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

May 26, 1988

MEMORANDUM FOR: Victor Stello, Jr.
Executive Director for Operations

ATTN: T. Rehm

FROM: R. F. Fraley, Executive Director, ACRS

SUBJECT: 337TH ACRS MEETING FOLLOW-UP ITEMS

Based on discussions regarding methods for improved implementation and follow-up of ACRS recommendations, the Committee agreed that a summary of Actions, Agreements, Assignments, and Requests made during each full Committee meeting will be sent to your office following each meeting.

Attached per this agreement is a list of the requests made at the 337th ACRS Meeting, May 5-7, 1988.

Those items in the list "Actions, Agreements, Assignments, and Requests" dated May 25, 1988 that do not deal with requests made of the NRC Staff or that are not pertinent to NRC Staff activities have not been included in this follow-up list.

Attachment:
As stated

cc w/att:
E. L. Jordan, AEOD
H. L. Thompson, NMSS
T. E. Murley, NRR
E. S. Beckjord, RES
S. Chilk, SECY
M. Clausen, OCM/LZ
C. Ader, OCM/TR
C. Miller, OCM/FB
G. Felgate, OCM/KC
G. Marcus, OCM/KR

8806060078 *4

EDO---003735

9. The Committee was briefed by representatives from the NRC Staff and Sandia National Laboratories on the fire risk scoping study.

10. The Committee was briefed by the NRC Staff on the proposed NRC generic letter regarding Individual Plant Examinations for nuclear power plants.

11. The Committee was briefed by the NRC Staff on the status of the NRC program to evaluate the integrity of Mark I containments to withstand severe accidents.

12. The Committee was briefed by the Babcock & Wilcox Owners Group (BWOG) and NRC Staff on the NRC review of BWOG safety reassessment of B&W nuclear power plants. The Committee will continue consideration of this program during the June ACRS meeting.

13. The Committee was briefed by Mr. Ward in regard to the Westinghouse Advanced Pressurized Water Reactor [RESAR SP(90)] design description and the probabilistic safety study that was performed by Westinghouse and was reviewed by BNL and the NRC Staff.

14. The Committee discussed and reviewed the key licensing issues for the DOE-sponsored advanced reactors. The Committee plans to continue its discussion on this subject and invite the NRC Staff to the June 1988 ACRS meeting.

15. The Committee was briefed by the NRC Staff on the proposed revision of the ECCS rule (10 CFR 50.46, Acceptance Criteria for Emergency Core Cooling Systems for Light Water Reactors).

16. The Committee discussed proposed comments on the NRC RES thermal-hydraulics research program. Consideration of the Committee's report will continue during the June ACRS meeting.

17. The Committee was briefed by Mr. Satish Aggarwal, RES, on the International Nuclear Power Plant Aging Symposium. The Symposium is to be held in Bethesda, Md. on August 30-31 and September 1, 1988. Members were encouraged to attend.

18. The Committee decided to review the proposed restarts of Pilgrim and Peach Bottom nuclear plants. Decision to review proposed restarts of other plants will be made at a later time. [Memorandum for V. Stello from R. Fraley was sent May 11, 1988.]

19. The Committee agreed not to review the requested TMI-1 power level increase of 32 mw (1.3%), the design basis power level for this plant.

20. The ACNW is currently scheduled to have its first meeting on or about June 28-29, 1988.

21. The members were informed of proposed changes in the ACRS MOU to provide for Committee review of predecisional documents in open session. The members had no objection to these changes.

FUTURE ACTIVITIES

The Committee agreed to the tentative future agenda as shown in Appendix A.

APPENDIX A
FUTURE AGENDA

June 2-4, 1988

Thermal-Hydraulic Research (Open) (DAW/PAB) Estimated time: 1 hr. - Discuss proposed ACRS comments on NRC research program regarding thermal-hydraulic phenomena.

Generic Issues - Prioritization (Open) (CPS/SD) Estimated time: 2 hrs. - Discuss proposed prioritization of a new set of UGIs.

International Organization of Reactor Operators (Open) (CPS/RFF) Estimated time: 1 hr. - Briefing by INPO representative regarding proposed world association of nuclear operators.

USI A-17, Systems Interactions (Open) (DAW/MDH) Estimated time: 1½ hrs. - Committee briefing and discussion regarding the status of NRC action to consider systems interactions in nuclear power plants. Subcommittee meeting will be scheduled when NRC Staff resolution package is received.

Quality of Fasteners Used in Nuclear Plants (SECY-87-296) (Open) (PGS/EGI) Estimated time: 3/4 hr. - Briefing regarding status of staff evaluation of quality of bolts and other fasteners used in nuclear power plants. Subcommittee meeting will be held on May 26, 1988.

10 CFR Part 20 Rulemaking (Open) (DWM/EGI) Estimated time: 1 hr. - ACRS comments requested regarding proposed rule change. Proposed rule package and related documents expected by 5/15/88.

Appointment of New Members (Open) (FJR/NSL) Estimated time: ½ hr. - Discuss nature of annual call for nominees to be considered for appointment to the ACRS per Chairman Zech's memo to R. Fraley dated March 14, 1988.

ECCS Evaluation Models (Closed) (DAW/PAB) Estimated time: 1 hr. - Discuss Westinghouse UPI Evaluation Model for upper plenum injection of emergency core cooling water. Subcommittee meeting May 27, 1988 (tentative). Staff/Westinghouse will participate as considered appropriate.

Regional Programs (Open) (FJR/PAB) Estimated Time: ½ hr. - Subcommittee report of 5/24/88 visit to NRC Region II (Atlanta) Office.

ABWR (Open) (CM/RKM) - Subcommittee report of 6/1/88 meeting regarding first review module for this GE plant design.

ACRS Subcommittee Activities (Open) (MWL/HSS) Estimated time: 1 hr. - Reports and discussion regarding ACRS subcommittee activities including pressure vessel inspection, EPRI requirements document, and Japan trip report.

