improvements to 13 important issues, a more fundamental change must occur in operational procedures and the way in which the NRC discharges its responsibility. Risk-informed regulation must be accepted and utilized by all levels of the NRC organization. Clear, concise definitions of adequate protection must be developed and understood by the industry, NRC, and the public. The how-safe-is-safe-enough argument should no longer distract or dominate the regulatory dialog.

Industry and the NRC should strive to work more closely in a more informal and constructive atmosphere and conduct open dialogue with the public to arrive at regulatory procedures that allow the NRC to discharge its mandate effectively without imposing undue economic penalties on the industry.

Adoption of the recommendations presented in this report, with input from participating members of the nuclear community, can produce positive results that can lead to better relations among NRC, the public, and industry, and, ultimately, will benefit the rate payers and the U.S. economy.

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The Regulatory Process for Nuclear Power Reactors

A Review

A Report of the CSIS Nuclear Regulatory
Process Review Steering Committee

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John F. Ahearne

Congressional Cochairs

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AUGUST 1999



Executive Summary

In 1999, 103 operating nuclear power plants generate approximately 20 percent of the total U.S. electricity supply. As the electric utility industry moves toward deregulation and restructuring, it is becoming more important to keep operating costs low enough to be competitive with other forms of generation, and utilities are exploring all possibilities for cost reduction. External regulation, including that by the U.S. Nuclear Regulatory Commission (NRC), is one area that can have a significant impact on the operating costs of a nuclear plant.

This report examines NRC operational practices and regulation of nuclear plants specifically in areas related to reactor and plant operation. It focuses on 13 issues that are considered to be significant and have in the past proved to be central to the interactions among NRC, industry, and the public. Each issue is examined individually and, where appropriate, recommendations are made for improvements or changes. The premise of these suggestions is that it is the NRC's responsibility to assure the protection of the health and safety of the public.

The issues were categorized into three groups: implementation, emerging issues, and process. Because all issues were considered important individually, no attempt was made to assign priority. Considerable interdependence exists among specific issues with similar objectives, resulting in groupings that take on increased importance.

- Inspection, assessment, and enforcement are the direct links between the NRC and operating nuclear plants and will have enormous impact on the economic and operational performance of a plant in the eyes of stakeholders and investment communities. This report points out that the NRC is moving toward a more efficient and effective way of conducting these responsibilities and is working closely with its stakeholders to establish equitable procedures while it protects the health and safety of the public. The report strongly recommends that maximum effort and attention be directed toward these issues.
- License transfer, license renewal, and decommissioning are emerging issues critical to the competitive position of utilities, particularly in the restructured business environment that all utilities face. The NRC is in the early stages of developing procedures for each action. This report suggests it will be necessary for the NRC to take corrective actions in its operating procedures and modifications to enabling legislation to be ready for increased activity in each of these areas. Although some actions are not direct NRC responsibility—other state and federal agencies, as well as the public, will need to be involved—the report points out the need for the utilities and the NRC to prepare for these actions and communicate with all stakeholders as the procedures evolve.
- Safety philosophy and the need for the NRC to establish clear, concise definitions of adequate safety to be consistently applied to all nuclear power plants and all

NRC regulatory actions is of enormous importance. The move to risk-informed regulations and the change in the NRC culture will be based on the ability of the NRC to establish policies based on defining and articulating adequate protection and on creating a clear, consistent, and well-understood statement of safety philosophy.

The NRC has made many changes recently and has begun steps to address many of the issues raised by critics. This report concludes, however, that the changes under way should be accelerated.

Project participants sought to develop conclusions and recommendations that represented a consensus of all the participants. There were however, several areas where individual members, particularly those representing public interest groups, held alternate views regarding the specific actions the NRC should undertake. These views are included in the main body of this report in the appropriate sections.

It has been apparent that the NRC is engaged in a number of internal efforts to improve and streamline its operations and regulatory activities. As a result, many of the recommendations and conclusions made here were arrived at independently by the NRC and are already under consideration or in place. Although NRC personnel participated in the preparation of this report, it was not possible to be current with improvements made as a result of new programs instituted by the commission. It was necessary to freeze input at the end of January 1999 and make our assessments as of that time.

