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November 7, 1991
C311-91-2143

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Dear Sir:

Subject: Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
LER 91-004-00

Attached is Licensee Event Report (LER) No. 91-004-00 which addresses a failure to meet the requirements of Technical Specifications 3.8.6 during preparations for refueling operations. Public health and safety were unaffected.

This event was considered reportable pursuant to 10 CFR 50.73. The attached abstract provides a brief description of the event. For a detailed understanding of the event, refer to the text of the report.

Sincerely,

T. G. Broughton
Vice President and Director, TMI-1

GMG/mkk

Attachment

cc: Region I Administrator
TMI-1 Senior Project Manager
TMI Senior Resident Inspector

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NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
THREE MILE ISLAND, UNIT 1	0 5 0 0 0 2 8 9	1 OF 0 6

TITLE (4) MOVEMENT OF IRRADIATED FUEL ASSEMBLY WITHOUT CONTAINMENT INTEGRITY DUE TO PROCEDURAL WEAKNESSES AND PERSONNEL ERROR

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
1 0	0 8	9 1	9 1	0 0 4	0 0	1 1	0 7	9 1		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
N		20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	0 0 0	20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
G. M. GURICAN, CORPORATE LICENSING ENGINEER	AREA CODE 2 0 1 3 1 6 - 7 9 7 2

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)

		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On October 8, 1991, TMI-1 was in refueling shutdown. Licensed operators were performing 1303-11.4, "Refueling Systems Interlocks" test of the Main Fuel Bridge hoist. This test is normally performed in conjunction with 1505-1, "Fuel and Control Component Shuffles." Section 6.3.3.1, of the procedure requires fuel movement; however, this Section should have required that no movement of fuel take place until the prerequisites of 1505-1 were completed. In this event, the Bridge crew moved fuel to test the hoist interlocks when containment integrity was not set. Most of the 1505-1 prerequisites for containment integrity were completed except for the open Reactor Building personnel and emergency airlock doors [NH/AL]. Technical Specification 3.8.6 requires that at least one door in each airlock be closed when moving irradiated fuel in the Reactor Building. This event was caused by: procedural weaknesses, because 1303-11.4 did not clearly caution the operators that containment integrity was required prior to test of the interlocks; and, by personnel error, due to a lack of understanding by personnel that the test involved refueling operations. The causes of the event were reviewed with all fuel handling personnel prior to the commencement of the fuel shuffle. 1303-11.4 was revised to strengthen the procedure, provide prerequisites, and add warnings to prevent recurrence of this event.

This event is reportable per 10 CFR 50.73(a)(2)(i)(B).

MOVEMENT OF IRRADIATED FUEL ASSEMBLY WITHOUT CONTAINMENT INTEGRITY DUE TO PROCEDURAL WEAKNESSES AND PERSONNEL ERROR

I. PLANT OPERATING CONDITIONS BEFORE THE EVENT

TMI-I was in refueling shutdown with the Fuel Transfer Canal flooded. Preparations were underway to commence fuel handling. The entire core was scheduled to be off-loaded for the 10 year inspection of the reactor vessel. Prerequisites for fuel handling were being accomplished in accordance with 1505-1 "Fuel and Control Component Shuffles." A Reactor Building (RB) Purge was in progress with one (1) purge exhaust fan running (the second fan was out-of-service for maintenance). No purge supply fans were operating, so that air flow was into the reactor building through the open personnel and emergency airlock doors. Except for the operation of one purge exhaust fan (instead of two), the normal RB Purge system alignment, when containment integrity is not required, was in effect.

II. STATUS OF STRUCTURES, COMPONENTS OR SYSTEMS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT.

There were no inoperable structures, components, or systems which contributed to this event.

III. EVENT DESCRIPTION

Preparations were underway to commence fuel handling. Prerequisites for fuel handling were being accomplished in accordance with Refueling Procedure (RP) 1505-1 "Fuel and Control Component Shuffles." The prerequisites were completed with the following exceptions:

Data Sheet 1, Step 1.4 - Requires that the hatches in the reactor building be secured.

