JAN 15 1993

MEMORANDUM FOR: Robert L. Baer, Chief
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Division of Safety Issue Resolution
Office of Nuclear Regulatory Research

FROM: Moni Dey, Senior Task Manager
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SUBJECT: PUBLIC MEETING WITH NUMARC ON ELIMINATION OF REQUIREMENTS MARGINAL TO SAFETY

A public meeting was held with NUMARC on December 18, 1992 to discuss issues related to regulations that are marginal to safety, in particular, the current requirements for containment leakage testing. A list of attendees and the agenda are included as Enclosures A and B.

NUMARC provided the NRC staff with their comments on the schedule/scope of activities for the initial three-year review period and indicated their interest in expediting and completing modifications in all eight areas identified in the staff plan by 1995. NUMARC indicated that industry is prepared to fully support the staff efforts to accomplish the objectives.

The staff presented preliminary notes (Enclosure C) for a framework for transforming from a prescriptive to a performance-based regulatory approach, and specific potential applications to three regulations. NUMARC indicated it would follow-up its comments provided to the NRC on May 4, 1992 in this area, in response to a Federal Register notice published on February 4, 1992 (57 FR 4166).

The staff presented its draft plans (Enclosure D) for tasks for revision to containment leakage testing requirements and discussed potential industry efforts for the tasks. NUMARC reassured the staff that it would coordinate industry input for cost impact data, and would consider the suggested development of methodologies and implementation guidance.

The next meeting was scheduled for late January 1993.

ORIGINAL SIGNED BY

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ENCLOSURE A

ATTACHMENT A

NRC/NUMARC MEETING
REGULATIONS MARGINAL
TO SAFETY
December 18, 1992

	NAME	ORGANIZATION	PHONE #
1.	Moni Dey	NRC/RES	(301) 492-3730
2.	TREVOR COOK	DOE	(301) 903-7046
3.	Frank Cherny	NRC/RES	(301) 492-3945
4.	Robert Bater	NRC/RES	(301) 492-3930
5.	Frank Gillespie	NRC/NRR	(301) 504-1275
6.	Alex Marion	NUMARC	(202) 872-1280
7.	Tony Pietrangelo	NUMARC	202-872-1280
8.	MORRIS SCHREIM	NUMARC	(202)-872-1280
9.	MARTY BOWLING	VIRGINIA POWER	(804)-273-2699
10	Warren Minners	NRC/RES/DSIR	301 492 3900
11.	JACK HELTEMES	NRC/RES	301-492-3720
12.	[illegible]	[illegible]	[illegible]
13.	LOUIS LAKE	PSE&G/NUMAR	609-339-2457
14	WALT SMITH	NUMARC	202-872-1280

ENCLOSURE B

NRC/NUMARC MEETING

REGULATIONS MARGINAL TO SAFETY

December 18, 1992

AGENDA

- Schedule/Scope of Activities for Initial Three-Year Review Period
- Framework for a Performance-Based Regulatory Approach
- Purpose of Workshop
- Purpose of Site Visits
- Appendix J
- Other Regulations
- Next Meeting

ENCLOSURE C
ATTACHMENT C

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PRELIMINARY NOTES FOR
FRAMEWORK FOR TRANSFORMING FROM A PRESCRIPTIVE TO A
PERFORMANCE-BASED REGULATORY APPROACH

(These are notes to facilitate discussion and are not staff proposals at this stage)

Preliminary Criteria for Developing Performance-Based Regulations

A. Revised rules will focus on establishing the regulatory/safety objective in as an objective manner as possible. The main aim of a performance-based regulatory approach is to allow licensees flexibility to use cost-effective methods for implementation of the objectives.

B. The regulatory objective will be derived, to the extent feasible, from risk considerations and relationship tc safety goals.

C. Detailed technical methods for measuring or judging the acceptability of licensee's performance relative to the regulatory objectives will be

provided in Regulatory Guides. To the extent possible, approved industry standards and guidance will be endorsed in this regard.

D. Collective industry effort (NUMARC, EPRI, Owner's Groups) are encouraged to maintain standardized industry practices.

E. The new rules will be optional for current licensees and thus licensees can decide to remain in compliance with current regulations.

F. Scope of this effort will not be limited to regulations, but will address the body of regulatory practice e.g. SRP, inspection procedures, technical specifications, and other regulatory documents.

G. Performance-based regulatory approach should provide incentives for innovation and improvements in safety.

H. The following issues with regard to the three proposed rulemaking activities need to be addressed in the process:

(1) Can the new rule and its implementation yield an equivalent level of, or only have a marginal impact on, safety.

