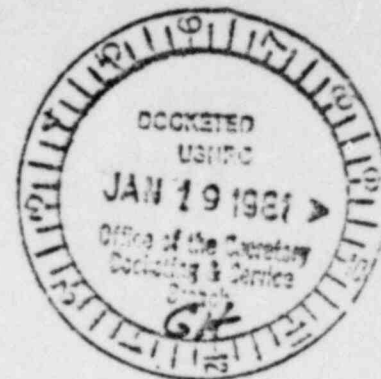


Jan 15, 1981



UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE NUCLEAR REGULATORY COMMISSION

In the Matter of)

METROPOLITAN EDISON)
COMPANY, et al.,)

(Three Mile Island)
Nuclear Station, Unit)
No. 1))

Docket No. 50-289
(restart)



UNION OF CONCERNED SCIENTISTS
OFFER OF PROOF ON UCS CONTENTION No. 11

UCS Contention No. 11 states as follows:

The design of the hydrogen control system at TMI was based upon the assumption that the amount of fuel cladding that could react chemically to produce hydrogen would, under all circumstances be limited to 5%. The accident demonstrated both that this assumption is not justified and that it is not conservative to assume less than the worst case. Therefore, the hydrogen control systems should be designed on the assumption that 100% of the cladding reacts to produce hydrogen.

The licensee and staff objected to this contention as an impermissible challenge to 10 CFR 50.44.* The

* See Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit No. 1), Certifications to the Commission, January 7, 1980, p.3, (hereinafter "certification"). The certification was explicitly made in response to a petition for waiver of 10 CFR 50.44 by intervenor Sholly, whose contention 11 is similar to UCS's. The questions certified were stated broadly enough to include both contentions. Id., p. 12-13

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regulation provides, inter alia, that in designing systems for the control of combustible gas, the bounding assumption is that a maximum of 5% of the zirconium cladding in the core will react with water to form hydrogen. There is no dispute that during the TMI-2 accident, approximately 30 to 50% of the zirconium reacted to generate hydrogen.

The Board certified the following questions to the Commission:

1. Whether the provisions of 10 CFR 50.44 should be waived or exceptions made thereto in this proceeding where a prima facie showing has been made under 10 CFR 2.758 that hydrogen gas generation during the TMI-2 accident was well in excess of the amount required under 10 CFR 50.44 as a design basis for the post-accident combustion gas control system for TMI-1.

2. Whether post-accident hydrogen gas control should be an issue in this proceeding where post-accident hydrogen gas control was perceived to be a serious problem and was in fact a problem during the TMI-2 accident.

In addition, this Board stated the following:

Under 10CFR 2.758(b), the sole ground for a waiver or exception to a regulation shall be that the special circumstances with respect to the subject matter of the

particular proceeding are such that the regulation would not serve the purposes for which it was adopted. Mr. Sholly has made a clear and prima facie showing that, in this proceeding, the applicable provisions of 10 CFR 50.44 will not serve the purposes for which they were adopted. (Certification, p. 5)

On May 16, 1980, the Commission issued by 3-2 vote CLI-80-16 in which it refused to waive 10 CFR 50.44 and held that the adequacy of hydrogen control measures could be litigated under 10 CFR Part 100:

Under Part 100, hydrogen control measures beyond those required by 10 CFR 50.44 would be required if it is determined that there is a credible loss-of-coolant accident scenario entailing hydrogen generation, hydrogen combustion, containment breach or leaking, and offsite radiation doses in excess of Part 100 guideline values. (CLI-80-16, Sl.op. p. 2).

The Union of Concerned Scientists filed with the Commission a Motion for Reconsideration of CLI-80-16 on June 4, 1980. A copy is attached and the substance of the motion will therefore not be reiterated here.

On September 26, 1980, the Commissioners split 2-2 on

UCS's motion for reconsideration. Such a vote constitutes a denial. The separate views of Chairman Ahearne and Commissioner Hendrie reassert that 10 CFR 2.758(b), permitting waiver of a Commission regulation on a showing that "special circumstances with respect to the subject matter of the particular proceeding" indicate that the rule would not serve the purpose for which it was adopted, does not apply where the circumstances extend beyond the particular proceeding. This remarkable position is that, if a rule is proven by events to be generically bankrupt, the Commission may still apply it to individual cases and prevent intervenors from challenging it in those cases. Specifically, since the TMI-2 accident showed that the limiting assumption of 5% zirconium reaction is technically unsupportable for any plant, it can remain unchallengeable for each plant.

The effect of this ruling on UCS's rights is as noted in the separate views of Commissioners Gilinsky and Bradford (Sl.op., p. 2).

