

**LICENSEE EVENT REPORT (LER)**

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), 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

FACILITY NAME (1) **CONSUMERS ENERGY COMPANY  
PALISADES NUCLEAR PLANT**

DOCKET NUMBER (2)  
**05000255**

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**TITLE (4) SUPPLEMENT 1, "VIOLATION OF TECHNICAL SPECIFICATION 6.5.7 FOR FAILURE TO FULLY TEST VALVES"**

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 NAME	DOCKET NUMBER
11	10	97	97	013	01	4	15	98	FACILITY NAME	DOCKET NUMBER 05000
OPERATING MODE (9)		N		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check one or more) (11)						
POWER LEVEL (10)		99.6		20.2201(b)	20.2203(a)(2)(v)	X	50.73(a)(2)(i)	50.73(a)(2)(iii)		
				20.2203(a)(1)	20.2203(a)(3)(i)		50.73(a)(2)(ii)	50.73(a)(2)(x)		
				20.2203(a)(2)(i)	20.2203(a)(3)(ii)		50.73(a)(2)(iii)	73.71		
				20.2203(a)(2)(ii)	20.2203(a)(4)		50.73(a)(2)(iv)	OTHER		
				20.2203(a)(2)(iii)	50.36(c)(1)		50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A		
				20.2203(a)(2)(iv)	50.36(c)(2)		50.73(a)(2)(vii)			

**LICENSEE CONTACT FOR THIS LER (12)**

NAME Philip D. Flenner, Licensing Engineer

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**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	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
If yes, COMPLETE EXPECTED COMPLETION DATE	X				

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

On November 10, 1997, the plant was operating at 99.6% power. During the evaluation of an NRC Architect-Engineering Design Inspection team request for information, it was determined the check valves (CK-ES3339 and CK-ES3340) in the minimum flow recirculation piping from the discharge of each High Pressure Safety Injection (HPSI) pump were not periodically tested to confirm their closure capability. It was concluded that this is contrary to the requirements of ASME XI and Technical Specification 6.5.7.

A review of other check valves, control valves, and motor operated valves for similar testing discrepancies identified four additional instances where valves were not fully tested. These four instances are reported in this supplement.

In each case, upon discovery, the equipment was either declared inoperable until testing was performed or determined to be operable per ASME Code or Technical Specifications requirements. All affected valves which were declared inoperable were subsequently tested and were declared operable based on the results, within the 24 hour period allowed by Technical Specification 4.0.3.

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**EVENT DESCRIPTION**

On November 10, 1997, the plant was operating at 99.6% power. During the evaluation of an NRC Architect-Engineering Design Inspection team request for information, it was determined the check valves (CK-ES3339 and CK-ES3340) in the minimum flow recirculation piping from the discharge of each High Pressure Safety Injection (HPSI) pump were not periodically tested to confirm their closure capability. It was concluded that this is contrary to the requirements of ASME Section XI and Technical Specification (TS) 6.5.7. The requirements for valve testing are contained in ASME Section XI, Article IWW, which references OMa-1988 (Part 10). OMa-1988 (Part 10), Section 4.3, specifies the Inservice Testing (IST) requirements for Category C check valves. The technical concern is an interface between a high pressure and low pressure system not being tested periodically to confirm appropriate isolation. Without such confirmation of isolation, it is postulated that the piping and components with lower pressure rating might be overpressurized. Although these check valves were not being tested periodically for the closure attribute, they were being tested regularly for the open attribute per the ASME Section XI valve testing program. They also were included in the Check Valve Program which had confirmed the satisfactory materiel condition of these valves.

Upon discovery, both HPSI pumps and associated check valves were declared inoperable. TS 4.0.3 allows for a delay up to 24 hours to complete the surveillance testing prior to taking the required TS action. The check valves were tested to confirm they would close properly. The HPSI pumps and associated components were declared operable and compliance with the TS was restored. The testing was performed without any reduction in plant power level.

