



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, D. C. 20555

October 31, 1990

The Honorable Kenneth M. Carr  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: SUMMARY REPORT - THREE HUNDRED SIXTY SIXTH MEETING  
OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS,  
OCTOBER 4-6, 1990

During its 366th meeting, October 4-6, 1990, the Advisory Committee on Reactor Safeguards discussed several matters and completed the report and letters noted below. In addition, the Committee authorized Mr. Fraley to transmit the memoranda identified below.

REPORT TO THE COMMISSION

- Report to Chairman Carr Related to Legal Services for the ACRS, dated October 12, 1990.

LETTERS

- Draft Implementation Documents for the Proposed License Renewal Rule (Letter to James M. Taylor, EDO, dated October 11, 1990.)
- NRC Computer Codes and Their Documentation (Letter to James M. Taylor, EDO, dated October 11, 1990.)

MEMORANDA

- Appointment of ACRS Members (Memorandum for Chairman Carr from R. F. Fraley, dated October 12, 1990.)
- Periodic ACRS Meeting With the Commissioners (Memorandum for Samuel J. Chilk, Secretary of the Commission from R. F. Fraley, dated October 12, 1990.)
- Amendment to 10 CFR Part 34: ASNT Certification of Industrial Radiographers (Memorandum for Donald A. Cool, Chief, Radiation Protection and Health Effects Branch, RES, from R. F. Fraley, dated October 12, 1990.)

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Mr. Fraley has informed Mr. Cool that the Committee members have decided not to review this proposed Amendment to 10 CFR Part 34.

- Consideration of Turkey Point Standardized Technical Specifications (Memorandum for Peter B. Bloch, Administrative Judge, ASLB, from R. F. Fraley, dated October 15, 1990.)

The Committee decided not to take further action regarding Mr. Bloch's request, contained in his September 25, 1990 memorandum, that the ACRS consider the safety significance of several matters of concern to the ASLB regarding the use of standardized technical specifications for the Turkey Point Plant, Units 3 and 4.

#### HIGHLIGHTS OF CERTAIN MATTERS CONSIDERED BY THE COMMITTEE

- License Renewal Standard Review Plan and Associated Draft Regulatory Guide

The Committee heard presentations by and held discussions with members of RES and NRR with regard to the following documents that are intended to provide guidance for implementing the provisions of the proposed license renewal rule, 10 CFR Part 54:

- Draft Regulatory Guide, Task DG-1009, "Standard Format and Content of Technical Information for Applications to Renew Nuclear Power Plant Operating Licenses."
- Draft NUREG-1299, "Standard Review Plan - License Renewal."

The Committee provided several comments and recommendations to the EDO on this matter. The Committee agreed that the proposed Regulatory Guide and NUREG-1299 should be issued for public comment and stated that it plans to continue its review of this matter after the public comments on the proposed 10 CFR Part 54, the Regulatory Guide, and the proposed NUREG-1299 have been received and assimilated.

- Documentation of NRC Computer Codes

The Committee discussed the adequacy of documentation of NRC computer codes, especially of those in the thermal hydraulic and severe accident areas. The Committee provided a letter to the EDO on this matter, including several comments and recommendations. The Committee stated that the RES program managers should ensure that adequate documentation is provided in a timely manner, particularly for models and correlations

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and developmental assessment. The Committee suggested that the NRC make sufficient funding and resources available to ensure that the documentation associated with the development of the agency's codes is adequate.

• Appointment of ACRS Members

The Committee members continued their review of the qualifications of candidates for appointment to the ACRS. Based on the review of the qualifications of 46 candidates, the members selected a panel of three candidates for the position on the ACRS that will open on February 23, 1991.

As instructed by the Committee, Mr. Fraley transmitted the names of these three candidates to the Commission on October 12, 1990, requesting that the Commission make its selection by the end of December 1990.

The Committee plans to recommend to the Commission an additional panel of candidates at a later date for the position that will open on May 9, 1991.