Moreover, Chairman Ahearne and Commissioner Hendrie are, in effect, saying that even after experience has amply demonstrated the inadequacy of safety regulations covering the internal components of the reactor the burden is still on a challenger to lay out a specific accident sequence to the Commission which leads to containment failure and public radiation exposures in excess of those permitted by Part 100. It is an unreasonable burden. It amounts to saying that accidents we have not thought of cannot happen.

This is also the purport of the majority views in CLI-80-16 (Sl.op.,p.3-4):

Second, the effect of a suspension of the 50.44 hydrogen design basis assumptions would be that constraining assumptions would be placed on hydrogen generation safety evaluations. Under those portions of 50.44 that would remain, and under 10 CFR Part 50, Appendix A, General Design Criterion 50, the evaluation would need to assume that a loss-of-coolant accident is certain to occur, that any hydrogen generated is certain to burn, and that the containment is certain to fail at pressures in excess of design pressure. The only issues would be how much hydrogen would likely be generated and whether the pressures resulting from combustion of the hydrogen would exceed containment design pressure. (Emphasis added).

If the regulation had been waived in response to this Board's certification, UCS would have established the following facts by cross-examination, stipulation, or direct testimony:

1. During the accident at TMI-2, approximately 30 to 50% of the zirconium in the core reacted to form hydrogen. Some of the hydrogen was released to the containment and exploded. This exceeded the maximum assumptions contained in NRC regulations by approximately six to ten times.
2. A core damage or core melt accident could result in the generation of amounts of hydrogen which, if ignited, could result in pressures exceeding the containment design pressures.
3. Neither the licensee nor the NRC staff know how much hydrogen was generated during the TMI-2 accident, how much was released to the containment, and how much exploded.
4. Neither the NRC nor the licensee have evaluated the

effect of hydrogen explosions or combustion on equipment important to safety inside containment.

5. The short and long term measures proposed by the staff do not eliminate the possibility of a core damage or core melt accident. At the most, they lower the probability of accident sequences similar to TMI-2 by some unknown increment.

6. Neither the NRC nor the licensee know what the probability is of a core damage or core melt event resulting in the generation of hydrogen beyond the limiting assumptions of 10 CFR 50.44.

7. Dr. D. Okrent, a member of the ACRS, has stated that:

"... it appears to be difficult to demonstrate with a high degree of confidence that the frequency of severe core damage or core melt for reactors in operation or under construction is less than about one in a thousand per year. It may be smaller, but it is also conceivable that it is somewhat larger. Also, there are many potential paths to severe core damage or core melt so that it will be difficult to make the frequency of such an accident very much smaller, with a high degree of confidence."
(D. Okrent, New Trends in Safety Design and Analysis, IAEA-CN-39/6.4, IAEA International Conference on Current Nuclear Power Plant Safety Issues, Stockholm, October 20-24, 1980).

8. Since the TMI-2 accident, the NRC has itself disregarded the limiting assumptions of 10 CFR 50.44 with respect to hydrogen generation. For example, the Commission has imposed requirements beyond those required by 10 CFR 50.44 in the case of the Sequoyah plants and the Staff has notified the licensee of the D.C. Cook plants that it will have to provide

additional hydrogen control measures. Thus, it is clear that the NRC does not consider itself bound by the provisions of 10 CFR 50.44; only intervenors are so bound.

Based upon these facts, UCS would have requested the following findings from the Board:

1. There is insufficient technical basis to conclude that a 5% limiting assumption for zirconium-water reaction is reasonable.

2. The licensee has not met its burden of proving that its proposed measures to control combustible gas, which are based upon this limiting assumption, are sufficient to provide reasonable assurance that the public health and safety is protected.

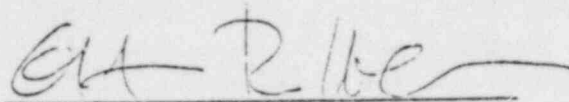
3. Therefore, the Board cannot recommend that the plant as currently designed be authorized to restart. TMI-1 should not be permitted to restart unless and until it has been demonstrated either that a) the plant contains systems capable of controlling the amount of hydrogen that would be generated if 100% of the zirconium reacted with water to form hydrogen, or b) technically justifiable and suitably conservative assumptions supporting less-than-100% reaction have been established.

Under the Commission's ruling declining to waive 10 CFR 50.44, UCS would be required to prove the "credibility" of specific scenarios leading to core damage, hydrogen generation, ignition and containment breach. In other words, despite the clear evidence of TMI-2 discrediting the fundamental bases of the rule, the burden of proof has been placed on the intervenors. If the rule had been waived, the licensee would have been required to provide evidence justifying whatever limiting assumptions for zirconium reaction (less than 100%) it chose to use for design of its combustible gas control system. It would also have had the burden of proof on the issue. Under the Commission decision, UCS has the burden of disproving the 5% assumption by proving the "credibility" of another core damage event and proving either that 1) such an event would not only exceed design containment pressure but also some theoretical "actual" pressure limits, or 2) that such an event would damage or destroy safety systems and thus lead indirectly to releases of radiation.

