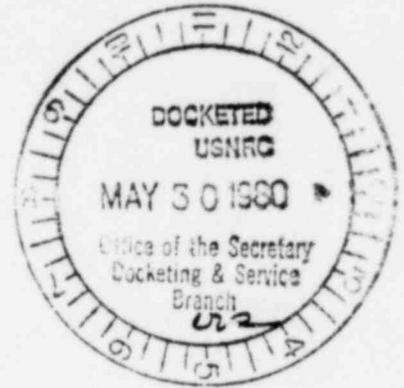


UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
ATOMIC SAFETY AND LICENSING BOARD

Ivan W. Smith, Chairman  
Dr. Walter H. Jordan  
Dr. Linda W. Little



In the Matter of )  
METROPOLITAN EDISON COMPANY ) Docket No. 50-289 SP  
(Three Mile Island Nuclear ) (Restart)  
Station, Unit No. 1 )

MEMORANDUM AND ORDER ON  
HYDROGEN CONTROL CONTENTIONS  
(May 30, 1980)

On January 4, 1980 the board certified to the Commission two questions:

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.

LBP-80-1, 11 NRC 37.

In the Commission's Memorandum and Order of May 16, 1980, CLI-80-16, the Commission answered certified question No. 1, in the negative. In declining to waive the provisions of 10 CFR §50.44, the Commission observed that it is

planning a general rulemaking on the question of possible safety features to deal with degraded core conditions and that §50.44 should remain in place pending the more deliberate and considered rulemaking.

As to certified question No. 2 the Commission commented that it did not intend to exclude the issue of hydrogen gas control from its Notice and Order for Hearing of August 9, 1979; that the hydrogen control issue can be litigated under 10 CFR Part 100.

Emphasizing that the assumptions of hydrogen generation under 10 CFR §50.44 are dependent upon ECCS design as opposed to actual ECCS operation, the Commission's Order authorizes litigation of the likelihood of an accident generating hydrogen in quantities exceeding 10 CFR §50.44 design bases, the likelihood of such hydrogen combusting, and the ability of the containment to withstand pressures beyond containment design pressure. The Commission also noted that a critical issue in the chain of circumstances under consideration would be the likelihood of an operator interfering with the ECCS operation.

Three intervenors have submitted contentions relating to post-accident hydrogen: Mr. Sholly, Union of Concerned Scientists (UCS), and Anti-Nuclear Group Representing York (ANGRY). The board authorized discovery on the hydrogen control contentions, but their acceptance or rejection as

issues for litigation is still pending. The contentions are:

Sholly Contention 11

It is contended that the production of hydrogen in the reactor core from clad metal-water reactions following a LOCA poses an unacceptably high risk of catastrophic failure of the reactor pressure vessel and the reactor containment, with the subsequent release of a substantial portion of the core inventory into the environment. It is further contended that until a safe and reliable means for eliminating hydrogen gas from the containment is installed at Unit 1, and is provided with suitable redundancy as required by GDC 41, restart of Unit 1 poses a risk to public health and safety and must be denied.

UCS Contention 11

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 less than 5%. The accident demonstrated both that this assumption is not justified and that it is not conservative to assume anything 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.

ANGRY Contention V (A)

V. The NRC Order fails to require as conditions for restart the following modifications in the design of the TMI-1 reactor without which there can be no reasonable assurance that TMI-1 can be operated without endangering the public health and safety:

- (A) Installation of a Hydrogen Recombiner as recommended by a minority position in NUREG 0578;

Major elements of Mr. Sholly's Contention 11 may be litigated as a Part 100 issue and in accordance with the standards of the Commission's May 16 Order. However we have redrafted Sholly's Contention 11 to bring it into alignment with the Commission's Order and to accommodate the views of the board members.

