Consumers Power

POWERING MICHIGAN'S PROGRESS

Palisades Nuclear Plant: 27780 Blue Star Memorial Highway, Covert, MI 49043

January 26, 1996

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

DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT
LICENSEE EVENT REPORT 95-010-01 - ENGINEERED SAFETY FEATURE ACTUATION - MANUAL REACTOR TRIP DUE TO ISOLATION OF PRIMARY COOLANT SYSTEM LEAK - REVISED REPORT

Licensee Event Report (LER) 95-010, Revision 1, is attached.

This event was reportable to the NRC per 10CFR50.73(a)(2)(iv) as an event or condition that resulted in a manual actuation of an engineered safety feature.

SUMMARY OF COMMITMENTS

This letter contains no new commitments. The scope of the previous comitment made in LER 95-010 was revised to more clearly reflect our intended corrective action. This corrective action has been completed. All commitments relating to LER 95-010 are closed.

Richard W. Smedley
Manager, Licensing

CC Administrator, Region III, USNRC
Project Manager, NRR, USNRC
Resident Inspector, USNRC - Palisades

Attachment

IE22
1/1

NRC Form 366
(9-83)

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

LICENSEE EVENT REPORT (LER)

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TITLE (4) LICENSEE EVENT REPORT 95-010-01 - ENGINEERED SAFETY FEATURE ACTUATION - MANUAL REACTOR TRIP FOLLOWING THE ISOLATION OF A PRIMARY COOLANT SYSTEM LEAK - REVISED REPORT

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (6)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
									N/A	0 5 0 0 0
0 8	1 5	9 5	9 5	- 0 1 0 -	0 1	0 1	2 6	9 6	N/A	0 5 0 0 0

OPERATING MODE (9)	N
POWER LEVEL (10)	0 0 0

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

[ ] 20.402(b)	[ ] 20.405(c)	[X] 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 (Specify in Abstract below and in Text, NRC Form 366A)
[ ] 20.405(a)(1)(iii)	[ ] 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 (AREA CODE)
Robert A Vincent, Licensing Supervisor	6 1 6 7 6 4 - 8 9 1 3

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

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS
	A B	T B G		NO					

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 August 15, 1995, at 0248 hours, with the plant in hot standby condition and one control rod partially withdrawn, a 1/2" diameter primary coolant system (PCS) instrument line compression fitting in containment failed. The leak caused a pressure transmitter output to fail low and initiate a PCS low flow trip on one channel of the reactor protective system (RPS). The leak rate was approximately 12 gpm and the operations crew was immediately aware of the event based on control room indications and notifications from personnel in containment. During the closure of manual root valves to isolate the leak, additional PCS low flow trip channels were inadvertently affected. A manual reactor trip was initiated in anticipation of an automatic reactor trip on the combination of invalid low PCS flow inputs to the RPS. The cause of the leak was less than adequate engagement of a tubing section into a compression fitting during its assembly at some unknown time in the past. The cause for the reactor trip was the inadvertent closure of the wrong isolation valves due to several valves being mislabeled.

The corrective actions completed include replacement of the failed instrument line, the restoration and functionality check of the pressure transmitters, inspection and clean up of components in the vicinity of the leak, and an evaluation of the generic implications of this event and similar industry experience events. A walkdown of all primary coolant system root valves is planned during the next cold shutdown period to ensure each valve is labeled correctly.

EVENT DESCRIPTION

On August 15, 1995, at 0248 hours, with the plant in hot standby condition and individual control rod drop time testing in progress, the control room operators were alerted to several indications that a small Primary Coolant System (PCS),[AB], leak had occurred in the containment building. The information received was: a smoke detector alarm in containment, a low PCS flow channel trip and alarm on the "B" channel of the Reactor Protective System (RPS), and an immediate phone call from personnel working in containment that a steam leak had suddenly occurred in the lower level of containment in a location near racks of numerous PCS instruments. The operators entered off normal procedure (ONP) 23.1, "Primary Coolant Leak", and commenced plans to isolate the leak, [TBG]. Several immediate actions were also taken at this time including the estimation of the leak rate at approximately 12 gpm and the full insertion of the partially withdrawn control rod.

The operations crew identified three manual valves that would need to be closed in order to isolate the PCS leak. From all indications the break was on the instrument line feeding the "failed-low" differential pressure transmitters, DPT-0112AB and DPT-0112BB, which provide steam generator differential pressure indication in the control room as well as input to the RPS low PCS flow trip circuitry. During this planning, it was also determined that other differential pressure transmitters and their associated "D" channel RPS low PCS flow trip channels would be affected by the closure of the selected isolation valves. For this reason, the previously tripped RPS "B" channel for low PCS flow was placed in the bypass mode to isolate the invalid low flow trip on channel "B". This planned action would avoid a possible reactor trip on PCS low flow due to the anticipated two out of four trip logic being satisfied upon leak isolation.

Upon arriving at the scene of the leak, the auxiliary operators closed the initial set of three valves. At this time, the operators were not aware that several manual root valves for the instruments involved were mislabeled. The leak rate did not change upon the closure of the valves and the operators contacted the shift supervisor (SS) for further actions. The SS instructed the operators to physically walk down the tubing run to identify the proper isolation valves. The operators subsequently located and closed the remaining valve that provided full isolation of the leak. The total inventory lost was approximately 800 gallons.