Review of AEOD Studies (Open) (HWL/HA) Estimated time: 1 hr. - Briefing regarding AEOD studies of service water systems, etc., to be provided.

Important Safety-Related Issues (Open) (CPS/SD) Estimated time: 2 hrs. - Discuss hierarchical structure for important safety-related issues applicable to nuclear power plants.

ACRS Practices and Procedures (Open) (HWL/CM/RFF) Estimated time: ½ hr. - Discuss proposed changes in ACRS Bylaws regarding activities of members (e.g., participation in meetings not sponsored by the ACRS) and realignment of ACRS subcommittee assignments.

July 14-15, 1988

USI A-48, Hydrogen Control (Open) (WK/MDH) - Briefing and discussion regarding proposed resolution of $H_2$ control in Mark III and Ice Condenser Containments based on approved rule. ACRS may offer comments if the members desire to do so.

Operating Procedures for Severe Accidents (Open) (WK/MDH) - Briefing regarding policy paper on Emergency Operating Procedures by NRR representatives per discussion during the 336th meeting. Could slip to August.

NRC Policy on Severe Accidents (Open) (WK/MDH) - ACRS comments requested regarding Commission paper on an integrated plan to implement Commission policy on severe accidents. Policy paper is expected by 5/18/88 (Tentative)

Equipment Qualification (Open) (CJW/RKM) - ACRS comments requested regarding the EQ Scoping Study (Phase II). Subcommittee meeting will be held on June 14, 1988.

Modular HTGR (Open) (DAW/MME) - Comments requested. Subcommittee meeting to be scheduled for June 22, 1988 (tentative).

Diagnostic Evaluation Program (Open) (HWL/HA) - Briefing/discussion regarding NRC diagnostic evaluation of Dresden and McGuire nuclear stations. Reports of Dresden and McGuire evaluation have been received. A subcommittee meeting may be needed (tentative).

Mark I Containment Performance (Open) (DAW/MDH) - ACRS comments requested regarding proposed resolution of Mark I ability to contain severe accidents. Final report scheduled for 8/30/88 (tentative).

Liquid Metal Reactors (Open) (DAW/MME) - Proposed SERs for DOE LMRs to be provided by July 1988. ACRS comments requested.

Policy Statement on Working Hours (Open) (FJR/HA) - ACRS comments requested. No anticipated date for expected documents.

Operating Events (Open) (HWL/HA) - Briefing/discussion regarding recent operating events and incidents at nuclear facilities (tentative - depending on significance of incidents that have occurred, need for subcommittee meeting, etc.).

Later

Peach Bottom Nuclear Plant - We have been advised that the Harford County Council has asked the Governor of Maryland to ask the Maryland Congressional delegation to request that the ACRS perform an independent review of the management and hardware (cracks in access covers welded onto the reactor shell which surrounds the core) problems at Peach Bottom. This request has not yet been received.

ACRS Review of Shutdown Nuclear Plants - Review the proposed restarts of Pilgrim and Peach Bottom. (Decision to review proposed restarts of other plants will be made at a later time.)

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

May 10, 1988

Mr. Victor Stello, Jr.
Executive Director for Operations
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Stello:

SUBJECT: FIRE RISK SCOPING STUDY

In our July 16, 1986 letter to the Commission concerning fire protection issues, we urged reconsideration of the budget and manpower allocations to the fire-related portions of the NRC safety research program. In response, in a memorandum dated July 24, 1986, Chairman Zech recommended that the Staff work closely with the ACRS to assess further research needs and to consider what priority should be given to fire protection research. The Staff acted in January 1987 by initiating the Fire Risk Scoping Study at the Sandia National Laboratories (SNL), and we provided our views on the scope and direction of this Study in a report to the Commission dated August 10, 1987.

During our 337th meeting, May 5-7, 1988, we met with representatives from the Office of Nuclear Regulatory Research and SNL to discuss the results and conclusions of the Fire Risk Scoping Study. This matter was considered by our Subcommittee on Auxiliary Systems during a meeting on March 9, 1988. We also had the benefit of the document referenced.

We were informed that the Staff is now considering what actions should be taken regarding the disposition of the recommendations resulting from the Study, and a decision is expected by the end of FY 1988. If some of the asserted results survive deeper scrutiny, they could be important. Therefore, we recommend that the Staff evaluate the results and conclusions of the Study and decide on a course of action on a schedule which permits any high-priority research to be initiated in FY 1989. We wish to be kept informed of further developments, and we expect to provide comments after the Staff has identified its proposed plans.

Sincerely,

W. Kerr

W. Kerr
Chairman

Reference:
Draft Report dated March 1988, Sandia National Laboratories, NUREG/CR-5088, SAND 88-0177, "Fire Risk Scoping Study: Investigation of Nuclear Power Plant Fire Risk, Including Previously Unaddressed Issues"

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

May 10, 1988

The Honorable Lando W. Zech, Jr.
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: PROPOSED COMMISSION POLICY STATEMENT ON THE PROFESSIONAL CONDUCT OF NUCLEAR POWER PLANT OPERATORS (SECY-88-57)

During the 337th meeting of the Advisory Committee on Reactor Safeguards, May 5-7, 1988, we discussed the Proposed Commission Policy Statement on the Professional Conduct of Nuclear Power Plant Operators. This matter was reviewed by the Human Factors Subcommittee on April 27, 1988 with the NRC Staff, and at this same meeting related industry initiatives were discussed with representatives of the Nuclear Management and Resources Council (NUMARC) and the Institute of Nuclear Power Operations (INPO). We also had the benefit of the documents referenced.

Based on our discussions and review, we recommend that the Commission not issue the proposed policy statement for public comment. We make this recommendation for two reasons: (1) the proposed policy statement and associated supplementary information have not been adequately developed; and (2) issuance at this time could be counterproductive to a more comprehensive effort under way by industry. Instead, we recommend that, at least for the present time, the NRC monitor the broader and more comprehensive industry effort and defer the decision on the need for such a policy statement until a later time.