A review of other check valves, control valves, and motor operated valves for similar testing discrepancies was undertaken to determine if similar problems were present. This review identified four additional instances where valves were not fully tested. These four instances are:

- (1) Check valve CK-DMW400 has a function to open and pass water flow from Primary Makeup Water Tank T-81 to Condensate Water Storage Tank T-2. The function was not being periodically tested. This condition was identified on March 17, 1998 with the plant at full power. The check valve was declared inoperable. Within 4 hours after the valve was declared inoperable, a non-intrusive accoustical test was performed while subjecting the check valve to a flow condition and the test successfully confirmed the valve would open. On this basis, the valve was declared operable. No mode changes or power reductions were required relative to this testing.

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- (2) Charging Pump Line to Safety Injection Test Line Isolation Valve MO-3072 has a remote position indication which has not been tested to verify that the valve position is properly indicated. This condition was identified on March 17, 1998 with the plant at full power. MO-3072 is a normally closed valve with a closed safety function and no open safety function. MO-3072 was determined to be operable because the valve was verified to be closed and therefore met its safety function. This is not considered to be a reportable condition but is included as an instance where the IST Program was deficient.
- (3) Air Space Purge Fan V-46 Discharge Isolation Valves CV-1813 and CV-1814, which are electrically locked closed in power operation but can be opened in cold shutdown, were not timed during stroke testing. This condition was identified on March 17, 1998, with the plant at full power. CV-1813 and CV-1814 were determined to be operable since they were electrically locked closed in their safety function position, as required by TS. However, these valves were caution tagged to remain closed until their stroke-to-close time is tested.
- (4) Containment Steam Heating Return and Supply Valves CV-1501, CV-1502, and CV-1503 were not timed during stroke testing. This condition was identified on March 26, 1998 with the plant at 90% of full power. These valves were declared inoperable. They were timed during stroke testing within 8 hours and declared operable after successful testing.

**ANALYSIS OF EVENT**

The general commitment to an inservice testing program per ASME XI is contained in TS 6.5.7. TS 6.5.7 however does not provide system or component testing requirements. Identifying components for inclusion in the ASME XI testing scope depends on the plant specific design basis. The IST program documents EM-09-02, "Inservice Testing of Plant Valves," and EGAD-EP-09, "Palisades Inservice Testing Program Basis Document," consist of a component-by-component determination of required performance attributes and the appropriate testing for those attributes. A key input for the IST program is the Palisades Equipment Database. The Palisades Equipment Database was developed through design reviews and identifies safety-related equipment and their required operating modes.

For check valves CK-ES3339 and CK-ES3340, the components have always been considered safety related for pressure retention and they are in an ASME XI Class 2 system. The required operating configurations in the Palisades Equipment Database have been safety related to open, but non-safety related for closure for both valves. This initial Palisades Equipment Database design interpretation was documented in 1979. Based on this determination, these particular valves were included in ASME XI IST testing to confirm they will open, but not included in the ASME XI IST testing to confirm closure.

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In the late 1980s, a major upgrade to the Palisades IST program occurred. Upgrades for valve testing were based on preliminary Generic Letter 89-04 information. In April 1988, upgrades to EM-09-02 "Inservice Testing of Plant Valves" were completed which included the addition of check valves CK-ES3339 and CK-ES3340 to the scope of the IST program. These check valves were only specified to be tested to confirm they would open per surveillance test QO-19 "HPSI Pumps and ESS Check Valve Operability Test". An objective of this upgrade to the IST program was to assure that required attributes identified in the Palisades Equipment Database were incorporated into the IST program. The upgrade was not intended to validate or reconstruct the plant's design basis. Therefore, the existing Palisades Equipment Database was used as the basis for determining valve test requirements. Since the Palisades Equipment Database only specified an open safety function, the closed safety function was not specified as requiring a test. Had the valves been identified in the Palisades Equipment Database as having a closed safety function, there would have been an IST test to periodically confirm proper closure.