(2) Can the regulatory/safety objective (qualitative or quantitative) be established in an objective manner to allow a common understanding between licensees and the NRC on how the performance or results will be measured or judged.

(3) Can the regulation and implementation documents be developed in such a manner that they can be objectively and consistently inspected and enforced against.

Specific Potential Applications of a Performance - Based Regulatory Approach

I. Containment Leakage and Testing Requirements

Present Regulatory Objectives:

A. Containment Leakage: GDC 16 - Provide essentially leak-tight barrier against uncontrolled release of radioactivity to environment for postulated accidents (leak-tightness is specified with a allowable leakage rate in the plant technical specifications).

B. Containment Testing: Test the overall containment, pressure-containing or leakage-limiting boundaries, and containment isolation valves at specific intervals (identified in rule) to confirm and provide confidence the allowable leakage rate will not be exceeded for postulated accidents.

Background:

- Present information of risk from postulated accidents indicate that the allowable leakage rate from containments can be increased.
- Risk studies have shown that control of containment leakage at low rates is not as risk significant as previously assumed.
- Containment leakage tests are conducted to confirm the availability of the containment, and they indirectly reduce risk based on these assumptions.

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Potential Modifications:

o Two separate initiatives:

A. Increase allowable containment leakage rate based on safety goals and PRA technology (define new performance standard). Rulemaking may not be necessary since leakage rate is specified in Technical specifications.

B. Modify Appendix J to a performance-based regulation:

- Limit revised rule to a new regulatory objective: In order to ensure the availability of the containment during postulated accidents, licensees should either: (a) test overall containment leakage no longer than every 10 years, and test pressure-containing or leakage-limiting boundaries and containment isolation valves on an interval based on the performance history of the equipment; or (b) provide an on-line monitoring capability of containment isolation status.

- Move details of the tests and reporting in Appendix J to a Regulatory Guide as guidance.

- Endorse approved industry standards on: (1) Guidance for calculating plant-specific allowable leakage rates based on new NRC performance standard; (2) Guidance on the conduct of containment tests; and (3) Guidance for on-line monitoring of containment isolation status.

- Current detailed requirements in Appendix J will continue to be acceptable for compliance with the modified rule (licensees presently in compliance with Appendix J will not need to do anything if they do not wish to change their practice).

II. Fire Protection Requirements (Appendix R to 10 CFR 50)

Present Regulatory Objective:

SSC important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effects of fires and explosions - GDC 3.

Background:

o Appendix R expands on the above regulatory objective by: (1) specifying fire damage limits to trains of systems associated with achieving and maintaining safe shutdown conditions, or; (2) requiring an alternative or dedicated shutdown capability if fire damage limits cannot be achieved.

o Appendix R contains further specific requirements for separation criteria to achieve fire damage limits, water supplies for fire suppression systems, valves, manual fire suppression, tests, automatic fire detection, fire brigade, emergency lighting, administrative controls, design of alternative and dedicated shutdown capability, fire barrier cable penetrating seal qualification, and fire doors.

o PRA technology is now available to determine the risk significance of fire sequences in various areas of a plant, and may provide a basis for the design of fire protection features.

Potential Modification:

Modify Appendix R to a performance-based regulation:

o Replace deterministic criteria in App. R that specify limits to fire damage to trains of systems with criteria that allows the use of PRA

technology and risk significance of fire sequences to determine fire protection features (establish quantitative criterion related to safety goals if feasible).

o Move various means for achieving the regulatory objective of Appendix R, including fire damage limits to trains of systems and necessary separation criteria, to a Regulatory Guide.

o Endorse approved industry standard on the use of PRA technology in determining fire protection features in a Regulatory Guide.

o Current detailed requirements in Appendix R will continue to be acceptable for compliance with the modified rule (licensees presently in compliance with Appendix R will not need to do anything if they do not wish to change their practice).

o The following areas of fire protection requirements in Appendix R have potential for reduction in burden with marginal impact on safety (these areas were previously identified in NUREG/CR-4330, Vol 1, "Review of Light Water Reactor Regulatory Requirements," April 1986): (1) Disabling of automatic features; (2) Transient combustible load assumptions; (3) Loss of offsite power; (4) Three-hour fire barriers; (5) Allowance for operator actions and (6) Emergency lighting.