Implementation

Safety Philosophy

Safety philosophy constitutes and defines the basis for the NRC to promulgate, administer, inspect, assess performance, and enforce compliance with its regulations, which then results in adequate protection of public health and safety. The safety philosophy also provides the basis for licensees to design, construct, operate, and maintain nuclear power plants. Because no human activity is absolutely safe, it is important and entirely appropriate to establish a clear, consistent, and well-understood statement of safety philosophy and the meaning of adequate protection.

This has proved extraordinarily difficult for 40 years in the traditional regulatory framework because that framework is based on deterministic engineering judgment coupled with defense in depth. Building risk insights into the regulatory framework is important because in current practice there is a legal presumption that substantial compliance with the deterministically based regulations provides adequate protection of public health and safety. However, using risk insights in formulating risk-informed regulations ensures that the body of regulations reflects a safety focus. Without a definition of adequate protection, there is continued controversy among stakeholders.

The NRC is examining how risk insights might be further used within the regulatory process to remove unnecessary burden. Recent discussions among the NRC, the industry, and other stakeholders regarding the assessment process did result in substan-

tive discussion of partial descriptors of adequate protection. The NRC introduced the concept of seven cornerstones as a basis for defining scope in the new oversight model.

It is agreed that the NRC build its safety philosophy by defining objective thresholds for the seven cornerstones. The NRC should continue to pursue and complete on a priority basis its proposed program to move to risk-informed regulations in parallel with the development of a clearly defined safety philosophy that can be consistently applied to all nuclear plants, and eliminate situations where there are inconsistencies between the regulations and the safety they are intended to ensure.

Assessment Process

The results of the NRC's assessment process have substantial influence on the perceptions of key stakeholders as to the financial and technical status of the operating facility. Given the practice of making these assessments publicly available, it is important that NRC assessments meet the highest standards of accuracy and objectivity and provide clear, consistent, safety-focused, objective, and meaningful appraisals of plants' safety performances. The NRC is exploring improvements to its inspection, assessment, and enforcement programs.

The NRC and the Nuclear Energy Institute (NEI) have jointly proposed a plant-assessment model that features three tiers of performance expectations that relate to public health and safety. The model is focused on safety and makes use of risk insights, objective performance indicators, graded inspection findings, and regulatory action thresholds.

The NRC is evaluating this approach along with the seven cornerstones as a possible replacement for the systematic assessment of license performance (SALP) process that, until recently, was the primary vehicle for all NRC assessments. The NRC, industry, and appropriate other stakeholders should expeditiously conclude the development of this model and subject it to a pilot program. The NRC should communicate the assessment results to its stakeholders via the Internet and public meetings.

Inspection Process

Is the NRC inspecting the proper areas from a safety perspective and are the inspection findings evaluated in the proper context? The NRC is responsible for establishing a clear and comprehensive definition of adequate protection of public health and safety; it must have an inspection program in place that provides for effective oversight of licensee activity to assure that its mandate is achieved. Inadequate or misfocused inspection may result in the NRC failing to detect activity or trends that compromise adequate protection. Excessive or misguided inspection may result in distraction of resources from safety issues, which, in turn, can lead to degraded safety performance and is certainly wasteful of both public and licensee resources.

Foremost among criticisms by stakeholders is that some inspections do not maintain a sharp safety focus but deal with administrative details not directly related to safety. The NRC is also criticized for using the inspection process as a mechanism for imposing new requirements and overwhelming a licensee's resources and creating a

distraction to safe operation. An effective inspection program must be developed in concert with other changes now under way in the regulatory process.