This burden cannot reasonably be placed on UCS, particularly considering that the Commission itself has chosen in an uncontested case to disregard the limits of 10 CFR 50.44 in imposing hydrogen control requirements for the Sequoyah plant and is considering similar action in a number of other

cases. The Commission's refusal to waive 10 CFR 50.44 constitutes a clear abuse of discretion.

By

A handwritten signature in dark ink, appearing to read "Ellyn R. Weiss", is written over a horizontal line.

Ellyn R. Weiss
General Counsel, UCS

January 15, 1981

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD



In the Matter of)
)
)

METROPOLITAN EDISON)
COMPANY, et al.,)
)

(Three Mile Island)
Nuclear Station, Unit)
No. 1))

Docket No. 50-289

CERTIFICATE OF SERVICE

I hereby certify that copies of the "Union of Concerned Scientists Offer of Proof on UCS Contention No. 11," have been mailed postage pre-paid this 15th day of January, 1981, to the following parties:

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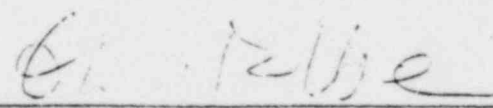
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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE NUCLEAR REGULATORY COMMISSION

In the Matter of)
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METROPOLITAN EDISON)
COMPANY, et al.,)
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(Three Mile Island)
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No. 1))

Docket No. 50-289
(Restart)

PAGE
OF-FILE

UNION OF CONCERNED SCIENTISTS' MOTION
FOR RECONSIDERATION OF CLI-80-16

In a Memorandum and Order dated May 16, 1980, CLI-80-16, the Commission addressed itself to two questions certified to it by the Licensing Board for the TMI-1 Restart proceedings. These were:

1. Whether the provisions of 10 CFR 50.44 should be waived or exceptions made thereto in this proceeding where a prima facie showing has been made under 10 CFR 2.758 that hydrogen gas generation during the TMI-2 accident was well in excess of the amount required under 10 CFR 50.44 as a design basis for the post-accident combustion gas control system for TMI-1.
2. Whether post-accident hydrogen gas control should be an issue in this proceeding where post-accident hydrogen control was perceived to be a serious problem and was in fact a problem during the TMI-2 accident.

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In response to the certification (and without inviting the comments of the parties), the Commission declined to waive 10 CFR 50.44 and held that post-accident hydrogen control can be litigated under Part 100. Specifically, in order to get to the question of whether hydrogen control measures planned for TM-1 are adequate, intervenors must show that there is "a credible loss-of-coolant accident scenario entailing hydrogen generation, hydrogen combustion, containment breach or leaking, and offsite radiation doses in excess of Part 100 guideline values." (Sl. op. at 2)

In support of its decision to leave 10 CFR 50.44 in place, the Commission made two basic and interrelated arguments. First, while recognizing that the TMI accident "raised a safety issue regarding hydrogen control . . . that should be addressed," (Sl. op. at 2), the Commission argued that the appropriate forum in which to consider hydrogen design basis assumptions is a "planned" rulemaking which has yet been neither noticed nor scheduled. Second, the Commission finds that "operator interference with ECCS operation . . . was the root cause of the hydrogen generation problem" at TMI-2 (Sl. op. at 4) and that the post-TMI "instruction" to licensees not to prematurely turn off ECCS "compensates for the less conservative analytical framework of Part 100, and serves as a basis to sustain the present hydrogen generation assumption of 50.44 at least for the interim until the degraded core rulemaking can be completed." (Id.)

UCS requests the Commission to reconsider CLI-80-16. We believe that it is incorrect both as a matter of law and

of fact and that it reflects an ill-considered prejudgment of some of the basic unresolved issues raised by the TMI-2 accident.

Because the key to the decision seems to be the Commission's conviction that interference with the ECCS was the "root cause" of the hydrogen problem and that the new instruction to operators has sufficiently addressed that cause, we will address that issue first. UCS believes that, in reaching that factual conclusion, the Commission has made a number of implicit assumptions in the absence of any factual record and has prejudged issues yet to be resolved in the hearings.