Whether any part of UCS's Contention 11 falls within the permissible scope of the contention is debatable and ANGRY's Contention V (A) is only marginally within the scope, if at all. However, we need not analyze the deficiencies of the UCS and ANGRY contentions, because, having raised the general subject matter and having demonstrated an interest in this aspect of the litigation, we will permit UCS and ANGRY to consolidate with Mr. Sholly on the revised Sholly contention. This, we believe, will protect their interests in the subject to the extent that their interests fall within the scope of the issue. Inasmuch as it is Mr. Sholly's contention that survives, it would seem to be his prerogative to be lead intervenor, but we leave that to the affected intervenors to arrange.

Accordingly the board accepts Sholly Contention 11, as we have redrafted it:

Revised Sholly Contention 11

The licensee has not demonstrated that, in the event of a loss-of-coolant accident at TMI-1:

1. substantial quantities of hydrogen (in excess of the design basis of 10 CFR §50.44) will not be generated; and
2. that, in the event of such generation, the hydrogen will not combust; and
3. that, in the event of such generation and combustion, the containment has the ability to withstand pressure below or above the containment design pressure, thereby preventing releases of off-site radiation in excess of Part 100 guideline values.

Item 3 of the contention is intended to include intentional venting of the containment as postulated in the basis of Mr. Sholly's contention, and would permit the licensee to place into issue a defense that, even assuming the generation and the combustion in excess of §50.44 design bases and the threat of breach of containment, that post-accident hydrogen control measures would limit releases to guideline values under Part 100.

As stated in the Commission's May 16 Order, "A critical issue here would be the likelihood of an operator interfering with the ECCS operation." The board expects the parties to develop fully a record on the operator interference issue.

The contention will of course be construed according to the terms of the Commission's May 16 Order. This, however, raises the possibility of a problem which we invite the parties to address.

The board quorum has been unable to agree on certain aspects of the Commission's May 16 Order.<sup>1/</sup> Dr. Jordan believes that the Order precludes litigation of engineered post-accident hydrogen control measures beyond those required by §50.44 because the Commission has reserved that issue to rulemaking. He relies upon, inter alia, the Commission's statement that "This rulemaking proceeding will include measures to deal with hydrogen generation following a loss-of-coolant accident." Order, p.3. Moreover, Dr. Jordan believes that, as a practical matter, the litigation will center around hydrogen generation, combustion, and containment integrity, with other hydrogen control issues becoming factually immaterial as an issue in this particular proceeding.

Mr. Smith, defers to Dr. Jordan's assessment of the practical aspects of the possible litigation on post-accident hydrogen control measures, but he believes that such issues should not and, under the Commission's Order, must not be foreclosed.

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<sup>1/</sup> Dr. Little has not participated in this action, but she will be available to consider the parties' comments and any reconsideration.

In support of his position, Mr. Smith points to the language of the Commission's Order on page 2:

The Commission believes that, quite apart from 10 CFR §50.44, hydrogen gas control could properly be litigated in this proceeding 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.

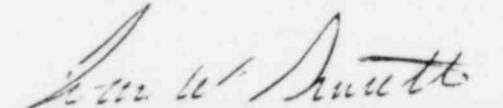
Under Mr. Smith's view of the Order, in a credible scenario where ECCS operation, particularly operator interference, as opposed to ECCS design, leads through a chain of events to offsite radiation in excess of Part 100 guidelines, the adequacy of engineered post-accident hydrogen control measures would become an issue under the Order.

Dr. Jordan and Mr. Smith agree that, under the contention as it is redrafted, the issue is unlikely to become critical but it is not foreclosed from consideration. The licensee may elect to defend against the contention on the questions of the likelihood of generation, the likelihood of combustion, or the capacity of the containment to withstand the effects of combustion. Perhaps licensee may never reach the point of depending upon engineered post-accident hydrogen control measures. But, we agree that the impending rulemaking does

not prohibit the licensee from asserting, in addition to one or more of the first three defense elements, that additional hydrogen control measures may be relied upon to meet Part 100 guidelines. In that event, of course, the intervenors would be permitted to follow wherever licensee's defense takes them.

The parties may submit comments, motions for reconsideration or corrections, and requests for discovery relief within 10 days following the service of this order.

THE ATOMIC SAFETY AND  
LICENSING BOARD

  
Ivan W. Smith, Chairman

Bethesda, Maryland

May 30, 1980