• ACRS Meeting with the Commissioners

The Committee is scheduled to meet with the Commissioners between 2:00 - 3:30 p.m. on Thursday, November 8, 1990, to discuss various items of mutual interest. After considering the topics proposed by the Committee, the Commissioners have chosen the following items for discussion during this meeting:

- Essentially Complete Design - Level of Design Detail Under 10 CFR Part 52.
- Source Term update and Decoupling Siting from Plant Design.
- Proposed Resolution of Generic Issue B-56, Diesel Generator Reliability.
- Status of ACRS Formulation of Containment Design Criteria for Future Plants.
- Reevaluation of the Systematic Assessment of Licensee Performance (SALP) Program.

• Advanced Reactors

Members of the NRC staff briefed the Committee regarding their plans for review of Advanced Reactor designs (CANDU-3, PIUS, MHTGR, and LMR). The staff stated that the Commission, in its FY 1992-1993 budget request to the OMB, has requested

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resources to support the review of the CANDU-3 and PIUS designs. As directed by the Commission, the staff plans to assign 2 FTE each to the CANDU-3 and PIUS design reviews during FY 1991.

This was an information briefing - the Committee took no action.

- Performance-Based QA

Representatives of the NRC staff briefed the Committee regarding the proposed revision to Chapter 17, "Quality Assurance," of the Standard Review Plan (SRP). This revision incorporates, as appropriate, the results of the QA study performed in 1984 by the NRC staff and its consultants as mandated by the Congress. The staff has added Section 17.3 to Chapter 17 of the SRP to describe a performance-based QA program so as to incorporate one of the major findings of the above mentioned study that QA should focus more on the performance of each individual, including management personnel.

This was an information briefing - the Committee took no action.

- International Activities

Members of the NRC delegation of the Joint Coordinating Committee for Civilian Reactor Safety, who met in the U.S.S.R. during the period of June 25 through July 9, 1990, briefed the Committee regarding the U.S.S.R. practices in the following areas:

- Erosion and corrosion of piping and components.
- Embrittlement and Annealing.
- Severe Accidents.

This was an information briefing - the Committee took no action.

- NUREG-1150, Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants

The Committee considered a draft report to the Commission on NUREG-1150 and decided to continue the discussion of this matter during the November 8-10, 1990 ACRS meeting.



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- Annual ACRS Report to the Congress

The Committee discussed the scope, format, and content of the forthcoming ACRS report to the Congress on the NRC Safety Research Program and budget and decided to use a format similar to that used for last year's report. However, the transmittal letter of the report may be expanded, as necessary, to include comments and recommendations on the ongoing and proposed NRC Safety Research Program and budget that the Committee considers important.

The Committee agreed that Dr. Catton, the Safety Research Program Subcommittee Chairman, should consider an integrated report on the NRC Safety Research Program and budget for submittal to the Commission during next year.

#### SUBCOMMITTEE MEETINGS

Since the last summary report of ACRS activities, the following Subcommittee meetings have been held:

- Advanced Pressurized Water Reactors, September 21, 1990

The Subcommittee met with representatives of Combustion Engineering, Inc., and discussed the feedback from operational experience at CE plants, in particular at the Palo Verde Nuclear Plant, for the CE System 80+ design.

- Plant License Renewal, October 2, 1990

The Subcommittee reviewed the draft Regulatory Guide, Task DG-1009, "Standard Format and Content of Technical Information for Applications to Renew Nuclear Power Plant Operating Licenses," and draft NUREG-1299, "Standard Review Plan - License Renewal."

- Joint Severe Accidents, Extreme External Phenomena, and Probabilistic Risk Assessment, October 3, 1990

The Subcommittees continued their discussion of NUREG-1150, "Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants," in the areas of seismic and fire analyses.

- Improved Light Water Reactors, October 31, 1990

The Subcommittee reviewed the latest NRC staff proposal regarding the level of design detail under 10 CFR Part 52.