The NRC is working with the industry and other stakeholders on an improved inspection process. It consists of two elements: independent verification and risk-informed audits. Risk-informed core inspections offer several advantages over current practice. NRC revisions should, whenever possible, provide objective acceptance criteria that account for the risk-informed basis underlying the inspection. An objective acceptance criterion, which accounts for the risk-informed basis underlying the inspection, will be necessary. The new processes also should be used to identify regulations that need to be amended. The NRC should periodically solicit feedback on the inspection process from its external stakeholders to determine if the substantive changes being implemented have met stated objectives.

Enforcement Process

How is the NRC's safety philosophy embodied within its enforcement program for nuclear power plants? Is the NRC enforcement action directly related to the safety significance of a violation based upon objective criteria? Does the NRC's enforcement program provide clear, consistent, and meaningful response to plants' safety performance problems? Notwithstanding unique plant design and the appropriate consideration of specific details of each violation, it is important that the enforcement program be as predictable and as consistent as possible. Sanctions imposed at a higher severity level than warranted by the safety implications of the problem carry both tangible and intangible adverse consequences. Artificially lowered sanctions can mask the safety significance of a violation. The issue is also important because misapplied enforcement action diverts licensee and NRC resources from potentially more significant activities.

Enforcement action should be taken **only** for clear violations of a law, a regulation, the license, or the technical specifications. Enforcement should not be based on subjective criteria such as regulatory significance, regulatory concern, changing staff interpretations, or expanding views of compliance.

In designing the new enforcement process, the commission should address the criticisms that have been levied against the current process and should periodically solicit feedback from its external stakeholders to determine if changes have met stated objectives. The NRC should continue its policy of open predecisional enforcement conferences and should post all plant enforcement actions on its Web site.

Emerging Issues

Decommissioning

Competitive and restructuring forces are bringing a new focus to decommissioning issues. Some plants have been shut down before their operating licenses have expired; the same competitive forces will cause others to extend the licensed life. Some utilities may sell their plants and others may face bankruptcy in the competitive and struc-

ture market. These factors will challenge the integrity of decommissioning plans established in a regulated cost of service market.

Experience with early decommissioning efforts provides opportunities for improved efficiency in the regulatory process that involves decommissioning. A risk-informed approach may be most beneficial here because a body of regulations pertaining to decommissioning does not exist and there is not a legacy of deterministic regulations.

The report recommends action by the NRC, Congress, and federal agencies other than the NRC, but the NRC has a vested interest in all the recommendations. Issues involve the accrual and maintenance of decommissioning funds, tax considerations, a more efficient use of resources by the NRC in the decommissioning process, and dual regulation by NRC and the Environmental Protection Agency (EPA). Finally, the report recommends that the NRC facilitate public involvement to be certain that there is confidence that the plant and all the radiated materials will be disposed of in a safe manner. The public interest groups felt that, in order to protect the workers and the public properly, decommissioning must be carried out under regulations in 10 CFR 72, which pertain primarily to the on-site storage of spent fuel.

License Transfer

Section 184 of the Atomic Energy Act of 1954 requires that no license for any nuclear facility may be transferred without the review and consent of the NRC. The NRC has considerable experience in license transfer activities and has handled about 50 transfers efficiently. Restructuring of the utility industry in the wake of deregulation is resulting in increased demand for consideration of license transfer requests; in all cases, the parties to the transaction need to seek a timely resolution of the license transfer request. The license transfer considerations should be focused on issues relating to the NRC's mandates under the Atomic Energy Act.

The report recommends that the NRC be sufficiently flexible to transfer licenses expeditiously between parties whose qualifications are well known to the NRC, and allow expeditious review of transfers that do not involve control or substantial ownership. At the time of this report the NRC was already involved in taking many of these actions and the report recommends that this effort be continued with periodic and frequent reviews with all stakeholders.

The report recommends that the NRC establish ground rules and procedures for dealing with the question of ownership and disposition of low-level waste and spent fuel; develop policy options with respect to foreign ownership domination or control; and develop a road map to provide guidance about which other federal agencies are required reviewers and at what stage and to what extent they will be involved.