We provide the following elaboration of these two reasons for our recommendation:

Inadequate Development: The proposed policy statement has not been developed to the stage that it is ready for issuance. In contrast to being a broad statement of policy suitable for Commission issuance, it is a list of limited prescriptive do's and don'ts suitable, at most, for inclusion in a lower-level document. Further, one can conclude that complying with the list of proposed do's and don'ts would constitute an adequate standard of professional conduct for operators. We do not consider this to be the case.

Confusion and inconsistencies exist among the policy statement, the associated SECY document, and the enclosed supplementary information on such matters as to which operating personnel (i.e., licensed? unlicensed? both?) the policy applies. The document is replete with all-inclusive statements, such as: "... should have knowledge of all aspects of plant status"; "... should [illegible] to prevent and mitigate any operational problems"; "All

2.

on-duty operators at all times must be alert;" "The operator's attention must be given to the condition of the plant at all times"; "All of the operator's senses must be focused on carrying out..." [emphasis added]. Such expectations are unrealistic when dealing with humans.

The proposed policy statement also addresses the matter of unauthorized individuals being allowed to manipulate controls. This matter is quite clearly covered in the Commission's regulations [e.g., 10 CFR 50.54(h) and (i) and 10 CFR 55.13]; therefore, it should not be included in a proposed policy statement on professional conduct.

Further, the proposed policy statement indicates that licensees should discourage the use of electronic entertainment devices such as radios and tape players. The NRC Staff has not been able to show that the use of such devices necessarily is disruptive of professional conduct and poses a public health and safety problem. The accompanying SECY paper indicates that licensees either must provide assurance that the use of electronic entertainment equipment in the control room maintains or enhances operator performance, or must prohibit the use of such equipment. In contrast to expecting licensees to prove the unprovable, we think that licensees should be asked to ensure that, if such devices are permitted in control rooms, they do not interfere with normal control room operations.

Counterproductive to Industry Effort: Representatives of NUMARC and INPO briefed the Human Factors Subcommittee on two related industry efforts. These are the top-down effort to develop management Principles for Enhancing Professionalism of Nuclear Personnel and the bottom-up effort to develop a Professional Code for Operators. The first effort is to establish principles by which management can provide an environment in nuclear power plants that is conducive to excellence and professionalism. This effort includes principles for corporate management and will include not only principles for managing operations personnel but also principles for managing maintenance, technical, and engineering personnel. The bottom-up effort encourages every nuclear utility to assist its operators in developing a professional code for operators (both licensed and unlicensed). Documents entitled, "Key Elements of Professional Code for Operators" and "Suggestions for Developing and Implementing a Code" have been distributed to all utilities. These were developed by a select group of Senior Reactor Operators from each utility. INPO has asked each member utility to have its professional code for operators in place and in use by July 1988.

The proposed policy statement is much less comprehensive than the industry effort to establish a professional code and will lack the pride of authorship of those who must utilize it. Issuance of the policy statement at this time would be counterproductive because some utilities may await issuance of the impending policy statement in contrast to participating fully in the industry-wide effort. We think this would be unfortunate.

For these reasons, we recommend that the Commission not issue the proposed policy statement for public comment. Instead, we recommend that the

Commission encourage the industry effort and monitor its effectiveness following implementation.

Sincerely,

W. Kerr
Chairman

References:

1. SECY-88-57 dated February 29, 1988, for the Commissioners from V. Stello, Executive Director for Operations, NRC, Subject: Proposed Commission Policy Statement on the Professional Conduct of Nuclear Power Plant Operators, with enclosures (ACRS Internal Use Only).
2. Letter dated March 14, 1988 from Zack T. Pate, President, INPO, to R. Patrick McDonald, Senior Vice President, Alabama Power Company, regarding development of professional codes for operators.
3. Letter dated March 30, 1988 from Zack T. Pate, President, INPO, to Joseph M. Farley, President, Alabama Power Company, regarding the development and adoption of a set of management principles to enhance professionalism.

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

May 10, 1988

The Honorable Lando W. Zech, Jr.
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: PROPOSED GENERIC LETTER ON INDIVIDUAL PLANT EXAMINATIONS AND THE PROPOSED INTEGRATED SAFETY ASSESSMENT PROGRAM II

During the 337th meeting of the Advisory Committee on Reactor Safeguards, May 5-7, 1988, we discussed a draft generic letter prepared by the NRC Staff as guidance for Individual Plant Examinations (IPEs) for severe accident vulnerabilities. We also discussed the proposed Integrated Safety Assessment Program II (ISAP II) and related information. Both of these topics have been considered during previous meetings of the ACRS, and we reported our preliminary views on the IPE generic letter in our report of June 9, 1987 and on the ISAP process in our report of July 15, 1987. The ACRS Subcommittee on Severe Accidents met on April 26, 1988 to discuss the latest version of the proposed generic letter on IPEs. The ACRS Subcommittee on Generic Items met on April 27, 1988 to discuss ISAP II. We also had the benefit of discussions on both topics with members of the NRC Staff and industry representatives, as appropriate, and the availability of the documents referenced.

These two programs developed by different NRC Staff groups have not been integrated, even though they deal with many of the same issues. It is for this reason that we are providing our comments on both programs in a single letter. The present Staff positions, as we understand them, are that the IPE generic letter should be issued in its present form and that implementation of the ISAP II should not be pursued at this time. We disagree with both of these positions. Instead, we believe that the IPE program should be expanded to incorporate all outstanding safety issues, not just those under the severe accident rubric. The generic letter should be revised accordingly. The ISAP II approach should then serve as the instrument by which changes in plant equipment or procedures identified by the IPE could be evaluated and assigned priority by the licensees and reviewed by the NRC Staff.

We consider the most recent draft of the IPE generic letter an improvement over that which we commented on in our report of June 9, 1987. However, in our report of March 15, 1988, we expressed our concern that there was a lack of coherence among the several principal regulatory programs of the Commission. We believe the IPE program offers an opportunity for providing improved coherence. In its present form, the generic letter will, instead, continue the current compartmentalization.

