

April 23, 2001

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

**DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT  
CHANGE TO VALVE RELIEF REQUEST NUMBER 7**

On March 31, 2001 (during the current refueling outage), nonintrusive testing was performed on Safety Injection Refueling Water (SIRW) Tank outlet check valves CK-ES3239 and CK-ES3240. Test results were inconclusive on both valves, in that acoustic signals were not sufficiently above background noise levels to conclusively identify opening and closing valve disk impacts. During a conference call on April 11, 2001, Consumers Energy and NRC Staff discussed the basis for concluding the valves were in acceptable condition and indicated our intent to update and resubmit Valve Relief Request (VRR) Number 7. This letter provides the requested change to VRR No. 7 for NRC review in accordance with 10CFR50.55a (f)(5)(iii).

**Background**

On August 30, 1996, the NRC issued a Safety Evaluation Report (SER) concerning the third 120-month Interval Inservice Testing (IST) Program for the Palisades Plant. In this SER, the NRC approved VRR No.7 on the condition that two actions be completed. In addition, the NRC requested that Consumers explore the use of nonintrusive test (NIT) methods. On August 29, 1997, Consumers confirmed that the requested actions were complete, and made the following commitment:

Nonintrusive testing techniques shall be attempted on valves CK-ES3239 and CK-ES3240. If this technique can successfully verify the full-stroke exercise, VRR No. 7 shall be deleted and a cold shutdown testing basis shall be submitted.

The NRC accepted this response and approved Valve Relief Request (VRR) No. 7 on March 6, 1998.

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On July 9, 1998, Consumers submitted a change to this commitment to both remove SIRW Tank Outlet Check Valve CK-ES3240 from VRR No. 7, and to establish a Cold Shutdown Testing Basis for it. The basis for the change at that time stated that NIT results showed that CK-ES3240 could be successfully tested using the technique developed. However, the reliability of NIT techniques for CK-ES3239 was inconclusive and we retained the commitment in VRR No.7 to continue to attempt to develop a reliable NIT technique for this valve.

### **Current Conditions**

Nonintrusive testing performed on both CK-ES3239 and CK-ES3240 during the current refueling outage has not resulted in conclusive valve performance data as expected. In particular, we have determined, contrary to what was previously believed, that acoustic data to confirm full valve open impacts is, in fact, inconclusive. When these results were obtained on March 31, 2001, previous data was examined back to 1996. The review consisted of 4 sets of open and closed NIT data for single Low Pressure Safety Injection (LPSI) pump flow. The 1996 and 1997 data utilized acoustic methodology only, and the 1999 and 2001 data utilized both acoustic and magnetic methodologies. The 4 sets of NIT data were overlaid for each valve, revealing no conclusive open or closed impacts, but did reveal steady-state values that showed smooth disc motion, with no evidence of degradation via loose parts or binding internals.

Neither past nor current testing provided a sufficient acoustic signature to clearly define open impacts. This is attributed to the relatively low flow rates available during the test condition, which has resulted in valve movement (full or partial-stroke), but without sufficient force to cause definitive open or closed impact signals. However, the magnetic data from this testing does indicate smooth valve motion and does not indicate any degradation compared to past data. It is therefore concluded that nonintrusive testing can be used for general condition monitoring and trending, but not to verify open and closed disk impacts. Accordingly, VRR No. 7 is being revised to incorporate CK-ES3240 back into the scope of this request.

The attachment to this letter provides the basis to revise the currently approved version of VRR No. 7. The revised relief request provides for alternate testing in four areas: 1) CK-ES3239 and CK-ES3240 will continue to be partial-stroke tested open by passing flow, on a quarterly basis; 2) CK-ES3239 and CK-ES3240 will be partial-stroke tested open by passing flow, incorporating nonintrusive technologies, during each refueling outage. Nonintrusive data will be trended to monitor the general health of the valves; 3) CK-ES3239 and CK-ES3240 will be tested in the closed direction using a differential

pressure test each refueling outage and; 4) CK-ES3239 and CK-ES3240 will be disassembled and inspected (including a manual full-stroke exercise) on a ten-year interval, which corresponds with the full core offload frequency for inservice reactor vessel examinations.

