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March 29, 1995
NRC-95-0031

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington D.C. 20555

Reference: Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

Subject: Licensee Event Report (LER) No. 95-003

Please find enclosed LER 95-003, dated March 29, 1995, for a reportable event that occurred on February 28, 1995. There is one commitment in this LER to develop a plan to allow for additional monitoring of reactor water level reference legs during a future outage. A copy of this LER is also being sent to the Regional Administrator, USNRC Region III.

If you have any questions, please contact Joseph M. Pendergast, Compliance Engineer at (313) 586-1682.

Sincerely,

DRGipson

Enclosure:NRC Forms 366, 366A

cc: T. G. Colburn
J. B. Martin
M. P. Phillips
P. L. Torpey
A. Vegel

Wayne County Emergency
Management Division

IE22

NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Fermi 2	05000 341	1 OF 5

TITLE (4)
Reactor Water Level Instrumentation Error - Leakage from Reference Leg

EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
02	28	95	95	-- 003 --	00	03	29	95	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	2
POWER LEVEL (10)	000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

20.402(b)		20.405(c)		50.73(a)(2)(iv)	73.71(b)
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
20.405(a)(1)(iii)	X	50.73(a)(2)(i)		50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)
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 (Include Area Code)
Joseph M. Pendergast, Compliance Engineer	(313) 586-1682

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)

	YES (If yes, complete EXPECTED SUBMISSION DATE)		NO
		X	

EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On February 27, 1995 at 4:32 p.m., the narrow range reactor water level instrumentation failed a channel check surveillance because the difference between channels exceeded 5 inches. All control rods were fully inserted and the mode switch was in mode 2 at the time of the event. Technical Specifications 3.3.1 and 3.3.2 were entered. The reactor protection system channel for B21-N080D was placed in the tripped condition as required by Technical Specifications, and valve E1150-F008 was de-energized closed. Technical Specification 3.3.1 and 3.3.2 required the mode switch to be placed in Shutdown within 12 hours if the reactor water level discrepancy was not corrected. On February 28, 1995 at 4:16 a.m. an Unusual Event was declared and terminated when the mode switch was placed in shutdown completing a plant shutdown in accordance with the Technical Specifications.

The most likely cause of the reactor water level discrepancy was gradual draining down of the division 2 reactor water level instrument reference leg. It is believed that the reference leg began to slowly drain down when the reactor coolant temperature dropped to a point where condensation could no longer make-up for the leakage in the reference leg. The reference leg for the division 2 racks has been refilled correcting the discrepancy. A plan is being developed to allow for additional monitoring during a future outage to confirm the effectiveness of the valve line up verification.

Initial Plant Conditions:

Operational Condition:	2 (Start Up)
Reactor Power:	0 Percent
Reactor Pressure:	0 psig
Reactor Temperature	160 degrees Fahrenheit

Description of the Event:

On February 27, 1995 at approximately noon, with the reactor in mode 2 and all control rods fully inserted, the "B" narrow range reactor water level instrument (LI) began slowly trending upward relative to the "A" side instrument. At this time reactor water level was being maintained in the normal operating band (approximately 195 inches) and the Nuclear Supervising Operator {(NSO) (utility - licensed)} had selected the "B" instrument to control reactor water level. As the indicated level increased on the narrow range "B" instrument, the NSO made adjustments to maintain indicated level within the normal range. This resulted in a gradual lowering of the actual reactor water level. At 2:50 p.m. a low reactor water level alarm (ANN) was received when the "A" level instrument reached the low level alarm setpoint (level 4) of 192.7 inches. The NSO raised reactor water level several inches above the level 4 setpoint using the channel "A" instrument (lowest reading) to correct this condition. (Note: The reactor water level 3 setpoint is 173.4 inches and this setpoint is when a reactor scram occurs.)

On February 27, 1995 at 4:32 p.m., the narrow range reactor water level instruments failed their channel check surveillance when the discrepancy between "A" and "B" instruments exceeded 5 inches. The investigation concluded that the narrow range level instruments on rack H21-P005 were diverging from the corresponding instruments on H21-P004 and the flood-up level instrument on H21-P005. Because the narrow range instruments on H21-P004 and the flood-up instrument on H21-P005 confirmed each other, the narrow range reactor water level instruments on H21-P005 were declared inoperable. Wide range level instrumentation remained offscale (high) during this time due to cold plant conditions, and therefore was considered operable. A half scram was inserted onto the B2 reactor protection system (JC) channel, and the E1150-F008 valve (ISV) was de-energized closed as required by Technical Specification 3.3.2. Technical Specifications 3.3.1 for reactor protection system instrumentation, and 3.3.2 for isolation actuation instrumentation were invoked for the narrow range water level instruments.