- Advanced Boiling Water Reactors, October 31, 1990

The Subcommittee reviewed the physical separation and general plant layout for the GE Advanced Boiling Water Reactor design.

#### FUTURE ACTIVITIES

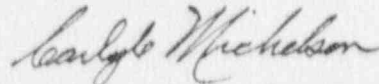
The Committee agreed to the following tentative schedule for the 367th, November 8-10, 1990, ACRS meeting:

- Severe Accident Risks: An Assessment for Five U. S. Nuclear Power Plants (NUREG-1150) (Open) - Continue preparation of ACRS report to the NRC regarding the merits and use of this document.
- Reactor Operating Experience (Open/Closed) - Briefing and discussion regarding lessons learned from nuclear power plant operating experience including problems with the operability of safety systems from noncondensable gasses, loss of off-site power and main steam isolation valve closure events at the Brunswick nuclear station, and a feedwater transient and subsequent failure of the RCIC system which occurred at the Pilgrim nuclear station. (NOTE: This item has been deferred.)
- Level of Design Detail (Open) - Briefing and discussion on level of design detail needed for new standard plant reviews.
- Meeting with NRC Commissioners (Open) - Discuss safety-related issues on matters that the Committee has been or is in the process of reviewing.
- 10 CFR Part 55, Fitness for Duty Requirements for Licensed Operators (Open) - Review and report on the proposed final version of the Fitness for Duty Rule.
- NRC Regulatory Impact Survey (Open) - Briefing and discussion of proposed NRC actions resulting from the regulatory impact survey. Prepare ACRS report to NRC, as appropriate.
- Biological Effects of Ionizing Radiation (Open) - Briefing regarding Report V of the National Research Council Committee on the Biological Effects of Ionizing Radiation.
- ACRS Subcommittee Activities (Open) - Reports and discussion of ACRS subcommittee activities regarding assigned safety-related matters such as the proposed containment design criteria for future plants, interfacing systems LOCA, and reconstitution of design basis documentation.
- Radioactive Waste Disposal (Open) - Briefing and discussion regarding the report on Rethinking High-Level Radioactive Waste Disposal prepared by the National Research Council Board on Radioactive Waste Management. (NOTE: This item has been deferred.)
- Combustion Engineering System 80+ (Open/Closed) - Review and report on proposed Licensing Review Basis (LRB) for CE System 80+ design.

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- Standardized Nuclear Plant, Westinghouse SP/90 Design (Open/Closed) - Review and comment on the proposed PDA for this standardized nuclear plant.
- Performance of Solenoid Valves at Nuclear Power Plants (Open) - Briefing on the status of AEOD's work on the evaluation of solenoid valve problems at nuclear power plants. (NOTE: This item has been deferred.)
- Anticipated ACRS Activities (Open) - Discuss anticipated ACRS subcommittee activities and items proposed for consideration by the full Committee. Proposed dates for CY 1991 ACRS full Committee meetings will also be discussed. Incomplete items from previous Committee meetings will be discussed as time and availability of information permit.

Sincerely,



Carlyle Michelson  
Chairman



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, D. C. 20555

October 12, 1990

The Honorable Kenneth M. Carr  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

We have your memorandum of August 1, 1990, dealing with legal services for the Advisory Committee on Reactor Safeguards. We wish to comment on the implication in your memorandum that the ACRS role is to provide "scientific and technical" advice to the Commission and to spell out a bit more carefully the basis for the position taken by the ACRS in a letter to you dated July 17, 1990.

The basic documents that specify the ACRS duties are Section 29 of the Atomic Energy Act, as amended, and the provisions contained in 10 CFR 1.13. You imply in your memorandum that these documents define the ACRS role as one of giving "scientific and technical advice" to the Commission, but the fact is that no such language is contained in either. To the contrary, both documents refer to advice on a variety of safety-related matters. Until now no Commission and no Chairman have defined limits to this assignment.