Data Sheet 1, Step 1.9 - Requires direct communications between all refueling stations.

Data Sheet 1, Step 1.14 - Done within 8 hours of commencing fuel handling. Involves water inventory and chemistry. (Although incomplete, it is not related to this event.)

A Senior Reactor Operator (SRO) and Control Room Operator (CRO) were assigned as the Bridge crew to complete Surveillance Procedure (SP) 1303-11.4, "Refueling System Interlocks" (already in progress) on the day shift. The specific surveillance being performed was Section 6.3.3.1 on the Main Fuel Bridge in the Reactor Building, which checks the fuel hoist over the reactor core.

Procedure 1303-11.4 is written in such a way that it contains many independent test sections. The sections are completed as plant needs and conditions permit. For example, the spent fuel bridge interlock section is normally performed prior to the outage to reduce the amount of testing required during the outage.

During the performance of this surveillance, several minor problems were encountered, which required the assistance of the Stearns Factory Representative. While waiting, the Bridge crew worked on communication equipment problems. At this point, the Bridge crew established communications with a control room CRO. The crew then proceeded with the surveillance in Section 6.3.3.1. This section requires the actual grappling of a fuel assembly and then monitoring the slow zones during the assembly withdrawal. Section 6.3.3.1 contained a NOTE which stated that "the following steps should be performed just prior to initiating the fuel shuffle per 1505-1." The Bridge crew believed that the fuel shuffle was imminent and therefore the current sequence of steps to be taken in the procedure was appropriate and in accord with the NOTE. However, the NOTE was a major procedural weakness in that it did not clearly warn the operators that the procedural steps to follow would involve fuel movement, nor did it require that all of the prerequisites of RP 1505-1 be completed prior to such fuel movement (including the setting of containment integrity).

The Bridge crew verified with the control room CRO which core location was the first assembly to be removed and then positioned the main bridge over that location (E-14) and lowered the mast onto the assembly. During the lowering of the mast, one of the zone lights did not come on as expected. However, the bridge crew verified that the mast actually traveled at the proper speed. The control room CRO was notified of the light problem and in turn notified the Shift Supervisor. The Shift Supervisor determined the light problem to be minor and indicated the surveillance could continue.

As the Bridge crew proceeded with the surveillance, they grappled onto the irradiated fuel assembly and requested the control room to monitor source range counts. At approximately 1040 hours, the assembly was withdrawn from the core completely up into the fuel mast. The SRO on the bridge was aware of Technical Specification requirements for refueling, but he did not consider the interlock checks per SP 1303-11.4 to constitute refueling operations. After the fuel assembly was withdrawn, the Bridge SRO realized that the RB was not configured for commencement of the fuel shuffle as was required by the last step in this section of the test procedure. Realizing this, he then notified the control room CRO that he was going to reinsert the assembly, and asked the control room CRO to have the Nuclear Engineers monitor source range counts during the insertion. This request was not carried out in the control room.

During the reinsertion of the assembly, the Bridge SRO notified the control room CRO that the assembly hung up approximately 16 inches from the fully inserted position. The control room CRO in turn notified the Shift Supervisor.

The Shift Supervisor then realized that a Technical Specification violation had occurred, i.e., movement of an irradiated fuel assembly without the establishment of containment integrity. When the Shift Supervisor communicated again with the Bridge SRO, the assembly was already fully reinserted into the core. The Shift Supervisor then notified the Director, Operations and Maintenance, who in turn called for a Plant Review Group (PRG) meeting to review the incident, and directed that no fuel movement would occur until the event could be reviewed with each defueling crew.

TMI-1 Technical Specification (T. S.) 3.8.6 requires that at least one door on each airlock be closed when moving irradiated fuel in the Reactor Building. T.S. 3.8.8 provides an action statement in case the above is not met, to stop fuel movement and restore containment integrity before resuming movement of irradiated fuel.