Review actions, initiated as a result of the original event, identified additional valves which were not being tested as required. The causes were similar to that determined for the failure to perform the proper inservice tests on check valves CK-ES3339 and CK-ES3340. Errors in the Equipment Database or in the use of the Equipment Database led to the failure to properly test the identified valves within the IST Program. Following are discussions of the causes that led to inadequate testing for the additional valves:

- (1) Check valve CK-DMW400 has a safety function to open and pass water flow from Primary Makeup Water Tank T-81 to Condensate Water Storage Tank T-2. The Equipment Database incorrectly identified the open position as non safety-related. This led to the failure to include valve testing to verify the function to open.
- (2) Charging Pump Line to Safety Injection Test Line Isolation Valve MO-3072 has a passive safety function to remain closed. Although the closed safety position of the valve can be and has been verified, a position indication check is required. Although the Equipment Database correctly identified the closed, passive safety function as safety-related, an action was taken in error to remove the valve from the surveillance testing procedure. This was caused by an inadequate consideration of all the available details when determining the IST scope and testing requirements.
- (3) Air Space Purge Fan V-46 Discharge Isolation Valves CV-1813 and CV-1814 have a passive safety function to remain closed during any postulated accident occurring above cold shutdown operation. These valves are electrically locked closed above cold shutdown in accordance with the Technical Specifications and therefore are capable of performing their safety function.

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During cold shutdown, CV-1813 and CV-1814 may be open to provide a flow path for Air Space Purge Fan V-46 to containment. The valves would be required to close on a Containment High Radiation (CHR) signal. In this case, they would have an active safety function to close. However, since containment isolation is not assumed during the postulated fuel handling accident in FSAR 14.19, no credit is taken for closure of the valves and the active safety function to close was not included in the IST Program.

When the IST Program was updated for the Third Interval in 1995, Palisades failed to add these valves for position indication testing; which is required for passive valves by ASME XI. This was caused by an inadequate consideration of all the available details when determining the IST scope for these valves. Prior to that update, the code did not require position indication testing for a passive function and therefore the valves were not included in the program.

- (4) Containment Steam Heating Return and Supply Valves CV-1501, CV-1502, and CV-1503 have a safety function to remain closed during any postulated accident occurring above cold shutdown operation. During this mode of operation, the normally closed valves are not locked closed and therefore have an active safety function to close if either a Containment High Pressure or a CHR signal is received. The valves were not included in the IST Program as having an active safety function to close since they are normally closed and are seldom used.

During cold shutdown, CV-1501, CV-1502, and CV-1503 may be open to provide heating to containment if needed. The valves would be required to close on a CHR signal. In this case, the valves would have an active safety function to close. However, since the containment isolation is not assumed during the postulated fuel handling accident in FSAR 14.19, no credit is taken for closure of the valves and the active safety function to close was not included in the IST Program.

When the IST Program was updated for the Third Interval in 1995, Palisades failed to test the valves for either stroke time or position indication. This was caused by an inadequate consideration of all the available details when determining the IST scope for these valves.

Palisades has considered the extent of this event. Due to the extensive validation over recent years in other Engineering Program areas, we believe that these types of problems do not exist beyond the ISI/IST area. Consequently, the ISI Program basis document will be reviewed and upgraded to a plant procedure. This process will include reviews which will serve to identify if ISI Program deficiencies similar to those identified in the IST Program exist.

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**SAFETY SIGNIFICANCE**

The overall safety significance of this event is low. This conclusion is based on the functions of the valves identified and the subsequent analyses or testing which occurred to verify the operability of the valves. The following provides details for the specific valves identified:

Check valves CK-ES3339 and CK-ES3340

The following postulated scenario creates a potential overpressurization in the HPSI suction piping if the check valves leak. Note that either HPSI pump could apply in this scenario. The case of HPSI pump, P-66A, operating and HPSI pump, P-66B, idled will be described, see the attached sketch. This postulated scenario presumes two in-series check valves stick-open, while the check valve on the suction of the idle HPSI pump closes. The check valves in the common header to the Safety Injection Refueling Water (SIRW) Tank (CK-ES3331 and CK-ES3332) are extra valves which are not credited with preventing backwards flow, but which are tested to assure they allow normal flow.