We believe that IPE and ISAP II can be recast in a reasonable time and with reasonable expenditure of resources. Radical changes are not necessary, but some modifications and improvements in focus are. We propose a program characterized as follows:

- The purpose of IPEs would be acknowledged as broader than the original intent of "searching for outliers." Instead, it would call for a general risk reassessment of each plant using the body of information available from the TMI-2 accident experience, development of PRA, existing severe accident research, and the general experience of about 1100 reactor-years. All outstanding safety issues, USIs, GIs, etc., would be subsumed by the program. It would be made clear that the intent of the program would be for this to be the end of new requirements for licensees. This would be changed only by the advent of important new information or experience.

  We note that the IPE program proposed by the NRC Staff already has been expanded well beyond the "search for outliers" concept. In subsuming USI A-45, "Shutdown Decay Heat Removal Requirements," into the IPE, for example, the Staff has taken a major step in the direction we are suggesting. Our proposal extends this to a more logical conclusion.

- Each licensee would be required to conduct a substantial and systematic risk analysis for their plant. We recommend that such an analysis would be a full scope PRA (at least Level 2) and include both external and internal initiators. We acknowledge the difficulties inherent in making this an immediate requirement. However, it should be possible to develop a phased approach with the intent that within several years each plant would have been analyzed by state-of-the-art methods.

- Conclusions about results of the risk analysis and necessary changes in actual plant systems and procedures would be determined by the licensee and reviewed by the NRC Staff through

the ISAP process. We believe the risk-based approach embodied in ISAP is the most logical means for resolving most safety issues. The risk analysis used in the IPE for each plant will be available for use by the licensee and NRC Staff in their ISAP evaluations.

We believe that the approach we have outlined above will provide the opportunity for a more integrated resolution of severe accident issues and other outstanding safety and licensing issues as well. We endorse current efforts on the part of the NRC Staff to formulate an integrated program.

Sincerely,

W Kerr

W. Kerr
Chairman

References:

1. U.S. Nuclear Regulatory Commission, NRR Generic Letter 88-02, dated January 20, 1988, "Integrated Safety Assessment Program II (ISAP II)."
2. Memorandum dated March 1, 1988, from T. Speis (NRC) to D. Ross (NRC), et. al., "Commission Paper on Integrated Approach to Implementing the Commission's Policy on Severe Accidents" (Draft).
3. Memorandum dated April 1, 1988, from T. Speis (NRC) to W. Kerr (ACRS), "Documentation Necessary for the Initiation of the Severe Accident Policy Implementation" (Draft Predecisional Attachments).
4. Draft SECY Paper (undated), Integrated Safety Assessment Program II (Predecisional Document), received April 26, 1988.

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

May 10, 1988

The Honorable Lando W. Zech, Jr.
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: PROPOSED REVISION OF THE ECCS RULE CONTAINED IN 10 CFR 50.46 AND APPENDIX K

During the 337th meeting of the Advisory Committee on Reactor Safeguards, May 5-7, 1988, we met with members of the NRC Staff and reviewed the final version of the proposed revision to the emergency core cooling system (ECCS) rule contained in 10 CFR 50.46 and Appendix K. Our Subcommittee on Thermal Hydraulic Phenomena met on April 20, 1988 to discuss this matter. We also had the benefit of discussions with the NRC Staff and of the documents referenced. The ACRS previously commented on the proposal to issue this rule for public comment in a letter dated September 16, 1986.

The proposed revision to the ECCS rule will eliminate the requirement to use the models specified in Appendix K and allow use of realistic models combined with an uncertainty analysis of the overall calculation. Certain criteria in 10 CFR 50.46, such as 2200°F peak cladding temperature and 17% cladding oxidation, would be maintained. The regulatory guide which will accompany the revised rule describes features of a realistic evaluation model acceptable to the NRC Staff and contains guidance on performing the necessary associated uncertainty evaluation.

No changes have been proposed to the final rule version as a result of the public comments received. The regulatory guide has been modified somewhat to clarify the NRC Staff's intent in certain areas.

The ACRS has long advocated use of best estimate or realistic evaluations for safety analysis. We believe the proposed rule is a major step forward in this effort, and we support its adoption. We wish to note the following points:

- Work to demonstrate the Code Scaling, Applicability, and Uncertainty (CSAU) method for the peak cladding temperature calculated to occur in the reflood phase of a large break LOCA has not been completed. This will be needed to establish guidelines for Staff review of future licensee submittals under the new rule. While the CSAU method has been reasonably demonstrated for the so-called

blowdown peak, application to the reflood demonstration will be more difficult. We do not object to plans to proceed with promulgation of the rule change, but we would like to be kept informed about the development of and allowance for uncertainty in the reflood peak temperature.

- We note that the draft Federal Register notice provided to support the rule change has eliminated reference to any claimed safety advantages for the rule. We believe the safety advantages are substantial.

Additional comments by ACRS Member Harold W. Lewis are presented below.

Sincerely,

W. Kerr
Chairman

Additional Comments by ACRS Member Harold W. Lewis

I have no quarrel with the Committee's letter, but want to seize the opportunity to reinforce a point that has been made before. It is stimulated by unsatisfactory answers to questions at the presentation to the Committee.

The CSAU "methodology" purports to be a systematic procedure for estimating the uncertainty in code calculations. That is a laudable objective, and its achievement would be even more laudable. It would be helpful if, in so doing, there were less confusion between the concepts of uncertainty and a probability distribution, and less misuse of the term "confidence limits." These objectives will not be reached unless some professional statisticians become involved. In this case, it is of more than usual importance, since the uncertainty is directly related to the acceptable level of conservatism which must be added to the realistic calculations.

References:

1. U.S. Nuclear Regulatory Commission, Draft SECY paper for the Commissioners from V. Stello, EDO, "Revision to the ECCS Rule Contained in Appendix K and Section 50.46 of 10 CFR Part 50," provided to the ACRS, April 20, 1988.
2. U.S. Nuclear Regulatory Commission, Draft NUREG-1230, "Compendium of ECCS Research for Realistic LOCA Analysis," Office of Nuclear Regulatory Research, dated April 1987.