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III. Standard for Combustible Gas Control System in Light-Water Cooled Power Reactors (10 CFR 50.44)

Present Regulatory Objective:

Each boiling or pressurized light-water nuclear power reactor fueled with oxide pellets within cylindrical metal cladding shall include means for control of hydrogen gas, generated following risk-significant postulated accidents, that is necessary to ensure that containment structural integrity is maintained and its leakage does not exceed the rate specified in Criterion 16 of Appendix A of 10 CFR Part 50 following combustion or detonation of hydrogen during the postulated accidents. Postulated accidents shall include those that lead to: (1) degraded core conditions without reactor pressure vessel (RPV) failure for light-water reactors whose application for a construction permit or manufacturing license was granted before February 16, 1982; or (2) full core melt with RPV failure for light-water reactors whose application for a construction permit or manufacturing license was pending as of, or submitted after, February 16, 1982.

Background:

o 10 CFR 50.44 presently requires the following for operating reactors:

- Recombiners for all types of containments to control hydrogen generated in a postulated LOCA involving about 5% of the cladding (Later Mark I and II containments were exempted from this requirement).

- Mark I and II containments were required to be inerted, considering postulated severe accidents.

- BWR Mark III and Ice Condenser pressure-suppression containments must have a control system for hydrogen generated from reactions involving 75% of the fuel cladding, based on a limiting case of degraded core accidents without RPV failure.

- Large dry containments were excluded from above requirement to control hydrogen from reactions involving 75% of fuel cladding, because of its capability to withstand pressures resulting from combustion/denotation of large amounts of hydrogen generated during postulated severe accidents.

- Large dry containments have not been exempted from requirement for recombiners which are not effective for controlling hydrogen generated from risk-significant severe accident sequences (this issue has been under consideration as a marginal-to-safety requirement).

o 10 CFR 50.34(f) addresses hydrogen control for future plants and requires systems that can control hydrogen generated from reaction of 100% of the fuel cladding.

o 10 CFR 50.44 and 50.34 are rules that evolved through the years and have become prescriptive. They specify the design capacity of hydrogen control systems and thus may not encourage the design of or allow credit for systems/features that could decrease the amount of hydrogen generated.

Potential Modification:

Modify 10 CFR 50.44 and 10 CFR 50.34(f) (ix) to a performance-based regulation:

o The above present regulatory objective could be the revised rule.

o Eliminate amounts of hydrogen to be controlled from the rules.

o Transfer staff positions on methods to meet the performance standards to a Regulatory Guide (e.g., operating Mark I and II containments should be inerted, and operating BWR Mark III and PWR Ice Condenser containments should control hydrogen generated involving 75% of the fuel cladding).

o Establish regulatory position that recombiners can be eliminated from large dry and subatmospheric containments.

o Transfer staff position, that future reactors address hydrogen generated involving 100% of cladding, from 10 CFR 50.34 (f) (ix) to a Regulatory Guide.

o Licensees currently in compliance with 10 CFR 50.44 will continue to be in compliance with modified rule.

o A need for industry effort in this area is not anticipated, unless industry has any new and alternative proposals for meeting the regulatory objectives.

ENCLOSURE D

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TASKS FOR REVISION TO CONTAINMENT LEAKAGE TESTING REQUIREMENTS

1. Define in a new regulation a performance standard for allowable containment leakage rate based on safety goals and PRA technology, in lieu of 10 CFR 100 dose requirements (NRC).

2. Update risk/cost impact study in NUREG/CR 4330 Vol. 2 for increasing the allowable containment leakage rate with latest PRAs including those documented in NUREG-1150 (NRC/Contractor). Has industry/EPRI done any studies in this area that could also be used? Will NUMARC coordinate industry input for cost impact?

3. Define in the new regulation (same as for 1.) types/options for tests required to demonstrate performance standard will be met during postulated accidents (NRC).

4. Evaluate risk/cost impact for increasing the interval for overall containment leakage (App. J Type A) tests (NRC/Contractor). Has industry/EPRI done any studies in this area that could also be used? Will NUMARC coordinate industry input for cost impact?

5. Evaluate/Develop methodology, and risk/cost impact, for testing pressure-containing or leakage limiting boundaries and containment isolation valves (App. J Type B & C tests) on an interval based on the performance history of the equipment (NRC/Contractor). Has industry developed, or willing to develop, any methodologies in this area? Will NUMARC coordinate industry input for cost impact?

6. Evaluate/Develop methodology, and risk/cost impact (relative to App. J Type A tests), for an on-line monitoring capability of containment isolation status. The evaluation should include a review of NUREG-1273, "Technical Findings and Regulatory Analysis for Generic Safety Issue II.E.4.3 - Containment Integrity Check", and methodologies developed in Sweden, France and Belgium (NRC/Contractor). Has industry developed, or willing to develop, any methodologies in this area? Will NUMARC coordinate industry input for cost impact?