First, the Commission has assumed that if the TMI operators had not turned off the ECCS, the core would have been adequately cooled. This assumption is unproven and unwarranted. There is no evidence of which we are aware indicating that the core was in a coolable condition at the time ECCS was throttled. It is not an established fact that, for the small-break LOCA sequence of the TMI-2 accident, the core would have been adequately cooled but for premature throttling of ECCS. On the contrary, this is the subject of UCS Contention No. 8.^{1/}

Second, the Commission has assumed that the instruction to operators removes the cause for concern that ECCS will be prematurely turned off. The instruction only specifies the conditions under which the operator may terminate ECCS. It assumes that the instrumentation available to the operator

^{1/} For the convenience of the Commission, a copy of UCS's final contentions is attached.

to indicate the condition of the core is reliable. UCS believes that in the case of TMI-1, the available instrumentation does not in all instances give an unambiguous and reliable indication of the condition of the core and thus, the NRC's instructions do not ensure against premature ECCS termination. Again, this is an issue in controversy in this case through UCS contention No. 7.

Thirdly, the Commission appears to assume that instructions to operators can compensate for poor design. 10 CFR 50.55 (a)(h) incorporates §4.16 to IEEE 279, which requires:

The protection system shall be so designed that, once initiated, a protection system action shall go to completion.

In UCS's view, this requires that the design of the facility preclude premature ECCS termination by, for example, preventing manual interference with ECCS until certain selected plant parameters measuring the condition of the core have reached established levels. We recognize that our interpretation of the regulations is disputed by other parties. Nonetheless, it is an issue yet to be decided in this case and properly raised by UCS Contention No. 10.

Finally, the Commission assumes that the appropriate dose limits to apply to the analysis of hydrogen control are those contained in Part 100. Part 100 requires the licensee to show that, even if the plant's safety systems are breached, doses to the public will not exceed the limits established therein. In contrast, the much stricter provisions of Part 20 limit expected releases which occur assuming the proper operation of plant systems.

By incorporating the Part 100 limits for the purpose of judging the acceptability of hydrogen control measures, the Commission has confused the two and misapplied Part 100. Application of the principle established by CLI-80-16 would allow purposeful releases up to the Part 100 limits. This would be analogous to saying that, if a plant's system for treating radioactive wastes were to malfunction, the licensee would be permitted to deliberately release material up to the Part 100 limits. Of course, this would not be permitted; the Part 20 limits would apply.

The staff has acknowledged this issue in NUREG-0578, "TMI-2 Lessons Learned Task Force Status Report and Short-term Recommendations:"

The course of events at TMI-2 with respect to hydrogen production and control in containment has indicated a need for thorough reconsideration of the Commission's design basis for combustible gas control systems. This should include both a re-examination of the reactor system effects (i.e., coupling the ECCS evaluation and the assumption of hydrogen produced by metal-water reaction) and the acceptability of 10 CFR Part 100 guidelines for evaluation of offsite doses from purposeful releases from the containment. (NUREG-0578, A-23, Emphasis added)

The above discussion has demonstrated that, in CLI-80-16, the Commission explicitly or implicitly resolved disputed factual issues without benefit of a record and without giving the parties an opportunity to make their case. This is analogous to the course followed by the Commission in a previous case and disapproved by the Court in State of Minnesota v. N.R.C. 602 F. 2d 412 (D.C. Cir., 1979). The Commission may establish precedent by rulemaking or by adjudication; what it may not

do is resolve factual issues properly raised in pending proceedings by fiat. (Id. at 416-417)

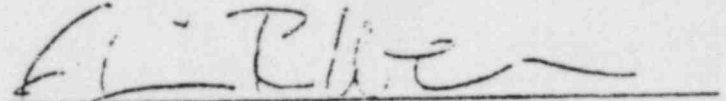
The final issue is whether the Commission, recognizing the lack of a rational technical foundation for the hydrogen generation design basis limits established in 10 CFR 50.44, may keep these limits in place for this proceeding while moving on an entirely separate track toward a "planned" rulemaking which has been neither scheduled nor noticed. We believe that it cannot.

There is no question that the agency is free to resolve issues before it either by rulemaking or by adjudication. SEC v. Chenery Corp. 332 US 194 (1947) The question here is whether, once the issue has been raised in this case the Commission can (1) take it out of this case when no formal rulemaking has yet been announced and (2) proceed with completing this case and authorizing restart before the issue has been resolved in the rulemaking proceeding. If the Commission were to tie the restart of TMI-1 to resolution of the generic issue in the rulemaking context, we would have no grounds to object. However, we believe that it is impermissible to deny the intervenors any forum in which to address this question before the plant resumes operation. The Commission's decision would do precisely that.

For the above-stated reasons, UCS moves the Commission to reconsider CLI-80-16 and to answer the certified questions in the affirmative by waiving the applicability of 10 CFR 50.44 for this proceeding. In so doing, the Commission would fully preserve its ability to consider the generic

issues in a rulemaking proceeding and would avoid prejudicial:
prejudging unresolved questions involved in the restart
proceedings.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "Elyn R. Weiss", written over a horizontal line.

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Counsel for the Union of Concerned
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June 4, 1980