Although the July 17 letter called this matter to your attention, it now appears that it would be helpful to explain more carefully just why it is important to reactor safety that we have the freedom to explore (including the use of appropriate consultants) all those aspects of a safety-related question that we deem important. The point made in the July 17 letter is that independence only on narrowly technical matters is unduly limiting.

The nub of the issue is that reactor safety is a complex mix of technical, procedural, human, and legal matters. For any given safety question one or another of these factors may dominate, and to limit the areas of investigation in advance is to seriously impair the ability of the Committee to function in its statutory role. Perhaps some examples will help.

- In 1986 the interpretation of the backfit rule was a pressing issue, involving both the extent to which a cost-benefit analysis could be required as justification for a backfit, and the definition of adequate protection. The Commission had already received a report from OGC on these matters, but the Committee felt that, in its role as an independent advisor to the Commission, it required a separate analysis. The Committee then engaged an outside law firm to study the issues

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on its behalf, and that study materially contributed to its understanding. In this case, the legal issues were inseparable from the technical ones.

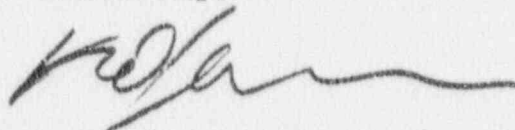
- Though we have yet to report to you on this, we have recently had a series of briefings on the criteria the staff was used to order a plant shut down and to permit it to restart. This discussion has raised, in some of our minds, serious questions about accountability for each of these decisions. Both for shutdown and for restart, the staff criteria were highly personal and subjective in areas (like "management culture") that lack explicit standards. Whether it is in the interests of nuclear safety for the licensee to be forced to simply placate the staff under these conditions is at best questionable. Certainly the staff has limited expertise in such areas.

These are two (of many that could have been furnished) examples of important safety-related matters, which are not narrowly "scientific and technical." The Committee is required by both law and conscience to advise you about all aspects of safety-related matters, without topical constraints. This will occasionally require that we seek outside consultation on a variety of subjects when a second opinion seems appropriate, even though the advice available from your staff may well be competent. (Such outside consultation may well involve legal matters.) After all, it is the staff that advises you, and our independence is illusory if we are confined to that same staff for our own inputs.

Once more we ask you to take these matters seriously -- they go to the heart of the relationship between the Commission and the Committee. We do not raise them lightly, and urge you to reconsider the position taken in your memorandum of August 1, 1990.

Additional comments by ACRS Members Carlyle Michelson and Charles J. Wylie, and by Chester P. Siess are presented below.

Sincerely,



Harold W. Lewis  
Acting Chairman

Additional Comments by ACRS Members Carlyle Michelson and Charles J. Wylie

It is our position that Chairman Carr's memorandum of August 1, 1990, constitutes an adequate reply to the ACRS letter of July 17, 1990. We believe that the ACRS is not constrained in pursuit of

its responsibilities as defined by the Atomic Energy Act and by Federal regulations. If it should require legal assistance concerning a specific matter, the Office of the General Counsel is ready and willing to support such a need. If the Committee should feel that independent legal assistance is essential, the Commission has ensured that such a need can be brought to its attention for resolution. To our knowledge, the Committee has never been encumbered in its efforts to find and retain outside scientific or technical assistance. It is our view that this matter has already achieved a proper closure and should be dropped.

Additional Comments by ACRS Member Chester P. Siess

I cannot agree with my colleagues that my ability to provide advice to the Commission on matters of reactor safety is seriously impaired by anything you wrote in your memorandum of August 1, 1990.



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October 11, 1990

Mr. James M. Taylor  
Executive Director for Operations  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Taylor:

SUBJECT: NRC COMPUTER CODES AND THEIR DOCUMENTATION

During the 366th meeting of the Advisory Committee on Reactor Safeguards, October 4-6, 1990, we continued our deliberations on the subject of the development of NRC's computer codes and their associated documentation. This topic was previously discussed during our 365th meeting, September 6-7, 1990. It was also discussed during a joint meeting of the Decay Heat Removal Systems and Thermal Hydraulic Phenomena Subcommittees held on August 28, 1990, in Idaho Falls, Idaho.