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

May 11, 1988

Mr. Victor Stello, Jr.
Executive Director for Operations
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Stello:

SUBJECT: NRC STAFF COMMENTS ON CONSULTATION DRAFT SITE CHARACTERIZATION PLAN

Enclosed is a report of the ACRS Subcommittee on Waste Management relative to the NRC Staff comments on the Department of Energy's Consultation Draft Site Characterization Plan for the Yucca Mountain, Nevada site. This report was provided to the ACRS during its 337th meeting, May 5-7, 1988.

The ACRS members hope you will find it useful.

Sincerely,

Raymond F. Fraley
Executive Director

Enclosure:
Report dated May 5, 1988 of the Meeting of the ACRS Subcommittee on Waste Management on April 28, 1988

cc, w/encl.
S. Chilk, SECY
H. Thompson, NMSS
R. Bernero, NMSS
G. Lear, NMSS
J. Larkins, OCM
M. Lopez-Otin, OCM
J. Scarborough, OCM
J. Kotra, OCM
M. Federline, OCM

5.

Dated: May 5, 1988

# REPORT OF MEETING OF ACRS SUBCOMMITTEE ON WASTE MANAGEMENT April 28, 1988

## I. INTRODUCTION

During a meeting on April 28, 1988, the Waste Management Subcommittee of the Advisory Committee on Reactor Safeguards reviewed the comments prepared by the NRC Staff based on their technical review of the Consultation Draft Site Characterization Plan (CDSCP) for the Yucca Mountain, Nevada Site as issued by the U. S. Department of Energy (DOE). Members of the Subcommittee participating in this meeting were Dade W. Moeller, Paul G. Shewmon, and Martin J. Steindler. Attending the meeting as consultants to the Subcommittee were J. Carson Mark and John C. Maxwell. Listed below are the comments and/or suggestions made on this matter by the Waste Management Subcommittee as a result of this meeting.

## II. COMMENTS AND/OR SUGGESTIONS

### A. General

In general, the comments prepared by the NRC Staff are comprehensive and thorough, and they appear to cover all key points. The comments also reflect considerable time, effort, and diligence on the part of the NRC Staff. In the opinion of the Subcommittee, the NRC Staff is to be complimented, not only on the technical quality of their review, but also on the fact that, through the approach they have chosen, the iterative process of their interactions with the DOE Staff is being made a part of the public record and is thus readily available for access by all interested parties.

The Waste Management Subcommittee generally agrees with the comments submitted by the NRC Staff and believes that they should be transmitted to DOE for resolution, including, particularly, the list of the five "Objections" to the CDSCP. As noted below, however, the Waste Management Subcommittee believes that the NRC Staff might give consideration to highlighting in their report other concerns worthy of being considered as important as the "Objections."

### B. Specific

In terms of specific comments, the Waste Management Subcommittee offers the following:

1. The system currently being used to designate concerns of greatest importance, the "Objections," is that they "be of such immediate seriousness to the site characterization program that NRC would recommend that DOE not start work until they are satisfactorily resolved."

   We believe that it would be useful for the NRC Staff to modify

their report so as to emphasize additional concerns that are of importance to the longer range development of the repository. Examples, some of which we believe represent fundamental flaws in the approach being taken by DOE, include:

a. A basic "theme" projected by the five "Objections" raised by the NRC Staff is a lack of conservatism on the part of the U.S. Department of Energy (DOE) in the development of its plans for characterizing the proposed repository site. Whereas the NRC Staff favors adopting a conservative approach, which could then be relaxed if further analyses justified it, the DOE appears to prefer to begin with a nonconservative approach and then to tighten up the requirements at a later time, if necessary. While the Waste Management Subcommittee understands that the DOE approach reflects to some degree the urgency seen by that Agency in moving ahead with plans for the repository (and their emphasis that the project be conducted in a cost-effective manner), it is quite possible that the development and implementation of a more conservative approach at this stage in the process will save time and money in the long run. To assist in this effort, the NRC Staff might consider providing specific guidance to the DOE Staff relative to the degree of conservatism that they would consider acceptable for those items where this difference is in question.

b. In its efforts to meet the requirements regarding waste releases, the DOE Staff has proposed three design objectives for the waste package. On examination, the NRC Staff has discovered that the requirements for the pre-closure phase for the repository are less stringent than those for the post-closure phase.

   This has led to design objectives that are both internally inconsistent and nonconservative. This is a serious deficiency in the CDSCP, and it should be emphasized in the NRC Staff review. To the extent that these deficiencies represent differences of opinion on the part of the NRC and DOE staffs, such differences should be clarified and clearly enunciated.

c. A third important area of concern is illustrated by the positions or approaches taken by DOE that appear not to comply either with the Standards for a high-level waste repository, as promulgated by the U. S. Environmental Protection Agency, or with the regulations promulgated by the NRC to assure compliance with the EPA Standards. Again, we believe that these examples of apparent noncompliance may represent a fundamental weakness in the DOE approach.

d. A fourth area of importance relates to premature acceptance of a geologic model for the Yucca Mountain site, a complex area characterized by geologically recent volcanic activity and faulting. Based on our interpretation of the NRC Staff review, we believe that certain portions of the data on geology, as presented in the CDSCP, are technically inadequate. This, again, appears to reveal a deficiency. The NRC Staff has noted DOE's inability or unwillingness to consider alternative explanations or mechanisms for selected phenomena, when such alternatives remain clearly within the scope of the data. This inflexibility could seriously hamper application of demonstrably sound technical judgment.

e. Discussions with the NRC Staff and Waste Subcommittee consultants revealed that movement along some of the faults near the proposed repository, and the weight of the rock overhead, could result in shifts (lateral, vertical or rotational) that might cause the host rock to shear and thereby place stresses on the waste canisters. This, in turn, could lead to the loss of their integrity. This is a matter that should be given attention.

f. Another concern may include the matter of volcanism. The presence of a nearby volcanic cone, apparently active within geologically recent time, as well as hot springs, may signal the need to evaluate the potential for thermal instabilities at the repository site. This concern should be addressed and resolved by DOE, to the satisfaction of the NRC Staff.