The scenario involves a post-accident lineup which occurs after recirculation actuation signal conditions, one HPSI pump running and supplying water to the Primary Coolant System (PCS), the other HPSI pump turned off, and PCS pressure just below the shut off head of the HPSI pumps. The minimum flow recirculation flow path to the SIRW Tank is isolated by the closure of CV-3027 and CV-3056 due to the recirculation actuation signal. Check valves CK-ES3331 and CK-ES3339 are stuck open (assumed because not previously subjected to periodic IST closure tests), allowing backwards flow and pressure to transmit through the idled HPSI pump, P-66B, to its suction side piping. Check valve CK-ES3168 is closed (assumed because this is confirmed by IST testing) and capable of preventing backwards flow, thereby allowing P-66B suction side piping to be pressurized from the discharge pressure provided by operating HPSI pump P-66A. This check valve backflow leakage scenario results in pressure build up in the idle HPSI pump discharge piping until it would equalize at or near the PCS pressure, and in the HPSI suction piping which is potentially subjected to pressure exceeding its design rating of 500 psig. Thus, there exists a possibility of overstressing the piping by applying pump pressure and this makes the closure attribute a safety related function for these check valves.

In recognition of the importance of these check valves, the IST program has been testing these check valves per ASME XI to confirm they open. In addition, the check valve program has been monitoring these check valves and has confirmed that no degradation of their materiel condition has occurred. What was not recognized was the IST requirement to test the closure attribute. The testing performed confirms the check valves close satisfactorily and there was no backflow

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leakage. Based on the need for multiple failures of in-series components between the discharge of the operating HPSI pump and the suction of the idle pump to result in overpressurization, and the as-found satisfactory condition of the check valves, it is concluded that minimal risk of overpressurizing the HPSI pump suction piping existed. Therefore, the safety consequences were minimal for not routinely testing these check valves per ASME XI for the closed safety function.

Check valve CK-DMW400

Based on satisfactory performance of CK-DMW400 during the immediate action testing, it is concluded that there was no degradation of the demineralized water supply to the AFW pumps. The past and current capability of providing demineralized water supply flow through this check valve has been shown to be adequate.

Additional confirmation that flow through this path meets the flow requirements was provided by special test T-344 performed in 1994, which confirmed the required flow of 100,000 gallons of water from T-81 and T-2 to the AFW pumps. Additionally, T-2 routinely receives makeup from tank T-939, "Demineralized Water Storage Tank," via flow through this check valve which further confirms that it opens properly.

The safety significance of the failure to perform an IST surveillance test on CK-DMW400 was minimal since the safety function of the valve to open has been shown by other means. In addition, a nonintrusive accoustical test verified the ability of the valve to open to perform its safety function.

Valve MO-3072

MO-3072 is a passive valve and therefore only a position indication check is required. The valve is in the scope of NRC Generic Letter 89-10 and receives a maintenance condition check every 18 months, a static VOTES tests every 3 refueling outage cycles, and a differential pressure test every 5 refueling outages. The last check was performed on March 20, 1997. The intent of the IST position indication test is met by the combination of the condition check and the subsequent functional stroke test, which successfully verified the operation of the valve.

There was no safety significance of the failure to perform an IST surveillance test on MO-3072.