A portion of the regulatory process depends heavily on the results of calculations done for the NRC by the national laboratories or other contractors. The codes used for these calculations range from thermal hydraulic codes like RELAP5 or TRAC to severe accident codes like SCDAP or MELCOR. Many of these codes are poorly documented, thus leaving one unable to determine either their capabilities, or perhaps more importantly, their limitations. In some cases, it appears that even the cognizant NRC staff representatives are not sufficiently knowledgeable of a given code's content.

The NRC has a responsibility to make the basis for its computer codes as scrutable as it requires of the industry. Many code developers consider the documentation phase of the code development process distasteful. Nevertheless, the RES program managers should see that adequate documentation is provided, particularly for models and correlations and for developmental assessment. We have seen evidence that they have not done so. One of the central problems is the tendency to defer the preparation of such documentation until the end of the program. Although such a deferral may be understandable, given the natural progression of the development program, it is essential that program management ensures that documentation is provided in a timely manner and within budget.

The August 28, 1990 Subcommittee meeting was held to review the nearly completed work related to the development of the RELAP5/MOD3 thermal hydraulic code. Discussions during this meeting provided

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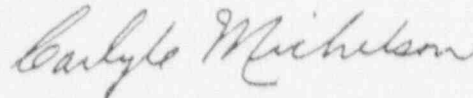
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evidence that the associated documentation was incomplete. The contractor personnel were new to the program and not well enough acquainted with the code's details to respond to questions from the Subcommittee. The potential exists for similar problems with the completion of the development program for the TRAC-PP1/MOD2 code. Deliberate attention by RES program managers is needed to ensure the documentation for these codes is adequate.

Another example that illustrates our concern involves the thermal hydraulic code known as REMIX, which has been used by the NRC to evaluate the potential for pressurized thermal shock given certain accident scenarios. Relevant experimental data were generated as part of the cooperative 2D/3D program, among the United States, Germany, and Japan, and these data were compared with REMIX code calculations. Although a Research Information Letter citing this work was issued in 1988, a report documenting these comparisons has never been issued by the NRC. Recent review of the Yankee Rowe pressurized thermal shock issue would have been well served by knowing how well the downcomer fluid temperature can be predicted, using a code such as REMIX, at the beltline welds following a small break loss of coolant accident.

Many millions of dollars have been spent on the development of the computer codes used by the NRC, nearly \$20 million for RELAP5 alone. The NRC should make sufficient funding and resources available to ensure that the documentation associated with the development of the agency's codes is adequate.

Sincerely,



Carlyle Michelson  
Chairman

Reference:

Memorandum dated August 24, 1988, from Eric S. Beckjord, Office of Nuclear Regulatory Research, for Thomas E. Murley, Office of Nuclear Reactor Regulation, Subject: "Research Information Letter No. 155, Full Scale Fluid Mixing Test Results in Support of Pressurized Thermal Shock Resolution."





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Mr. James M. Taylor  
Executive Director for Operations  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Taylor:

SUBJECT: DRAFT IMPLEMENTATION DOCUMENTS FOR THE PROPOSED LICENSE  
RENEWAL RULE

During the 366th meeting of the Advisory Committee on Reactor Safeguards, October 4-6, 1990, we reviewed draft Regulatory Guide, Task DG-1009, "Standard Format and Content of Technical Information for Applications to Renew Nuclear Power Plant Operating Licenses," and associated draft NUREG-1299, "Standard Review Plan - License Renewal." Our Subcommittee on Plant License Renewal also reviewed this matter during its meeting on October 2, 1990. During this review, we had the benefit of discussions with representatives of the NRC staff and of the documents referenced. These documents are an important part of the program to implement the proposed license renewal rule, 10 CFR Part 54, that was published for public comment on July 17, 1990. We commented to the Commission on this proposed rule in our report of April 11, 1990.