## III. SUGGESTED IMPROVEMENTS REGARDING NRC COMMENTS

One way that the NRC Staff might modify their review of the CDSCP to emphasize the additional concerns cited above would be to group the current list of "Comments" into several categories, depending on their importance and the type of problems they reflect. One possible approach, for example, would be to group the "Comments" into those that reflect a nonconservative approach on the part of the DOE Staff, those that reflect apparent nonconformance with EPA standards or NRC regulations, and those that reflect approaches to geological matters that are technically inadequate.

## IV. ADDITIONAL COMMENTS

1. It should be noted that the comments given above are preliminary and are based on an incomplete review by the Subcommittee of the CDSCP as well as the areas of concern expressed by the NRC Staff. As time permits, we plan to conduct more in-depth reviews of selected portions of the CDSCP. Specific areas that have been selected for more detailed analysis include "Performance Allocation" and "Performance Assessment."

2. In our review of the work of the NRC Staff in evaluating several DOE repository related programs, we were impressed by several aspects of the Staff's approach that we believe are worthy of special mention. One is their concerted effort to examine the CDSCP at this time in sufficient detail to try to assure that all questions of importance are raised at this early stage in the review process.

   Another is their effort to require DOE both to implement an acceptable QA program and to develop an inhouse means for its review and audit. With this program in place, the primary function of the NRC Staff in the QA area will be to review and critique the DOE auditing procedures. If the DOE QA program and auditing procedures pass NRC scrutiny, this should provide reasonable assurance that the DOE QA program is adequate. The burden for assuring that the procedures are followed will then rest with the DOE Staff, not with the NRC.

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

May 11, 1988

Mr. Victor Stello, Jr.
Executive Director for Operations
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Stello:

SUBJECT: "BELOW REGULATORY CONCERN" AND "DE MINIMIS" CONCEPTS

Enclosed is a report of the ACRS Subcommittee on Waste Management relative to the NRC Staff's position paper on the applicability of "below regulatory concern" and "de minimis" concepts to Commission policies. This report was provided to the ACRS during its 337th meeting, May 5-7, 1988.

These comments are based on a review of your memorandum (SECY-88-69) of March 8, 1988, as well as a meeting held by the Subcommittee with the NRC Staff on May 4, 1988. Since the information it contains may be of interest, we are also enclosing a memorandum from M. Steindler to D. Moeller dated May 6, 1988.

The ACRS Members hope you will find this material useful.

Sincerely,

Raymond F. Fraley

Raymond F. Fraley
Executive Director

Enclosures:
1. Report dated May 5, 1988 of the Meeting of the ACRS Subcommittee on Waste Management on May 4, 1988
2. Memorandum from M. Steindler to D. Moeller dated May 6, 1988

cc, w/ encls.
S. Chilk, SECY
H. L. Thompson, NMSS
R. Bernero, NMSS
G. Lear, NMSS
E. S. Beckjord, RES
J. Larkins, OCM
M. Lopez-Otin, OCM
J. Scarborough, OCM
J. Kotra, OCM
M. Federline, OCM

6.

Dated: May 5, 1988

REPORT OF MEETING OF THE THE ACRS SUBCOMMITTEE
ON WASTE MANAGEMENT
MAY 4, 1988

I. Introduction

During a meeting on May 4, 1988, the Waste Management Subcommittee of the Advisory Committee on Reactor Safeguards met with the NRC Staff to discuss the applicability of de minimis and Below Regulatory Concern (BRC) concepts to Commission policies. Members of the Subcommittee participating in this meeting were Dade W. Moeller, Chairman, Forrest J. Remick and Martin J. Steindler, members. Serving as consultants and expert advisors to the Subcommittee were Melvin W. Carter, Richard F. Foster, and Frank L. Parker. Summarized below are the observations and suggestions made on this subject by the Subcommittee as a result of discussions that took place during this meeting.

II. Responses to Questions in SECY-88-69

As part of its deliberations, the Subcommittee addressed each of the six issues enumerated in the memorandum of March 8, 1988, from the EDO to the Commissioners. These issues and the comments of the Subcommittee on each are given below.

Issue #1: "What benefit would be realized in establishing a generic BRC level as opposed to source specific levels (e.g., low-level waste streams, decommissioned lands and structures, recycled materials and equipment, consumer products, etc.)?"

Response: The Subcommittee strongly recommends addressing this matter on a generic basis. Advantages of this approach include:

(a) It would enable the NRC to set down relevant basic criteria and approaches.

(b) It has the potential for providing a mechanism for bringing consistency to the establishment of a BRC level for each of the multitude of sources and practices being addressed, i.e., it would enable the BRC level for each source or practice to be part of a systematic pattern.

(c) It would avoid the necessity of holding rulemaking hearings on the establishment of a BRC level for each source or practice.

Issue #2: "Of the possible ways to express BRC levels (e.g., cancer risk, individual dose, collective dose, exempted quantities or concentrations), which are appropriate for the various sources or practices licensed by NRC?"

ENCLOSURE 1

Response: The Subcommittee believes that the BRC level should be expressed in terms of the health risks to an individual. Such an approach would have several advantages:

(a) It would permit all sources and practices to be treated on a comparable basis.

(b) It would permit comparisons to be made between the BRC level for radioactive and other toxic (nonradioactive) substances.

(c) It would avoid the necessity of changing the BRC level as new data are developed on the quantitative relationship between radiation doses and their associated health effects.

To implement this approach, it would be necessary for the NRC Staff to develop a hierarchical system of supplementary guidance, similar to that recommended by the ACRS in the development and implementation of the Safety Goals for nuclear power plants. This hierarchical system would include secondary or tertiary guidance in the form of dose limits, radionuclide concentration limits, limits for surface contamination, etc. In this regard, we applaud the adoption by the NRC Staff of the effective dose equivalent as a means for expressing both single organ and whole body exposures.