License Renewal

Under the Atomic Energy Act and NRC regulations, the NRC issues 40-year licenses and approves 20-year renewals to commercial nuclear power plants operating in the United States. Although the first two license renewal applications submitted in 1998 are moving forward, the current process may still be unnecessarily complex and resource intensive, may not be able to establish sufficient confidence in a predictable

and efficient path for follow-on applications, and may not be able to accommodate the overall large number of applicants anticipated to apply for renewal in the next 5–10 years.

Confidence in the license renewal process—whether it will be fair, predictable, and efficient—is essential for justifying the cost and risks associated with license renewal as contrasted with pursuing nonnuclear options for future generation. The scope, process, and acceptance standards for license renewal are still in a state of flux, and they need to be resolved expeditiously to facilitate future applications and to enable the creation of an efficient and predictable renewal process.

The current approach provides no milestones for resolving issues, leaves open the possibility that issues will be reopened, and adds to the uncertainty of future reviews. Both NRC and industry agree that the license renewal process can and must be streamlined and NRC has done a commendable job in many areas.

The license renewal review scope is not risk informed. Although progress is being made to meet the commission's objectives of a fair, effective, and efficient process, much is needed on a timely basis to achieve these objectives fully and to achieve a high percentage of nuclear plant license renewals. Note that the necessary improvements are not just for the NRC; industry bears significant responsibility, especially in the area of standardizing processes.

The process must be seen by all as fair, effective, and efficient. NRC should establish a firm schedule and formal process for resolving all open generic issues for license renewal. Once resolved, NRC must commit to a very high threshold (e.g., significant new safety information) to permit issues to be reopened for future applicants. NRC and industry should actively pursue means to simplify and standardize the process, both for industry submittals and for NRC reviews. The public interest groups contend that the present license renewal process prohibits meaningful public participation and the NRC should revise this procedure to permit public input.

Risk-Informed Regulation

The move toward risk-informed regulation is a significant transition taking place at the NRC and has the support of the commission and senior NRC staff as a high-priority activity. A risk-informed approach may better focus licensee and regulatory attention on design and operational issues commensurate with their importance to public health and safety. This may also result in a reduction in unneeded expenditure of resources on matters that are not safety significant. The challenge is to accomplish this transition while maintaining the basic objectives of adequate protection of the health and safety of the public.

The report examines how risk-informed regulations may benefit all stakeholders, recommends that the changes be introduced in a carefully controlled way with pilot applications, and notes that acceptance of this change by licensees will be on a voluntary basis. Although risk-analysis tools are valuable for understanding relative importance of issues, there are limitations in those tools and, thus, research and analysis must continue so that NRC can adequately understand the risk effects from aging of components and structures as well as the impact of technology advances and human performance.

The report suggests that, as a first priority, definitions must be established for key reference terms such as "safety-related" and "important to safety." Finally, all improvements necessary to move to a risk-informed approach will not come to pass unless there is a significant effort to upgrade the capability of both the NRC staff and the licensee staff to do probabilistic risk assessments (PRAs). Because many PRAs are poorly done, it will take several years to bring the staffs to the necessary level. The public must remain confident in the NRC's ability to move to this and still protect health and safety. The public interest groups disagreed with the conclusions reached by the steering committee and felt that the NRC should establish minimum standards for PRAs and conduct audits to be sure these standards are met.

NRC Processes

License Amendment Process

Maintaining and updating the elements of an operating license are necessary and ongoing functions of plant management that consume a significant amount of licensee and NRC resources. An ineffective licensing amendment process affects the ability of the licensee to make the changes necessary to operate the plant in a safe, productive, and cost-effective manner.

Regulatory requirements state that any applications must be submitted and approved before detailed changes can be made to the license. Some changes can be made without prior NRC approval and the NRC is moving to expand the changes within licensee control. Some past license amendments have taken considerable time and a large volume of correspondence to win approval. The NRC, over the past year, has made progress in some of the most important license amendment areas. NRC has done a good job on several complex power uprate license amendments. NRC has undertaken initiatives to gain efficiencies more broadly in its license amendment process. A number of NRC initiatives now under way may result in increased demand for license amendments, heightening the need for greater efficiency in this area.