We believe that the general approach proposed by the staff for implementation of the license renewal process is reasonable, and we agree that both of the subject documents should be published at this time for public comment. However, we have a concern, discussed below, about control of the process for selecting structures and components important to license renewals (SCITLRs). We believe that this matter should be considered further as public comments on the rulemaking are evaluated. We also offer several comments on the implementing documents.

There is justification for the general philosophy of the proposed license renewal rule. Aging-degradation issues should be dealt with by more explicit programs as the plant age passes beyond the general target age for which it was designed. Our understanding is that a 40-year operating life has been used for most structures and components in nuclear power plants. However, that target age and the design were not so precisely defined that there should be a step increase in licensing requirements as the plant passes its 40th anniversary of operation. As we said in our April 11, 1990 report, "no specific form of plant aging becomes magically decisive at forty." We have a concern that the license renewal process under the proposed 10 CFR Part 54 will permit or encourage a

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significant expansion of regulatory requirements as a plant phases into operation under a renewed license. We had hoped and expected that the implementing documents would provide some clear indications of how such regulatory expansion would be constrained. They do not. Introductory material in the proposed 10 CFR Part 54 indicated that the backfit rule would somehow be used in controlling the extent to which regulatory requirements would be expanded. However, the rule itself does not make it clear how this is to be done, nor do the draft implementing documents. We recommend that the rule or the implementing documents be revised to ensure that the process for selecting SCITLRs and developing new requirements is sufficiently disciplined.

In addition, we have several specific comments on the proposed implementing documents:

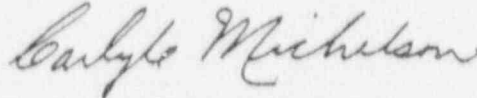
- (1) In the proposed process for evaluating age-related degradation, the draft Regulatory Guide indicates that a decision about classification of a given structure or component should be made on the basis of whether the structure or component is routinely replaced or refurbished (see Block 12 of Figure 1B in the draft Regulatory Guide). We recommend that satisfactory results of inspection or monitoring should also be credited at this decision point.
- (2) Many of the unresolved safety issues and generic safety issues that have been analyzed over the past several years have had assumptions about expected plant life factored into their resolution. The staff has indicated that, in general, an expected life of 60 years instead of 40 years would make little difference in cost-benefit analyses, given the large uncertainty inherent in the calculated results. However, the staff also indicated that a review of all such resolutions will be made, in the light of new expectations about plant lifetimes, given the changes of 10 CFR Part 54. We would like to be kept informed about the results of this review.
- (3) Certain industry topical reports on the subject of aging degradation are being developed by NUMARC, and are expected to be approved by the staff as acceptable references in license renewal applications. We encourage the development of these industry reports as a means of providing a comprehensive technical base for license renewal reviews. Because the license renewal process can be expected to extend over many years, much technical information about aging will be in need of revision, and some means for formally updating these industry reports and their approval by the NRC should be provided.
- (4) Perspectives gained from applicable risk assessment should be used in the selection of SCITLRs.

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- (5) Consideration should be given to including physical security systems in the SCITLR program.

We plan to continue our review of this important subject after public comments on this proposed rule, the Regulatory Guide, and the proposed Standard Review Plan are received and assimilated.

Sincerely,



Carlyle Michelson  
Chairman

References:

1. U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research, Draft Regulatory Guide, Task DG-1009, "Standard Format and Content of Technical Information for Applications to Renew Nuclear Power Plant Operating Licenses," Revision 5A dated August 1990, and U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Draft NUREG-1299, "Standard Review Plan, License Renewal," dated August 1990, transmitted by memorandum dated August 31, 1990, from Eric S. Beckjord, RES, and Thomas E. Murley, NRR, to Raymond F. Fraley, ACRS
2. U.S. Nuclear Regulatory Commission, Rules and Regulations, 10 CFR Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants," Proposed Rule Making, Published July 17, 1990