



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

AEOD/E122

SEP 4 1981

This is an internal, pre-decisional document not necessarily representing a position of AEOD or NRC.

MEMORANDUM FOR: Carlyle Michelson, Director
Office for Analysis and Evaluation
of Operational Data

FROM: Harold Ornstein
Office for Analysis and Evaluation
of Operational Data

SUBJECT: AEOD CONCERN REGARDING INADVERTANT OPENING
OF ATMOSPHERIC DUMP VALVES ON B&W PLANTS
DURING LOSS OF ICS/NNI POWER

In a memo of May 21, 1980 (reference 1), I pointed out the subject concern. I prepared a May 23, 1980 memo (reference 2) to Harold Denton bringing this concern to his attention.

In the past I have informed you of actions being taken by NRR and the licensees to correct this problem.

I am pleased to provide you with a recent SER for TMI-1 which describes the modification which was made to correct the subject design deficiency.

H. Ornstein
Harold Ornstein
Office for Analysis and Evaluation
of Operational Data

Enclosures:
As stated

cc: w/enclosures
C. J. Heltemes, Jr.
J. Pellet
R. Becker
AEOD Lead Engineers

XA

Dupe of 814918478

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Reference 1: Memo H. Ornstein to C. Michelson, "Lessons Learned From the February 26, 1980 Crystal River Transient," May 21, 1980.

Reference 2: Memo C. Michelson to H. R. Denton, "Lessons Learned From the Crystal River Transient of February 26, 1980 - Correcting Atmospheric Dump Valve Opening Upon Loss of ICS Power," May 23, 1980.

Hornstein



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

August 28, 1981

Docket No. 50-289

Mr. Henry D. Hukill, Vice President
and Director - TMI-1
Metropolitan Edison Company
P. O. Box 480
Middletown, Pennsylvania 17057

Dear Mr. Hukill:

We have reviewed your description of the proposed modifications preventing the automatic opening of the atmospheric dump valves (ADVs) upon loss of non-nuclear instrumentation power supply which you transmitted by letter dated January 21, 1981 (TLL 671). Your submittal is in response to our letter dated August 15, 1980 which discusses our concerns regarding the automatic opening of the ADVs that results in aggravating overcooling transients.

We find that your proposed modification resolves our concerns and therefore is acceptable. Our evaluation of your proposed modification considers your commitment to revise the administrative controls that requires a test of the manual backup channel every six months during plant operation.

A copy of our Safety Evaluation Report is enclosed.

Sincerely,

A handwritten signature in cursive script that reads "John F. Stolz".

John F. Stolz, Chief
Operating Reactors Branch #4
Division of Licensing

Enclosure:
Safety Evaluation Report

cc w/enclosure:
See next 3 pages

8109080058

cc w/enclosure(s):

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING THE ACTION TAKEN TO MODIFY THE CONTROLS FOR THE STEAM DUMP VALVES

METROPOLITAN EDISON COMPANY
JERSEY CENTRAL POWER AND LIGHT COMPANY
PENNSYLVANIA ELECTRIC COMPANY

THREE MILE ISLAND NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-289

Introduction

Our review of the Crystal River Unit No. 3 (CR-3) event of February 26, 1980, revealed that failure of the non-nuclear instrumentation (NNI) or the integrated control system (ICS) power supply can result in spuriously opening the atmospheric steam dump valves to a 50% position. Such an anomaly could significantly aggravate an overcooling transient of the primary system. By letter dated August 15, 1980 we informed Met Ed (the licensee) of our concern that on TMI-1 upon loss of ICS power supply, the ADVs automatically open to a 50% position, a similar anomaly to the CR-3 occurrence. In response to our concerns, the licensee by letter dated January 21, 1981 (TLL 671) discussed his plant design and proposed modifications to avoid this anomaly.

Discussion & Evaluation

The licensee's review of his design confirms that upon loss of ICS "Hand Power" the ADVs will open to the midscale position. To eliminate this situation, the licensee proposed to install a manual control channel for the ADVs which will automatically switch in upon loss of ICS "Hand Power". The manual control channel consists of a "manual loader", a voltage-to-current (E/I) converter, and a lock-out loss-of-voltage relay.

The "manual loader" contains a thumb wheel for the operator to select any position from 0 to 100% open and a meter indicating the output control signal to the ADVs. Administrative controls will require that the manual loader be set to 0% open. Thus, when ICS "Hand Power" is lost, the manual control will switch in automatically and it will be pre-selected to keep the ADVs in the closed position. The manual loader receives its +24 VDC input power, from an existing DC power supply and the DC power source originates from the 120 VAC "Computer Bus".

The selected voltage-to-current converter receives a -10 to +10 VDC signal from the manual loader and provides a corresponding 4-20 mA output current. This E/I converter is a Moore Type SCT, which does not have built-in provisions to test (measure) its output current. The E/I converter receives 120 VAC input power, from a common circuit breaker on the "Computer Bus", that provides input power (120 VAC/24 VDC) to both the E/I converter and the manual loader.

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A basic concern is that loss of control power could result in the ADV opening to the midscale position. The ICS "Hand Power" has many alternate sources but normally obtains power from inverter "1A" which is part of Division "A" of the Class 1E power system. The proposed manual control channel will obtain its power from the "Computer Bus". This bus obtains power normally from inverter "1E", which obtains its AC and DC inputs from Division "A" also. Between the inverter "1E" and the Computer Bus is a static transfer switch which provides automatic fast transfer capability to a regulated (Solatron) AC bus in the other Division of the Class 1E power system.

Based on our review of the proposed modification that utilizes the "Computer Bus" as an input power source for the manual control channel is sufficiently independent to reduce the likelihood of loss of both the automatic ICS and the manual control channel for assuring proper operation of the ADVs. On this basis, we find the "Computer Bus" power supply as an alternate power source is acceptable.

Our review also showed that loss of the 24 VDC power supply, failure of the "manual loader", or failure of the E/I converter could also cause the manual control system to drive the ADVs to the 50% open position. This condition arises because the manual loader goes to zero-volts output upon loss of input 24 volts or upon internal failure. Since a -10v to +10VDC control voltage was the selected range then zero volts is another midscale failure mode which resulted in opening the valves to the 50% position. In the absence of reasonable testability of the E/I converter to detect such failures and the absence of any periodic surveillance activities being proposed, many of these failures are "undetectable". Specifically our concern is that, upon loss of ICS power, the control of the ADVs would be automatically transferred to the proposed manual control channel which could then send the ADVs spuriously to the 50% open position due to an "undetectable" midscale failure. Further, it is not evident that the operator will know how or be able to easily reclose the ADVs.

To resolve our concern, the licensee has agreed to test the manual backup channel every six months during plant operation by transferring the control of the ADVs temporarily from the ICS to the new manual control channel to demonstrate that the channel will maintain the ADVs in the closed position. This matter will be included as part of the administrative controls pertaining to this modification. In addition, depending upon equipment delivery, the licensee expects to have both the proposed modification and administrative controls in place prior to restart.

Since the control power for ADVs and the position indicator power are from opposite Divisions of the Class 1E power system, there is maximum assurance that both control and indication power will not be lost concurrently. Therefore, at this Unit, no modification is needed in this area.

Based on the above evaluation we conclude the licensee has adequately responded to our request transmitted by letter dated August 15, 1980 and we therefore find the licensee's proposed modifications to the controls of the steam dump valves acceptable.

Dated: August 28, 1981