The report notes that there is considerable room for improvement on the part of both licensees and the NRC. It is important to maintain dialogue between the NRC and industry to identify lessons learned and to streamline the license process. Recommendations are made to improve clarity of communications, management accountability, considerations of the introduction of new technology and address the amount of detail embodied in licenses and technical specifications.

Hearing Process

The Atomic Energy Act of 1954 provides an opportunity for a hearing to any person whose interest may be affected by commission proceedings on the granting, suspending, revoking, or amending a reactor license. The central question is whether there is a broad requirement demanding adjudicatory hearings and whether it is efficient or in the interest of the regulatory process to select adjudicatory hearings preferentially. All hearings attract criticism from various stakeholders and continue to insert substantial uncertainty, particularly with respect to timeliness. Issues include hearings' protracted

nature, the apparent inability to limit broad and nonspecific issues, and the tendency to permit unnecessary or protracted discovery. It is important that the hearing process be modified to provide the efficiency now demanded.

Although the NRC has used less formal hearings in some contexts, it has for the most part continued to use the adjudicatory hearing as the principal format for reactor actions other than reactor license transfer matters. The commission should fully embrace the notion that the Congress intends for the NRC to have extraordinary control over the duration, subject matter, and nature of the hearings that they consider appropriate to meet their mandate unless Congress itself chooses to be specific. With this principle in mind, the NRC should ensure that hearings are conducted only when necessary, but, when they occur, they should be efficiently run with decisions announced expeditiously and in a clear and succinct manner.

The commission should make legislative-type hearings the norm except those required for enforcement issues or where otherwise demanded by law or special circumstances. The public must perceive a transparent and open process; and there must be a proper context for public participation in important issues that affect the public, especially when issues are novel. It is inappropriate to either shut out the public or resort to the courts to hear issues ignored in the regulatory process. The public interest group representatives on the project steering committee maintained that the public cannot meaningfully participate in the regulatory process without the availability of formal hearings with rights of discovery and cross-examination.

Petitions under 10 CFR 2.206

Public groups believe that the 10 CFR 2.206 process does not afford members of the public a viable means for affecting NRC actions against a licensee. NRC's regulations and procedures under Section 2.206 are more expansive than is necessary to satisfy statutory requirements under the Atomic Energy Act. The opportunities afforded by the 2.206 process, although not required, are viewed as important adjuncts to the opportunities for public participation provided by statute.

To help prevent the impression to petitioners that the NRC is summarily dismissing their petitions without giving serious thought to the issues raised by them, NRC director's decisions should adopt a style that is more technical and less legalistic in nature. In the case of petitions that are vague or do not provide supporting data, NRC should formally contact the petitioner to clarify ambiguous issues. If new issues or information is identified, NRC should formally notify the licensee to enable it to supply NRC with any relevant information. NRC should assure that no internal organizations inhibit or otherwise place unwarranted obstacles in the path of public petitioners who use the 2.206 process.

Rule-Making Process

Many of the proposals for changes in the way the NRC regulates the industry can be accomplished administratively by NRC management. The nuclear electric power industry is undergoing rapid change in practices, technology, and risk assessment. The industry must make decisions on the sale or retention of facilities, extension of operating licenses, and closing and decommissioning plants.

Although significant reductions in the time required to publish a rule in final form have been achieved, further reductions should be a continuing goal within the requirements of legislation governing NRC rule making and with due regard to the complexity and controversial nature of the subject matter. Failure to amend existing regulations or adopt new ones to reflect current technology and new economic forces disservices the regulators' obligations, the interest of the regulated industry, and the broader public interest. The commission should maintain the capability to make independent technical conclusions to support the rule changes it proposes.

This report recommends that NRC interact with both the public and the industry before it issues a proposed rule: get input for the content of the proposed rule; strive for simple, as opposed to complicated, rules; issue draft implementing guidance for comment at the same time as issuing the proposed rule; improve discipline in the internal management of comment periods; and meet with stakeholders to reach resolutions of comments on proposed rules.

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