At 1110 hours, October 8, 1991, a PRG meeting was held to review this event. Based on the above event description, the PRG concluded that containment integrity had not been established prior to beginning irradiated fuel movement as required by T. S. 3.8.6, and the event was reportable under 10 CFR 50.73(a)(2)(i)(B) as a 30 day report.

In summary, procedural weaknesses and misunderstanding of the personnel involved resulted in the occurrence of this event.

The procedural weaknesses involved:

- The Section 6.3.3.1 NOTE gave no clear indication that the performance of the procedural steps which followed would in fact involve fuel movement.

- The procedure did not specifically require that the prerequisites of RP 1505-1 should have been completed prior to fuel movement, including establishment of containment integrity, which is the Technical Specificaton requirement.

The personnel errors involved:

- Lack of understanding on the part of the Bridge crew and some Control Room personnel that the Main Fuel Bridge interlocks test involved refueling operations; this was exacerbated by poor communication between CR personnel and the Bridge crew.

- The operating crew involved was focused on bridge operations to such a degree that the overall condition and readiness of the Reactor Building for refueling operations went unobserved.

IV. COMPONENT FAILURE DATA

There were no component failures associated with this event.

V. AUTOMATIC OR MANUAL INITIATED SAFETY SYSTEM RESPONSES

There were no Safety System Actuations associated with this event.

VI. ASSESSMENT OF THE SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

All of the requirements to establish containment integrity had been completed with the exception of closing the doors at the two airlock entrances. The doors (4 total - 2 per airlock) were operable and capable of being closed immediately in the event of a fuel handling accident. Additionally, a Reactor Building purge was in progress such that air was drawn into the Reactor Building through the open doors and then exhausted through the purge valves. If there had been a fuel handling accident during this event, the Reactor Building Purge Exhaust would ensure that air flow would have been into the containment through the open airlock doors and out through the purge filters.

Subsequently, upon actuation of the interlock on high radiation by the purge exhaust radiation monitor (RM-A-9), the purge valves would have shut, which would stop the purge exhaust flow. Air flow would then be into the Reactor Building through the open emergency hatch airlock door and exhausted through the personnel hatch airlock door into the Fuel Handling Building, and through its Ventilation Exhaust Filters.

During this event, the Bridge SRO was in communication with the Control Room. Therefore, if any problems had occurred, the Control Room could have immediately evacuated the Reactor Building and directed that the airlock doors be closed.

VII. PREVIOUS EVENTS OF A SIMILAR NATURE

None.

VIII. CORRECTIVE ACTIONS TAKEN

1. No refueling operations were performed until this event was discussed with all fuel handling personnel by the Refueling SROs.

2. This incident was reviewed with the personnel directly involved in the event by the Director, Operations & Maintenance, TMI-1.

3. A Temporary Change Notice to the procedure being performed was implemented to immediately correct it by adding new prerequisites to Section 3.0 "Limits and Precautions," and a WARNING following the revised NOTE at the beginning of Section 6.3.3.1. Additionally, a WARNING was placed after Step 6.3.3.1.g to highlight the fact that withdrawal of a fuel assembly would be required in the next few steps.

4. The Plant Incident Report has been reviewed by all operations department personnel, including off-shift licensed personnel, in accordance with Administrative Procedure 1029, "Conduct of Operations."

IX. CORRECTIVE ACTION PLANNED

1. Procedure 1303-11.4 is under review for revision with the objective of strengthening the procedure including, at a minimum, sign-off of the applicable prerequisites prior to movement of irradiated fuel. The procedure change is expected to be completed by March 31, 1992.

2. This incident will be included in the Pre-refueling operator training curriculum as part of the Industry Experience Review.

* The Energy Industry Identification System (EIIS), System Identification (SI) and Component Function Identification (CFI) Codes are included in brackets, "[SI/CFI]", where applicable, as required by 10 CFR 50.73(b)(2)(ii)(F).