



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

February 23, 1984

Docket No. 50-289

MEMORANDUM FOR: R. W. Houston, Assistant Director for Reactor Safety, DSI
FROM: G. C. Lainas, Assistant Director for Operating Reactors, DL
SUBJECT: UNION OF CONCERNED SCIENTISTS COMMENTS ON THE TMI-1 MAIN
STEAM LINE RUPTURE DETECTION SYSTEM

UCS has submitted the enclosed comments on the TMI-1 main steam line rupture detection system in partial response to the Commission order taking review of ALAB-729. We need to address these UCS comments in our filing which is due to the Commission on March 12, 1984. We request that you review the UCS comments and provide a written response for input to the filing by close of business, February 29, 1984. We request that you coordinate the response within DSI.

A handwritten signature in cursive script, appearing to read "G. C. Lainas".

G. C. Lainas, Assistant Director
Operating Reactors Branch #4, DL

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE COMMISSION

In the Matter of)
METROPOLITAN EDISON COMPANY)
(Three Mile Island Nuclear)
Station, Unit No. 1))

Docket No. 50-289
(Restart)

Gray J. Goldberg II
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UNION OF CONCERNED SCIENTISTS' COMMENTS ON
THE TMI-1 MAIN STEAM LINE RUPTURE DETECTION SYSTEM

By Order dated January 7, 1984, the Commission took review of portions of ALAB-729 (the NRC Appeal Board's May 26, 1983, Decision on issues of TMI-1 plant design and procedures) and, inter alia, sought the views of the parties on "the adequacy of [GPU's] proposed solution" to the main steam line rupture detection system (MSLRDS) "problem."^{1/} These comments are responsive to that issue.

This issue arose because, during the Licensing Board hearings, it was discovered that a single failure in the non-safety grade MSLRDS could isolate all, i.e., both main and emergency, feedwater to both steam generators. GPU had committed to upgrading the MSLRDS to safety grade, but not before restart.^{2/} The Atomic Safety and Licensing Board ordered that prior to restart, GPU was required to "propose for Staff approval, a long-term solution

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1/ Order, January 27, 1984, p. 3.

2/ LBP-81-59, 14 NRC 1211, 1395, 1403, (1981).

to the steam generator bypass logic problem for implementation as soon as possible after restart. Prior to restart, the Staff shall certify to the Commission that the Licensee has made reasonable progress in initiating its program for the long-term solution.^{3/} This can only be construed as requiring approval of an actual design for the MSURDS prior to restart since GPU had already generally committed to a long-term upgrade to "safety grade."

In a submittal to the NRC staff dated August 2, 1982, the licensee proposed the addition of cavitating venturis in the EFW lines and removal of the MSURDS isolation signal from the EFW valves. On November 10, 1982, the staff found the proposed solution acceptable and concluded that the Licensing Board condition was satisfied. In a Safety Evaluation Report attached to its November 10, 1982, letter to GPU, the staff "concluded that there was no potential for containment overpressurization resulting from a MSLB [Main Steam Line Break] with continued emergency (auxiliary) feedwater addition because the main feedwater system isolates and emergency feedwater flow restrictors (cavitating venturis) limit flow to the affected steam generator."^{4/} However, it is important to recognize that the assumption that main feedwater will be isolated is not warranted until after the MSURDS is upgraded to safety grade. In contrast, the current status of TMI-1 is that the MSURDS is not safety grade and a single failure can prevent isolation of main feedwater to a ruptured steam generator. Thus, presently the potential for containment overpressurization resulting from a main steam line break exists.

^{3/} 10 CFR 50.1074.

^{4/} See E. Smith, SR, to GPU, D. Smith, SR, November 10, 1982, Attachment, Safety Evaluation Report, TMI-1, enclosure 1000.

The Appeal Board subsequently addressed the issue of the adequacy of the MSLRDS⁵ with regard to the Licensing Board's original concern about inadvertent isolation of feedwater, the Appeal Board "believe[d] that it is safe for the plant to restart while a long-term solution is developed."^{6/} However, the Appeal Board noted the following: "While this appears to solve the problem of inadvertent feedwater isolation, there still remains the concern for overpressurization of the containment if the nonsafety-grade MSLRDS failed to isolate main feedwater during a steam line break accident. Prior to acceptance of [the licensee's proposed solution], we recommend that the potential for containment overpressurization as a result of MSLRDS failure be evaluated."^{7/} Furthermore, the Appeal Board ruled, in response to a UCS exception, that since the development of a solution may "involve the resolution of disputed matters," the licensee's "proposal should be submitted for Commission, rather than staff, approval." The Appeal Board continued as follows: "The Commission can then consider whether the licensee's proposal is reasonable and whether the licensee has made reasonable progress toward initiating its program. It can also decide whether, or to what extent, it is necessary to accord the parties an opportunity to address licensee's proposal and its implementation."^{8/} Thus, it is the Commission's obligation to determine whether the TMI-1 MSLRDS proposal is acceptable, whether reasonable progress toward implementing it has been made and whether evidence must be taken, subject to cross-examination, to resolve these questions.

⁵ 104-103, 17 NRC 814, 824-825, 827-830, 1982.

⁶ Id. at 824-825.

⁷ Id. at 83.

⁸ Id. at 88.

In short, the non-safety grade MSLRDS proposed is unacceptable for reactor
is unacceptable because: 1) a single failure could isolate main feedwater to
both steam generators, unnecessarily creating a demand for emergency feedwater,
2) an overcooling event could result in depressurization of both steam
generators, causing the MSLRDS to isolate main feedwater to both steam
generators, and 3) a single failure could result in not isolating main
feedwater to the steam generator affected by a main steam line break accident,
thus overpressurizing the containment if the break is inside the containment.