Issue #3: "Given the complexity of some licensed activities, some of which may involve multiple contribution to public dose, what are the most useful definitions of 'sources' and 'practices' for which BRC dose limits would be developed?"

Response: We believe that the draft report of the Nuclear Energy Agency/International Atomic Energy Agency (NEA/IAEA) Expert Group on "Exemption of Radiation Sources and Practices from Regulatory Control" offers a useful beginning for the development of definitions of "sources" and "practices." The Expert Group defined a "practice" as:

> "a set of co-ordinated and continuing activities involving radiation exposure which are aimed at a given purpose, or the combination of a number of similar such sets."

And the Expert Group stated that a "source":

> "is simply the radioactive material, the equipment emitting radiation or containing radioactive material or the installation (or group of installations) producing or using radioactive material..."

Following this approach, the Subcommittee believes that a "source" might be defined as:

> "a physical entity that can be separately regulated or controlled."

1. Although the Subcommittee fully endorses the undertaking by the NRC of an effort to establish a BRC level, we believe it is important to recognize the complexity of this task. In essence, this effort is designed to answer the question, "How Safe is Safe Enough?" Whereas the establishment of Safety Goals for nuclear power plants answered this question for that portion of NRC's licensing responsibilities, the current effort is designed to answer the same question for a host of other sources and practices, some of which will apply to individual sources and practices at nuclear power plants. Since the Safety Goals for nuclear power plants appear to have gained wide acceptance, we would urge that the BRC level, under consideration here, reflect a health risk comparable to these Goals. Such an approach would constitute a first step for bringing consistency to the regulation of a multitude of sources and practices currently being addressed on an individual (and sometimes unccordinated) basis. Further, we believe that attaining general consistency among the various public risk goals being established by the NRC would represent a major contribution towards improved national regulation and towards increased respect for the regulatory process.

2. We recommend that the Commission concentrate on the establishment of a BRC level that places a limit on the health risks to individual members of the public. Such an approach, in our opinion, will assure that the associated collective doses are acceptable.

3. In the draft NEA/IAEA report, the suggestion was made that variations in the doses from natural background radiation could be used as a basis for the establishment of a BRC level. As stated above, we believe that consideration of the associated health risks to individuals can serve as a better basis for the establishment of such a level.

   Should the NRC decide, however, to use variations in natural background as one of several bases for setting a BRC level, we believe it is important to restrict these considerations to variations in the ambient (outdoor) natural background radiation. In our opinion, the consideration of variations in radiation dose rates inside buildings, which include "technologically enhanced" sources such as radon, would be inappropriate.

4. Regardless of the level ultimately considered to be BRC, it should be recognized from the onset that it will be impossible (with current technology) to measure the associated doses. Major reliance will have to be placed on mathematical models for estimating impacts individually and collectively on members of the public that arise as a result of the movement of radionuclides through a variety of environmental pathways under a range of scenarios. For this reason, it is important that such models, and the associated computer codes, be evaluated and validated. Included in such evaluations should be a determination of the uncertainties associated with the final dose estimates.

Issue #4: "If cost vs. risk reduction analyses are to be performed to establish BRC levels, what cost-averted/risk ratio (or ratios) should be used for the various licensed sources or practices?"

Response: Although we foresee the need to apply optimization evaluations (cost vs. risk reduction analyses) in the initial efforts to establish an appropriate BRC level for a range of classes of sources and practices that involve radioactive materials, once this effort is completed on a generic basis there should be no need to repeat it for the subsequent evaluations of individual sources and practices. In particular, we see no need to apply optimization techniques to sources or practices whose associated risks fall at or below the applicable BRC level. To establish the cost-averted/risk ratio (or ratios) that should be used in such analyses, we recommend the use of rulemaking hearings. The documents supporting the establishment of Title 10, CFR Part 50, Appendix I indicated that such hearings were to be held. So far as we know, this has never been done.

Issue #5: "What approach should be taken to translate operational BRC levels (such as individual or collective dose or exempt quantities and concentrations) into fatality or cancer risks given the absence of data correlating such levels with risk (i.e., do we use the linear non-threshold dose-response relationship at very low doses)?"

Response: Although we realize that the assumption and application of a linear relationship has limitations, at the present time we know of no approach that is demonstrably superior. To assure that the risk coefficient applied in the associated calculations is acceptable, the Commission might consider requesting the support and assistance of an independent group such as the National Council on Radiation Protection and Measurements, or the Committee on Interagency Radiation Research and Policy Coordination (CIRRPC).

Issue #6: "Can a dose or risk be set at which radioactivity can be ignored (i.e., can a definition of radioactivity be usefully established)?"

Response: The Subcommittee strongly recommends that the NRC concentrate its efforts on the establishment of a BRC level, leaving the matter of the establishment of a de minimis level to other groups such as the U.S. Environmental Protection Agency or an interagency committee (such as CIRRPC). So far as we know, the NRC does not need to define at this time the conditions under which a material or substance needs to be considered "radioactive." Should special circumstances show that such a definition would be useful, we would recommend that the concentration (2 nCi/g) specified by the Department of Transportation (and cited in 10 CFR Part 71) be used.

## III. Additional Comments

In the way of additional comments, the Subcommittee offers the following:

5. One characteristic of sources or practices that we believe should be included among the considerations taken into account in the establishment of secondary or tertiary guidance, is the matter of the half-lives of the radionuclides involved. Whereas radionuclides, such as $^{60}Co$, once released into the environment can be expected to decay and thus be "removed" from the environment within a matter of decades, and radionuclides such as $^{90}Sr$ and $^{137}Cs$ will decay within a matter of several centuries, long-lived materials, such as $^{239}Pu$, represent what must be considered as "permanent" contamination. Although evaluating the associated risk of extremely long-lived radionuclides on the basis of their lifetime dose commitment tends to compensate for this concern, it may well be that guidance for the control of these radionuclides should be more restrictive than that for sources and practices involving shorter-lived materials. Once released, long-lived materials represent a dose commitment to existing as well as to future generations.

