



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

~~ENCLOSURE-1~~

Item #2

JUL 27 1983

MEMORANDUM FOR: R. W. Houston, Assistant Director for Reactor Safety, DSI
FROM: W. R. Butler, Chief, Containment Systems Branch, DSI
SUBJECT: PROPOSED STAFF POSITION DEALING WITH HYDROGEN CONTROL
FOR MARK III CONTAINMENTS

We have prepared a proposed staff position as detailed in the enclosure, which we would recommend as the staff's response to the BWR Mark III Hydrogen Control Owners Group presentation anticipated for the upcoming meeting of July 28, 1983.

Since most of the elements of the enclosed position are not likely to be met by MP&L in time to support the initial full power licensing of Grand Gulf, an additional course of action is recommended for that particular application. The framework of our recommendation for Grand Gulf is as follows:

1. Recommend full power licensing of Grand Gulf for a period of about a year on the following basis:
 - a. All H₂ control requirements for the DBA are satisfied;
 - b. All TMI Lessons Learned Items have been implemented thus reducing the likelihood of degraded core accidents; and
 - c. The installed Hydrogen Igniter System provides some improvement in H₂ control capability for dealing with degraded core accidents.
2. Require demonstration by MP&L prior to initial full power licensing of Grand Gulf that drywell temperatures during these events do not cause failure of essential equipment.
3. Impose license conditions to require timely resolution of all outstanding technical items to meet the enclosed staff position.

W R Butler

W. R. Butler, Chief
Containment Systems Branch
Division of Systems Integration

XA Copy Has Been Sent to PDR

Enclosure: As stated

cc: R. Mattson
J. Kudrick
J. Shapaker

Contact: C. Tinkler, CSB 27605

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XA

PROPOSED STAFF POSITION

The generic issue of degraded core accident H_2 control for BWR Mark III containments is a matter which is the subject of ongoing research and review by the NRC and the industry. The requirements for enhanced hydrogen control to deal with degraded core accident H_2 releases which have been imposed on the owners of ice condenser and Mark III plants have been developed to provide assurance that these small volume, low design pressure facilities could successfully accommodate those accidents whose chief threat to safety is derived from large hydrogen generation and release.

The NRC believes that the mission of reducing the risks associated with large H_2 releases may best be served by continuing to require utilities to provide protection for accidents involving the release of H_2 corresponding to a fuel cladding reaction of up to 75%. There is no current binding requirement upon the rate at which H_2 shall be assumed to be released. Therefore, utilities may utilize conservative hydrogen release rates which are representative of physical processes including those which may limit the release rates.

Based on our understanding of the preliminary assessment of the thermal environment as determined by the BWR HCOG we believe it prudent that positive action be taken to improve the capability of essential equipment to survive the effects of hydrogen burning. Essential equipment located in the vicinity of the suppression pool or other regions subjected to severe environments should be relocated wherever feasible. As an alternative for equipment which may not be moved additional thermal protection should be provided.

Additionally, it is our conclusion that the BWR HCOG should continue the investigation of hydrogen combustion via testing in a larger scale facility, such as a $\frac{1}{4}$ scale test. It is important that uncertainties in the characterization of the containment atmosphere response be held to an acceptable minimum level.



Commonwealth Edison
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Items 3+4 2

'82 JAN 28 P2:41

January 25, 1982

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

①
OFFICE NUMBER
PROPOSED RULE **PR 50**
(46FR 62281)

Attention: Docketing and Service Branch

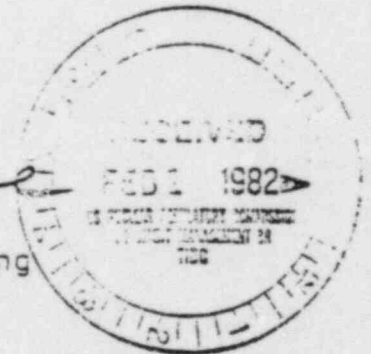
Subject: Proposed Rulemaking 10 CFR Part 50 "Interim Requirements
Related to Hydrogen Control" (46 FR 62281
December 23, 1981)

Dear Sir:

Commonwealth Edison has reviewed the subject proposed
rulemaking and offers the attached comments. We appreciate having
been given the opportunity to comment.

Very truly yours,

L. O. DelGeorge
L. O. DelGeorge
Director Nuclear Licensing



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Attachment

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*ADD:
m. Fleishman*

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PDR RR
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Acknowledged by

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Commonwealth Edison Company Comments
Proposed Rule on Interim Hydrogen Control Requirements
(46 FR 62281 12-23-81)