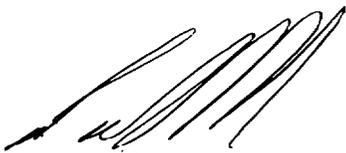
This revision to VRR No. 7 also provides a significantly expanded discussion of the inspection results and maintenance performed on the valves during the 1995 refueling outage. As a result of a newly incorporated licensing correspondence validation process at Palisades, inconsistencies have been identified in previous revisions of VRR No. 7. The brief summaries provided in these previous revisions of VRR No. 7 were incomplete. With respect to CK-ES3239, a correction has been made that the hinge pin and not the disk hanger arm bushing was replaced. The discussion for CK-ES3240 has been expanded to indicate that its hinge pin was also replaced as a precautionary measure in conjunction with the inspection. The "Basis for Relief" identified and approved in the previous revisions of VRR No.7 remain valid under the provision of 10 CFR 50.55a(f)(5)(iii) on the basis that compliance with the code requirements is impractical, and that the performance history of the valves have been acceptable. The corrections identified do not affect these conclusions.

#### SUMMARY OF COMMITMENTS

As a result of this revision of VRR No. 7, the existing commitment is being rescinded.

The rescinded commitment is:

Nonintrusive testing techniques shall be attempted on valve CK-ES3239. If this technique can successfully verify the full-stroke exercise, VRR No.7 shall be deleted and a cold shutdown testing basis shall be submitted.



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

Attachment

**ATTACHMENT**

**CONSUMERS ENERGY COMPANY  
PALISADES PLANT  
DOCKET 50-255**

**April 23, 2001**

**CHANGE TO VALVE RELIEF REQUEST NO. 7**

**Palisades Pump and Valve Inservice Testing (IST) Program**  
**REQUEST FOR RELIEF**  
**RR-V-7**

**Pending Approval**

<b>Component ID</b>	<b>Class</b>	<b>Cat.</b>	<b>System</b>	<b>Label</b>
CK-ES3239	2	A/C	ESS	SIRW Tank T-58 Discharge Check (Train B)
CK-ES3240	2	A/C	ESS	SIRW Tank T-58 Discharge Check (Train A)

**FUNCTION:**

1. Prevent back flow of possibly contaminated containment sump water into the Safety Injection Water Storage Tank (SIRWT), T-58, when the Safety Injection System (SIS) is in the recirculation mode (containment pressurized).
2. Provide a flow path from the SIRWT to the Emergency Core Cooling System (ECCS) pump suction for safety injection flow.

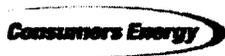
**TEST REQUIREMENT:**

1. OMa-1988, Part 10, Paragraph 4.3.2.2(a); During Plant operation, each check valve shall be exercised or examined in a manner which verifies obturator travel to the closed, full open, or partially open position required to fulfill its function.
2. OMa-1988, Part 10, Paragraph 4.3.2.2.(e); If exercising is not practical during Plant operation or cold shutdown, it may be limited to full-stroke during refueling outages.

**BASIS:**

Relief is requested in accordance with 10 CFR 50.55a(f)(5)(iii) on the basis that compliance with the code requirements is impractical. Exercising these valves to the open position required to fulfill their safety function, within allowed frequencies, is impractical based on the following:

1. The plant is not configured to allow testing of these check valves by passing either the design accident flow nor the flow required to cause the disk/hinge arm to reach the backstop.
2. There are no indication devices built into these check valves to monitor disk position, if flow sufficient to achieve a full stroke of these valves was attainable.
3. Acoustic and magnetic nonintrusive testing techniques have been unsuccessful in identifying full open impacts during various testing configurations attempted.
4. It is not prudent to perform disassembly and inspection activities to manually full-stroke the disk at times other than during a full core offload, for the following reasons:
  - a. The SIRWT (T-58) is unisolable to either CK-ES3239 or CK-ES3240 without first draining sufficient inventory from the tank to uncover the ECCS outlet standpipes, which rise 4 inches



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from the bottom of the tank.