6. It should also be recognized that the establishment of a BRC level, and the declaration that a given source or practice falls into this category, is not an action that is to be taken once and for all. The NRC Staff should be asked periodically during subsequent years to reexamine given sources and practices to assure that the anticipated characteristics and behavior of these sources and practices continue to be as originally assumed. Where changes and/or deficiencies are found, suitable adjustments should be made.

7. On the basis of our review, it would appear that, depending on the source or practice, health (fatal cancer) risks that would be representative of an acceptable BRC level would be less than $10^{-6}$ per year. Corresponding acceptable lifetime health risks would thus be less than $10^{-4}$.

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

May 6, 1988

MEMORANDUM FOR: D. W. Moeller

FROM: M. J. Steindler

SUBJECT: DECISION MAKING FOR "BELOW REGULATORY CONCERN"

The meeting of the Waste Management Subcommittee on May 4, 1988 on the subject topic uncovered, somewhat as expected, a tangle of issues, existing numerical values, past practices, and uncertain basic data about Below Regulatory Concern (BRC). It may well be that the individual Commissioners have not had the time to study in-depth this convoluted topic. It might be noted, however, that the question posed by them and reflected in SECY 88-69, the transcript of the briefings by the staff, and the questions posed by Commissioner Bernthal are all pointedly directed at important aspects of the BRC controversy. Further, the basic decision identifying a policy base for the NRC may well be made on non-technical considerations, but the need to identify consequences of such decisions falls on the technical community.

If the Commission desires to participate in the October international meeting on BRC and there put forth a thoughtfully developed U.S. position, we as advisors should aim to provide them with a communication that, together with the transcript of the subcommittee meeting, could clarify the issue. In that connection, it may be that the following could be of use:

I. Some basic principles for evaluating BRC levels.

I believe that there were a number of basic principles enunciated in masked fashion during our meeting. Some appear mutually contradictory and very likely no two or more could be applied simultaneously. These include:

A. If an analysis shows that, for a given level (concentration) of radioactive material, regulation of that material will not reduce the risk from it, then that level is BRC;

B. If regulation requires expenditure of more than $1000 per man-rem avoided, that level is BRC;

C. If the risk from a source is comparable to that from natural background (or some fraction thereof), that source level is BRC;

LTR-05T40344 2PP

ENCLOSURE 2

D. If the risk from a source cannot be experimentally measured, then that source is BRC;

E. If the risk from a source is less than that from known sources now not regulated, then the source is BRC;

F. If the risk from a source is equivalent to the reactor safety goal, currently believed to be in the range of 12 - 20 mrem/y, then that source is BRC;

G. If the risk from a source is 0.1% of other risks accepted in society, then the source is BRC;

H. If the risk from a source is calculated to be less than the risk used by other agencies to define their BRC, then the source is BRC for the Nuclear Regulatory Commission;

I. If a source is arbitrarily determined to represent a low risk, declare this to be BRC but agree to examine the evidence periodically to evaluate the need for modification of the BRC level;

J. If ALARA practices no longer yield a reduction in risk, that level is BRC.

Clearly, each one of these "principles" can be applied to scenarios that will yield a number, generally a source strength, that can be translated into an absorbed whole body equivalent dose and a risk level. This listing contains "principles" that would likely not be acceptable by a society that does not treat relative risks on a rational basis, i.e. risks from some sources are more acceptable than the same risk from other sources.

II. Average value of the BRC risk

It seems likely that some of the items I.A-J are unsuited for further consideration based on the likely magnitude of the contained risk. Eliminating these (e.g., I.G., I.D.) reduces the list of potentially applicable bases for setting the BRC to those whose calculated values may fall into a relatively narrow range. I believe this range could be defined and may well be close to the 1-10 mrem/y that was mentioned as seeming reasonable on the basis of what we heard. While the process of "expert opinion" is acceptable in some quarters, the Commission may require something different. It may be useful, therefore, to urge the staff to provide numerical values for the estimated risk based on the selected "principles" noted in Section I.

III. Conclusion

I believe we can conclude and transmit to the Commission two comments pertinent to the BRC matter before it.

A. The levels of BRC in terms of curies or curies per unit mass, i.e., a measurable value, no matter how derived, should use individual health risk (cancer deaths) as its basis.

B. While it is difficult to rationalize a narrow (single) basis for determination of the risk that is derived from sources that are BRC, it appears that there is a good chance that an acceptable risk will result from a BRC source that yields an annual effective dose equivalent in the neighborhood of 10 mrem. Therefore, if many pertinent "principles" result in this value, this would point to the rationalization of such a risk.

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

May 10, 1988

Mr. Victor Stello, Jr.
Executive Director for Operations
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Stello:

SUBJECT: REVISION 2 TO REGULATORY GUIDE 1.100, "SEISMIC QUALIFICATION OF ELECTRIC AND MECHANICAL EQUIPMENT FOR NUCLEAR POWER PLANTS"

During the 337th meeting of the Advisory Committee on Reactor Safeguards, May 5-7, 1988, we concurred in the regulatory position proposed in Revision 2 to Regulatory Guide 1.100, "Seismic Qualification of Electric and Mechanical Equipment For Nuclear Power Plants."

Sincerely,

William Kerr
Chairman

References:
Memorandum dated March 21, 1988 from Eric S. Beckjord, Office of Nuclear Regulatory Research, to Raymond F. Fraley, ACRS, transmitting:

a. Revision 2 to Regulatory Guide 1.100, "Seismic Qualification of Electric and Mechanical Equipment For Nuclear Power Plants," March 1988.
b. IEEE Std. 344-1987, "Recommended Practices for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations."
c. Public Comment Letters
d. Resolution of Public Comments

cc: S. J. Chilk, SECY
T. Rehm, EDO
E. Beckjord, RES
G. L. Arlotto, RES
S. K. Aggarwal, RES
C. Bartlett, RES
A. Cappucci, NRR



7.