At about this same time, the control room personnel observed additional unexpected PCS low flow pre-trips on RPS channels "A" and "C" and manually tripped the reactor. The RPS channels "A" and "C" low flow pre-trips had slowly evolved from the closure of the mislabeled valves and the subsequent pressure decay of the trapped fluid in the sensing lines to the associated pressure transmitters. The manual trip was initiated in anticipation of and prior to an automatic trip on PCS low flow due to the combination of invalid trip signals to the RPS channels. Based on the fact that the control rods were all located at their lower electrical limit, approximately three inches of withdrawal, the reactor trip was basically a necessary formality that did not significantly change the plant configuration. The operators completed the post reactor trip actions and determined that all plant equipment responded properly to the event. The NRC was notified of the manual reactor trip per the four-hour nonemergency reporting requirements of 10CFR50.72(b)(2)(ii) at 0513 hours.

CAUSE OF THE EVENT

There are two different occurrences that created the need to manually trip the reactor. The first occurrence was the failure of the instrument tube fitting which resulted in the PCS leak. The second event was the inadvertent closure of the wrong isolation valves to stop the leak, which resulted in two additional RPS low flow trip channels to fail low and necessitate a manual reactor trip.

FAILED INSTRUMENT TUBE FITTING

Following the isolation of the leak, it was determined that a section of 1/2" diameter instrument tubing had pulled out of a swagelock compression fitting. The instrument line is located at the bottom level of containment, 590' elevation, in the instrument air room. The inspection of the tubing and fitting indicated that the tubing had not been fully seated into the compression fitting during previous assembly. This was determined by the location of the permanent markings made by the compression fitting ferrule on the outside diameter of the tubing. The markings were located at the very end of the tubing indicating that the tubing had not been fully seated into the bore of the fitting prior to final fitting assembly. The expected location of the compression ferrule markings would be approximately 1/4" back from the leading edge of the tubing.

The tubing which had pulled out of the fitting had several bends located near the fitting that were needed in order to route the tubing around an adjacent support beam. It is likely that the tubing contacted the support beam and was unknowingly not fully seated in the bore of the compression fitting during initial assembly and any subsequent reassemblies. A review of work order history did not identify when the associated fitting was last altered. The fitting may have remained untouched since initial plant construction because its location would not require it to be disturbed as part of routine or nonroutine maintenance or testing on the associated pressure transmitters. A team of plant personnel walked down approximately one hundred other accessible compression fittings in containment. No other tubing runs were observed to have similar interference problems or complex routing that could lead to less than adequate tubing engagement.

Failure of instrument tubing compression fittings has been the subject of several operating experience notices. Most notably, in 1991, a failed compression fitting at Oconee Unit 3 resulted in leaking 87,000 gallons into containment. The root cause for this failure was different and was due to less than adequate compression of the mating ferrule. As a result of this 1991 operating experience event, Palisades enhanced the training for plant personnel who assemble compression fittings and also developed a formal checklist to be used during work activities. Also, an inspection of approximately one hundred compression fittings was completed during the 1993 refueling outage to evaluate the condition of a sample of fittings. Some minor discrepancies were observed and the work controls for compression fitting maintenance were further enhanced.

CLOSURE OF THE WRONG ISOLATION VALVES

The wrong valves were closed during isolation of the leak due to the mislabeling of two pairs of root valves within the set of steam generator E-50A differential pressure transmitters. The tags for the two pairs of valves contained proper data, but were inadvertently placed on the incorrect valves at some unknown time in the past. Based on their location on the instrument line, the root valves are not routinely manipulated to support maintenance or testing of individual components or the PCS system. The root valves for the differential pressure transmitters are all verified to be open during the performance of system checklists prior to plant start-ups. However, due to their close proximity to each other and their associated pressure transmitters, there would be no reason to suspect during the performance of the checklists that valve tags were placed on the wrong root valves. It is likely the tags were installed incorrectly due to personnel error.

SAFETY SIGNIFICANCE

The PCS leak of approximately 12 gpm was well within the 130 gpm capacity of the charging pumps and the PCS make-up systems. The physical location of the leak was quickly diagnosed and the leak was isolated within 1 hour and 20 minutes. The subsequent manual reactor trip was uneventful based on the fact that the plant was in the hot standby condition, the control rods were already fully inserted to their electrical lower limit, and the PCS parameters of pressure and temperature remain stable during a trip from the hot standby condition. All plant equipment responded properly to the event and the equipment located adjacent to the leak did not suffer any adverse effects.

Based on the evaluation of the failed tubing and actions taken to enhance compression fitting maintenance at Palisades, it is not deemed likely that other compression fittings will fail. Also, any future failures of tubing would result in analyzed conditions pertaining to the loss of a particular system fluid inventory or partial spray and flooding of other plant components.

Based on the evaluation of the mislabeled root valves, it is not likely that a significant event will result from the manipulation of mislabeled root valves. Palisades Off-Normal and Emergency Operating Procedures do not contain any significant root valve manipulations to minimize the consequences of a postulated accident. The tagged and labeled components in the plant that could require manipulation during off normal events have received adequate oversight during

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training and other license qualification efforts. Thus, the safety significant labels and tags in the plant are routinely used and verified to be correct. The likely extent of any root valve mislabeling which might be present, therefore, is judged to be very limited and not of safety significance.

CORRECTIVE ACTIONS TAKEN AND RESULTS ACHIEVED

The following corrective actions have been completed:

1. The failed swagelock fitting and associated tubing were replaced using the established Palisades guidelines for assembly of compression fittings.

2. The differential pressure transmitters were restored to service and verified to be operating properly.

3. The components and structures located in the general area of the leak were wiped down and inspected to ensure no damage occurred.

4. A team of plant personnel walked down approximately one hundred other accessible compression fittings in containment. No other tubing runs were observed to have similar interference problems or complex routing that could lead to less than adequate tubing engagement.

5. The labeling of all root valves associated with the PCS flow defferential pressure instrumentation has been verified to be correct. New labels were installed as needed.

CORRECTIVE ACTIONS TO BE TAKEN

All corrective actions have been completed.