- b. With the reactor cavity filled, the SIRWT retains approximately 45,000 gallons of borated water, on standby to gravity drain into the primary coolant system, independent of any AC power source. This is regarded as a significant line of defense for shutdown risk management in the event of loss of cavity inventory or extended station blackout.
- c. There are other valves between the shutdown cooling (SDC) portion of the system and the SIRWT discharge check valves, to provide barrier isolation. However, in the event any isolation valve failed to perform its function, there is approximately 64 feet of driving head that would divert Shutdown Cooling flow from the core into the Engineering Safeguard Rooms.
- d. The SIRWT is aluminum. Past problems with nozzle leakage from the bottom of the tank have been attributed to the tank flexing during drain and fill cycles. To minimize damage and costly repairs, draining the tank is a limited activity and not a routine outage evolution.

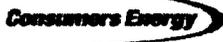
During the 1995 Refueling Outage the reactor was fully offloaded and both check valves were disassembled. This was the first time the valve internals were disassembled, for inspections and repairs. The inspection results were as follows:

CK-ES3239:

- 1. The disc's free movement to both the open and closed positions was demonstrated.
- 2. The general condition and body internals were satisfactory with no corrosion/erosion.
- 3. The disk to hinge arm connection was in satisfactory condition and no loose parts were identified.
- 4. The disk hanger arm bushing areas were satisfactory with little to no wear.
- 5. The hinge pin was unsatisfactory due to extensive wear/erosion and was replaced. (The extensive wear/erosion was determined to be caused by galvanic corrosion of the Hastelloy B hinge pin material. The hinge pin was replaced with a 17-4PH, A-564 Grade 630, material that was determined to be galvanically compatible with the other stainless steel valve components. The as-left seat blue check was satisfactory, the as-found was unsatisfactory).

CK-ES3240:

- 1. The disc's free movement to both the open and closed positions was demonstrated.
- 2. The general condition and body internals were satisfactory.
- 3. The disk to hinge arm connection was in satisfactory condition and no loose parts were identified.
- 4. The disk hanger arm bushing areas had some minor wear but were satisfactory.



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5. The hinge pin was in satisfactory condition, but was replaced as a precautionary measure due to the galvanic corrosion issue with CK-ES3239. The as-left seat blue check was satisfactory, the as-found was unsatisfactory.

Since both CK-ES3239 and CK-ES3240 were able to freely stroke to the full open and close positions after nearly twenty five years of service, it is reasonable to expect that these valves will remain in satisfactory condition for a ten year inspection interval. Added assurance is provided since the hinge pin corrosion phenomena was addressed by the material change out.

Several industry failures were identified in searching the Institute of Nuclear Power Operations (INPO) web page and the Nuclear Industry Check Valve Group (NIC) database. The majority of the failures that were reported are due to wear and age of the disk and seating surface. The failure mode for these valves appears to be gross internal leakage caused by wear. Again, the disassembly and inspection of CK-ES3239 and CK-ES3240, which occurred after nearly 25 years of service, provides assurance that these valves are not subject to failure due to wear or age.

**ALTERNATE TESTING:**

1. CK-ES3239 and CK-ES3240 will be partial-stroke tested open by passing flow on a quarterly basis.
2. CK-ES3239 and CK-ES3240 will be partial-stroke tested open by passing flow, incorporating nonintrusive technologies, during each refueling outage. Nonintrusive data will be trended to monitor the general health of the valves.
3. CK-ES3239 and CK-ES3240 will be tested close using a differential pressure test each refueling outage.
4. CK-ES3239 and CK-ES3240 will be disassembled and inspected (including a manual full-stroke exercise) on a ten year interval, which corresponds with the full core offload frequency for inservice reactor vessel examinations. This method is not in full compliance with the frequency requirements of Generic Letter 89-04, Position 2, for the reasons stated in the basis.

The alternate testing proposed will effectively monitor both condition and performance of these check valves. The combined testing will ensure that the valves will perform their safety functions and that they are maintained in a state of operational readiness.

**ACCEPTANCE CRITERIA:**

Observed test flow rates in the acceptable range constitutes an acceptable partial-stroke test for the SIRW Tank discharge check valves.

Nonintrusive test results will be evaluated and trended to monitor for loose internal parts, binding and general condition. Close impacts obtained during testing may be used for an acceptable valve closure.

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Observed differential pressures in the acceptable range constitutes an acceptable valve closure for the SIRW Tank discharge check valves.

At each disassembly, the valves will be manually exercised to verify full-stroke capability. The valves will be inspected to ensure that the internals are structurally sound (no loose, damaged or corroded parts).

**REFERENCES:**

None.

**APPROVAL REFERENCES:**

None.