As far as the long-term "solution" goes, the short answer is that there
is no design. At best, there is a broad, conceptual proposal contained in the
GPU submittal to the staff of August 23, 1983. Portions of that submittal
relevant to the long-term upgrade of the MSLRDS are as follows:^{9/}

Modifications

Add Cavitating Venturis in each Once Through Steam Generator (OTSG)
EFW Line. (Complete)

- a. This modification has been implemented to limit the flow of EFW
to a ruptured OTSG in order to ensure sufficient EFW flow to the
intact OTSG and to limit the mass and energy release within the
reactor building for overpressure prevention. The venturis will
limit the flow to the OTSG in order to reduce excessive reactor
coolant system (RCS) overcooling.

Provide Redundant Safety Grade EFW Control and Block Valves

- a. This is being provided to prevent a single active failure from
preventing the addition of EFW to an OTSG and to ensure the
capability to isolate EFW flow to a ruptured OTSG.

* * *

Requirements

Main feedwater isolation shall also be facilitated by the Main
Steam Line Rupture Detection System (MSLRDS). The MSLRDS shall

^{9/} GPU submittal to the staff of August 23, 1983, p. 10. The submittal also contains a discussion of the MSLRDS and the need for a redundant safety grade EFW control and block valves.

Utilizes a 2 out of 4 "2-4" logic for detection of main steam pressure below 600 psig.

* * *

Modifications

Detection of the Main Steam Line Rupture Detection System (MSLRDS) Signals to the emergency feedwater control valves BF-Y-004/5. (Complete)

The detection of the MSLRDS signals to the BFW System improves the availability of the OTSG's as a heat sink, and improves the reliability and capability of BFW flow to the OTSG(s) during loss of normal feedwater flow.

* * *

Upgrade the controls for the Main Steam Line Rupture Detection System to safety grade such that a single failure of the control system will not prevent isolation when required. The probability of a single failure causing inadvertent isolation shall be minimized.

The MSLRDS shall identify a ruptured OTSG when the main steam pressure falls below 600 psig and shall then automatically isolate the main feedwater to that OTSG.

The above constitutes GPU's proposed long-term "solution." By no stretch of the imagination can that information be termed a "design." Furthermore, to the best of our knowledge, the staff has neither approved nor disapproved the licensee's August 23, 1982, submittal. Therefore, it appears that the Commission's statement in its January 27th Order that the "licensee has already submitted its proposed solution to the staff, which approved it," is either incorrect or refers to the licensee's August 2, 1982, submittal and the staff's November 10, 1982, response.

The fact is that GPU's August 23, 1982, submittal is nothing more than a somewhat modified statement of its original commitment to the Licensing Board to upgrade the MSLRDS to safety grade in the long-term. That is incorrect and

found insufficient by both the Licensing Board and the Appeal Board,¹⁰ both of which called for approval of a design, such approval to come prior to restart, to solve the steam generator bypass logic problem. The Appeal Board particularly addressed itself to the potential for overpressurization of the containment as a result of MSLRDS failure.¹¹

GPU has neither proposed a design nor, of course, demonstrated that its design would solve the problems identified by the Licensing and Appeal Boards. In order for a rational determination to be made as to whether the MSLRDS is acceptable, GPU would have to show that the problems of containment overpressurization and excessive overcooling of the reactor coolant system have been adequately resolved. At this point it has simply promised to address them. More is called for than a bald assertion that the system will be safety grade.

A single failure analysis of the proposed design will have to be presented as well as, for example, information demonstrating the environmental and seismic qualification and testability of the equipment. How will main feedwater be isolated? How many valves will receive the isolation signal from the MSLRDS and what are the redundant, independent power supplies for those valves? Although the EPW venturis will provide more time before containment overpressurization could occur, they apparently will not prevent it.¹² If there is only one flow control valve to each steam generator, how is it proposed to preclude a single failure from either shutting off EPW flow to the

¹⁰ Supra, n. 3, 5.

¹¹ Supra, n. 7.

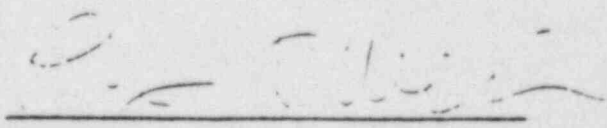
¹² As noted, supra n. 4, EPW has increased its flow rate after a shutdown to ensure the possibility to isolate EPW flow to a structure (EPW).

inlet steam generator or failing to shut off EPV flow to the ruptured steam generator? These and other questions must be answered before it can be said that the long-term MSLRDS is adequate.

In summary, GPU's long-term proposal is insufficient on its face because it fails to describe how the MSLRDS will be made "safety grade" and it fails to indicate how the clear potential for containment overpressurization will be obviated. It is little more than a collection of platitudes. The actual design might or might not be adequate; one simply cannot tell.

Moreover, it is abundantly clear that the MSLRDS currently installed in TMI-1 does not meet minimum safety requirements and this poses undue risk to public and safety.

Respectfully submitted,


Eilyn R. Weiss
General Counsel
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Dated: February 16, 1984

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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

CERTIFICATE OF SERVICE

I hereby certify that copies of "UNION OF CONCERNED SCIENTISTS' COMMENTS ON THE TMI-1 MAIN STEAM LINE RUPTURE DETECTION SYSTEM" and "UNION OF CONCERNED SCIENTISTS' REQUEST FOR EXTENSION OF TIME" have been served on the following persons by deposit in the United States mail, first class postage prepaid, this 16th day of February 1984, except as indicated by an asterisk.

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