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Valves CV-1813 and CV-1814

CV-1813 and CV-1814 are position indication tested once each refueling outage per SOP-3, "Safety Injection and Shutdown Cooling System," Checklist 3.3, "Containment Integrity Checklist." Although this testing is not identified in the IST Program, Checklist 3.3 does satisfy position indication testing requirements. CV-1813 and CV-1814 are electrically locked closed above cold shutdown operations. Locking these valves closed satisfies Technical Specification Definition 1.0 of "Containment Integrity" required above cold shutdown operation. CV-1813 and CV-1814 are also stroke exercised per RO-30 "Refueling Containment High Radiation (CHR) Monitor Functional Test." This Technical Specification Surveillance Procedure tests CHR isolation by exposing the High Radiation Monitors to a source above their set points and verifying the corresponding equipment responds per design.

The safety significance of the failure to perform IST surveillance tests on CV-1813 and CV-1814 was minimal. The position verification check and stroke exercising are both being performed during other tests although stroke timing is not performed. Valves CV-1813 and CV-1814 have been shown to be capable of providing their safety functions.

Valves CV-1501, CV-1502, and CV-1503

CV-1501, CV-1502, and CV-1503 are active valves with a closed safety function. These valves normally remain closed above cold shutdown operations, except when they are tested per Technical Specification Test Procedure QO-5, "Valve Test Procedure (Includes Containment Isolation Valves)," to verify they are capable of stroking from open to closed. Upon discovery of the lack of stroke time testing, CV-1501, CV-1502, and CV-1503 were tested and confirmed to be capable of stroking from open to close in much less than 25 seconds.

The safety significance of the failure to perform IST stroke timing surveillance tests on CV-1501, CV-1502, and CV-1503 (which are normally closed) was minimal. After discovery of the event, these valves were stroke time tested and successfully demonstrated the capability to perform their safety function.

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**CAUSE OF THE EVENT**

The following deficiencies contributed to the cause of this event:

- (1) Inaccurate information or inadequate level of detail available in selected design basis information, including the Equipment Data Base, have led to errors in determining testing requirements,
- (2) The IST Basis and the scoping documents were inadequate as a result of a lack of a technical review to verify component functions and testing requirements,
- (3) Palisades had an inadequate understanding and failed to consider all of the available details when determining the IST scope and testing requirements.

**CORRECTIVE ACTIONS COMPLETED**

- (1) The check valves CK-ES3339 and CK-ES3340 were tested to confirm proper closure capability.
- (2) Check valve CK-DMW400 was tested to confirm the proper opening capability. Additionally, other test results were used to verify the capability of the valve to perform its safety function.
- (3) Isolation valve MO-3072 was determined operable since a closed position verification was performed. In addition, MO-3072 was tested on April 12, 1998.
- (4) Isolation valves CV-1813 and CV-1814 were determined operable since they are electrically locked in the closed safety position above cold shutdown operation.
- (5) Return and Supply valves CV-1501, CV-1502, and CV-1503 were stroke time tested to confirm the proper closing capability.
- (6) Palisades Equipment Database safety related interpretations for the check valves (CK-ES3339 and CK-ES3340) were revised. In turn, the Palisades Equipment Database was revised accordingly, and the closure attribute of the check valves was added to the Inservice Testing program.
- (7) Other ASME Section XI check valves, control valves, and motor operated valves were reviewed for similar discrepancies in their Palisades Equipment Database or testing scope. Palisades Equipment Database interpretations and procedure changes were initiated to

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correct the discrepancies and to ensure that future testing requirements are met. By completing this action, an improved understanding for the IST scope and testing requirements was gained.

- (8) The Palisades Engineering Programs Staff have been briefed regarding this event and the need to verify the information gained from the Palisades Equipment Database.

#### CORRECTIVE ACTIONS TO BE COMPLETED

The following actions will be completed:

- (1) Revise the Palisades Equipment Database and IST Basis Documents for the affected valves.
- (2) Complete a documented review of the ISI basis document to determine if similar conditions exist within the ISI Program, as were identified in the IST Program.
- (3) The remaining Engineering staff will be informed of this event with the need to verify Engineering Database information.

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**PALISADES  
HIGH PRESSURE SAFETY  
INJECTION SYSTEM**