A walkdown of the instrument racks (RK) H21-P004, P005, P009, and P010 and the reference leg back fill system was performed by operations, instrumentation & controls (I&C), and engineering personnel. No reason for the level discrepancy, such as external leaks or valve misalignments were discovered. On February 27, 1995 at 9:14 p.m., the discrepancy between division "A" and "B" instruments had reached 9 inches, operators raised the reactor water level above the reference leg instrument taps (off scale high) to determine if this would correct the divergence by refilling the reference leg.

On February 28, 1995 at 1:51 a.m., the reactor water level was lowered to bring the level instruments back on scale. Raising reactor water level had not corrected the divergence in the level instruments, and the level discrepancy was 10 inches. At 4:16 a.m., an Unusual Event was declared when it was necessary to placed the mode switch in shutdown in accordance with the Technical Specification 3.3.1 and 3.3.2. The Unusual Event was terminated at 4:16 a.m. when the reactor mode switch was placed in shutdown, establishing Cold Shutdown conditions. No control rod (AA) motion occurred because control rods were already fully inserted. A plan was developed to re-verify the instrument rack valve line-up and check for external leaks of an instrument valve which had not been previously checked.

On March 1, 1995 at 3:51 a.m., the division 2 reference leg was refilled through instrument rack H21-P010, and an immediate response was observed, indicating that the common reference leg had drained down several inches. Refilling this reference leg corrected the level discrepancy.

Cause of the Event:

The most likely cause of the reactor water level discrepancy was a very slow drain down of the division 2 reactor water level instrument reference leg. A leak of approximately 0.1 milliliters per minute would produce the indicated level change. There was some leakage found on the H21-P010 instrument rack but this leakage was determined not to affect level instrumentation. Since there was no evidence of an obvious external leak, it is believed that the leak was developed through the equalizing valve (V). There are several instrument equalizing valves which could have affected reactor water level in this manner. The instrument valves were checked closed.

A small leak of this nature would not be evident during Power Operation when the reference leg back fill system is in service. The reference leg back fill system is removed from service when the plant is shutdown. Also, it would not affect level instrumentation during plant operation because condensation from the reactor would be able to make-up for these small losses. On February 14, 1995 at 4:28 p.m., the reactor was shutdown for work on the main turbine system. The plant was maintained in mode 2, and the reactor was kept hot, with normal operating reactor water level. The reference leg back fill system was removed from service. It is believed that the reference leg began to slowly drain down when the reactor coolant temperature dropped to a point where condensation could no longer make-up for the leakage. This would have begun several days before the level discrepancy could be detected.

Initially, the reference leg is filled to the condensing chamber. The volume of the condensing chamber (CDU) is large compared to the estimated leak rate. Therefore, indicated level changes at a very slow rate until the condensing chamber is drained and the vertical piping of the reference leg begins to drain.

Analysis:

The gradual loss of water from the division 2 reference leg resulted in a gradual upward drift on all wide range and narrow range level instrumentation on racks H21-P005 and H21-P010. Pressure instrumentation, flood-up level instrumentation, and division 1 level instrumentation was not affected.

An upward drift on the affected instrumentation would have reduced the actual levels at which actuation signals from this equipment would have occurred by approximately 10 inches. These signals are used by reactor protection system, containment isolation logic system, reactor core isolation system (BN), anticipated transient without scram mitigation logic, and feedwater (SJ) and main turbine trip logic (TA). However, redundant instrumentation on racks H21-P004 and H21-P009 was unaffected by this event and would have alone initiated the required actuations at the correct levels. Both reactor recirculation pumps were in service.

At the time of this event, the plant was in mode 2 at atmospheric pressure with the control rods fully inserted. Decay heat was minimal, and reactor temperature was steady at 160 degrees Fahrenheit without shutdown cooling in service.

Based on these considerations, the effect of a 10 inch level offset would have no affect on mitigating an event resulting in increasing or decreasing water level. Also, this gradual leakage from the division 2 reference leg would not result in a decrease in reference leg level once the reactor began steam production, therefore no level drift would occur during power operation.

Corrective Actions:

I&C performed hands on verification of instrument valves on the division 2 racks to ensure that equalizing and drain valves were fully closed. I&C refilled the division 2 reference leg from the division 2 rack, restoring agreement between division 1 and division 2 instrumentation. I&C then refilled the division 1 reference leg. Water level indication was monitored during these filling evolutions, which confirmed that only the division 2 reference leg had been affected. Once the reference legs were refilled, operators monitored the level instrumentation for several days with the reactor in Cold Shutdown, observing no divergence.

Given the small leak rate assumed, this monitoring and further monitoring at power does not totally eliminate the possibility of a leak. A small enough leak would not have resulted in an observable change in indication due to the volume of the condensing chamber. Indication also will be unaffected during Power Operation because any small leakage will be masked by operation of the reference leg back fill system and condensation (approximately 2.6 pounds per hour), which will keep the reference legs full. Therefore, a p' n is being developed to allow for additional monitoring during a future outage to confirm the effectiveness of the valve line up verification.

Previous Similar Events:

None.