1. The need to take action on hydrogen control for small, non-inerted containments on an interim basis is fairly clear. However, it is far less clear that a longer term, interim action on other containment types is required or even prudent. The analyses of containment integrity and equipment capability are set forth as being due two years after the effective date of the rule. Any such action for inerted BWR containments and large, dry PWR containments could and should be deferred to the degraded core rulemaking in view of the relative timing of these rules.
2. The use of 75% metal water reaction as a basis for evolved hydrogen does not appear unreasonable as a conservative value. However, each plant should be allowed to assess the plant/containment design for a variety of sequences to ascertain if it is reasonable to postulate that such an amount of hydrogen could exist in a combustible mixture. In many ways, the TMI sequence was very unique and may well represent a near optimum sequence for hydrogen generation and combustion.
3. The two step process related to equipment operability does not appear warranted nor is it well defined. First of all, for rare events such as degraded core events the added conservatism associated with the Eq approach is not warranted and is contrary to broad NRC policy in treating such events. Secondly, no need for such conservatism has been demonstrated by either the TMI event or by subsequent tests or analyses. The combustion of hydrogen, of itself, results in a very short duration temperature/pressure peak which has been calculated and demonstrated to have minimal if any effect on most equipment. The superposition of such a peak on a significant steam backpressure in the containment is realistic only to the extent that such a situation results from a combustible mix. This situation will vary depending on containment design and the sequence being considered. Attempts to arbitrarily bound this problem may well result in conditions counterproductive in terms of safety. For example, an overly conservative approach might cause the replacement of current, reliable, key equipment with heavily protected equipment of a new design. Such items may be more difficult to maintain, have greater reliance on support systems, and have lower overall reliability due to their lack of operating history.

4. Of the three analysis approaches described in 50.44 (c)(3)(vi), the first approach is the only one that promises to deal with issues in a way that might enhance safety. The last two are far too generic to insure an adequate representation of important parameters for individual plants. The first approach should be modified to allow plants, having an in-place PRA or IREP study, to use sequences from those studies rather than generic sequences. This will insure that plant specific details are considered. It will also allow efforts to be concentrated on the most likely events producing and burning significant hydrogen.

It should be noted that analyses need not be restricted to those done by means of MARCH. A variety of other tools are or will soon be available (such as the IDCOR programs). Such an approach will allow this work to be done more quickly and with reduced overall resource allocation.

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DOCKET NUMBER
PROPOSED RULE

2
PR-50

(46 FR 62281)

February 8, 1982

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
ATTN: Docketing and Service Branch

'82 FEB 17 P3:24

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OFFICE OF SECRETARY
DOCKETING & SERVICE

Re: Proposed rule on interim requirements related to hydrogen control, 46 FR 62281

On December 23, 1981 the Commission published a proposed rule which would require improved hydrogen control capability for BWRs with Mark III containments and PWRs with ice condenser containments. This attempt to require hydrogen control systems in these plants is commendable; however, this proposal has several deficiencies which should be corrected before being incorporated into the Commission's regulations.

First, the rule merely states that owners of said plants are required to submit analyses of their hydrogen control systems. No standards or acceptance criteria for evaluating these analyses are given. It is totally unrealistic to demand analyses without having any guidelines for evaluating them. Furthermore, it is stated (p. 62284) that these analyses are to support the continued reliance on the interim requirements of the present rule and to aid in the long term rulemaking on degraded cores. Apparently the Commission, rather than issuing standards and requiring licensees to meet them, is soliciting suggestions from the licensees as to what constitute appropriate standards. The purpose of the rule is to regulate licensees, not to aid them by letting them write the regulations. The Energy Reorganization Act of 1974 was supposed to have separated the promotion and the regulation of the nuclear industry; the provisions of this interim rule are promotional in that they are designed to justify the status quo.

This is even more apparent upon examining the time schedule for submitting such analyses. The analysis need only be submitted before operation above 5% of rated power and this analysis is "to demonstrate that the installed hydrogen control system is adequate . . ." (emphasis added; p. 62284, item 2). Thus, it appears that this analysis is merely an exercise to justify the hydrogen control system the licensee has already installed. Although analyses are recommended for assessing the effectiveness of alternative systems, no provisions are made for requiring the licensee to install the most effective of the systems analyzed. Should a more effective system exist, it is highly unlikely that a licensee would remove the system already installed in favor of the more effective alternative. The plant construction will have been completed by the time the analyses are required; the licensee would thus have a substantial financial incentive to justify the existing hydrogen control system in the analysis. This analysis should be required before the plant is constructed, as it is at this stage when design changes can be made effectively and cost-efficiently.

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Not requiring analyses until the plant operation exceeds 5% of rated power also has the disastrous effect of removing this issue from the public scrutiny afforded by the licensing process. Given the experience at Three Mile Island, hydrogen control should certainly be a litigable issue. Deferring the consideration of this issue until the plant is ready for full power operation, at which time the public hearings will have been completed, places an added burden on citizens wishing to address this concern; reopening the hearings then is difficult, and the petitioners would have to meet a much higher legal standard. These analyses should be required and made public before the start of licensing hearings. The provisions now proposed only serve to inhibit public participation and input.

Combustible gases pose a serious threat to the integrity of a nuclear power plant and to the health and safety of the public. Regulations concerning the control of these gases should be sophisticated, strict, and enforceable. Such regulations should at least be comparable to the ECCS regulations, 10 CFR 50.46 and appendix K of Part 50, which list specific acceptance criteria and standards for ECCS evaluation models. Until such regulations are promulgated for combustible gas control, the Commission should enforce the present requirements, i.e., that containment atmospheres be inerted pursuant to 10 CFR 50.44(c).

Respectfully submitted,

Susan L. Hiatt

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