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10 CFR 50.55a

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

SUBJECT:
Davis-Besse Nuclear Power Station
Docket No. 50-346, License No. NPF-3
10 CFR 50.55a Request RR-A35, Proposed Alternative to System Leakage Test Requirements

Pursuant to 10 CFR 50.55a(a)(3), FirstEnergy Nuclear Operating Company (FENOC) is requesting Nuclear Regulatory Commission (NRC) approval for a proposed alternative to certain requirements associated with the inservice testing program for the Davis-Besse Nuclear Power Station (DBNPS). The enclosure identifies the affected components, the applicable code requirements, reasons for the request, the proposed alternative, and the basis for use.

The proposed alternative would need to be implemented prior to May 20, 2012, the scheduled start date of DBNPS's spring 2012 refueling outage. Therefore, FENOC is requesting NRC approval of the proposed alternative by April 30, 2012.

There are no regulatory commitments contained in this submittal. If there are any questions or additional information is required, please contact Mr. Thomas A. Lentz, Manager – Fleet Licensing, at (330) 761-6071.

Sincerely,

Barry S. Allen

Enclosure:
Davis-Besse Nuclear Power Station, 10 CFR 50.55a Request RR-A35, Revision 0

cc: NRC Region III Administrator
NRC Resident Inspector
NRC Project Manager
Utility Radiological Safety Board

A047
NRR

Proposed Alternative
in Accordance with 10 CFR 50.55a(a)(3)(ii)

--Hardship or Unusual Difficulty Without
Compensating Increase in Level of Quality or Safety—

1. American Society of Mechanical Engineers (ASME) Code Components Affected

ASME Class 1 components (piping and valves) in the following Davis-Besse Nuclear Power Station (DBNPS) pressure test zones:

TEST ZONE	COMPONENTS
DH16	Auxiliary pressurizer spray line components at the following location: • Between RC51, Auxiliary Spray from Decay Heat Pump 2 Check Valve; and DH2735, Decay Heat Auxiliary Spray Stop Valve.
RC01	Reactor coolant system components at the following three locations: • Between HP48, High Pressure Injection Train 1-1 Stop Check Valve; and HP50, High Pressure Injection Train 1-1 Check Valve. • Between HP49, High Pressure Injection Train 1-2 Stop Check Valve; and HP51, High Pressure Injection Train 1-2 Check Valve. • Between HP57, High Pressure Injection Train 2-1 Stop Check Valve; and HP59, High Pressure Injection Train 2-1 Check Valve.

2. Applicable Code Edition and Addenda

ASME Section XI, 1995 Edition through the 1996 Addenda

3. Applicable Code Requirement

IWB-5221(a) states that the system leakage test shall be conducted at a pressure not less than the nominal operating pressure associated with normal system operation.

IWB-5222(b) states that the pressure retaining boundary during the system leakage test conducted at or near the end of each inspection interval shall extend to all Class 1 pressure retaining components within the system boundary.

4. Reason for Request

Background Information

Application of the above ASME Code requirements to all Class 1 components would require performance of a system leakage test at or near the end of each ten-year inservice inspection (ISI) interval that would extend a test pressure equal to the nominal operating pressure of approximately 2155 pounds per square inch gauge (psig), associated with 100 percent rated reactor power, to all Class 1 pressure retaining components connected to the reactor coolant system (RCS). This would include portions of Class 1 piping normally isolated from receiving RCS pressure due to their location upstream of a check valve, but when operated under system-specific parameters, are operated at pressures less than normal RCS pressure.

For Test Zone DH16, the auxiliary pressurizer spray line from the decay heat removal (DHR) system connects to the pressurizer spray bypass line downstream of the manual spray valve. During DHR system operation, an auxiliary spray flow to the pressurizer can be provided when the reactor coolant pumps are stopped and RCS pressure is less than the discharge pressure of the DHR pump. This line also provides a dilution water flow path to the core to preclude boron precipitation following a loss of coolant accident. The Class 1 portion of the auxiliary pressurizer spray line is 1 1/2" nominal pipe size (NPS) stainless steel.

For Test Zone RC01, the high pressure injection (HPI) system provides emergency core cooling for small break loss of coolant accidents. There are four HPI lines. The Class 1 HPI check valves are welded back-to-back; there is no piping or other components between the two valves. These valves isolate the RCS from the Class 2 HPI system. The inner isolation valve is a swing check and the outer valve is a stop check, both of which are 2 1/2" NPS stainless steel. Train 2-2 HPI is the flow path for normal makeup and is pressurized to slightly above 2155 psig during normal RCS operation; therefore, it is not included in this request.

Hardship or Unusual Difficulty

Normal RCS pressure is approximately 2155 psig. For Test Zone DH16 and RC01, the components cited above are separated from RCS pressure by check valves and are not normally subjected to 2155 psig.

For Test Zone DH16, an alternate test pressure rig is required to pressurize the piping between the first and second isolation valves. The first valve off the reactor coolant system is a check valve. A pressure differential between the RCS and the test boundary is required to ensure the check valve remains closed. For this check valve to remain closed, the maximum attainable test pressure would be less than the 2155 psig required by IWB-5221(a). Maintaining a differential pressure to ensure no fluid intrusion of non-borated water into the RCS (reactivity control concern), while meeting the IWB-5221(a) requirements, is considered unusually difficult.

External pressurization also requires the use of a non-Code test pressure rig. This device and its temporary system connections are not qualified to meet ASME Code Class 1 requirements should seat leakage occur at the first isolation valve during testing. Should a test rig failure occur, there is a potential for personnel injury, and manual isolation of the leak in an adverse environment would be required. Use of non-qualified materials to maintain reactor coolant pressure boundary (RCPB) integrity between the first and second isolation valves, at normal RCS pressure, also conflicts with the double isolation principle noted in 10 CFR 50.55a(c)(2)(ii).

Hydrostatic testing of this segment of the auxiliary pressurizer spray line, with the RCS out of service, was also considered and involves the following in-plant actions:

1. Remove check valve [RC51] insulation;
2. Grind off cover to casing seal weld;
3. Disassemble the valve and install a hydrostatic plug;
4. Temporarily reassemble the valve;
5. Perform the system leakage test;
6. Disassemble the valve and remove the hydrostatic plug;
7. Reassemble the valve;
8. Seal weld cover to casing; and
9. Reinstall valve insulation.

The radiological dose rate at check valve RC51 is approximately 80 milliRem/hour. It is estimated that the identified in-plant actions require approximately 11 man-hours to complete, resulting in a cumulative radiological exposure of approximately 0.9 man-Rem.

For Test Zone RC01, the HPI check valves are welded back-to-back; there are no test connections that would permit pressurization between the two check valves. Pressurization upstream of the check valves would require abnormal system lineups and would likely cause a thermal transient cycle on the respective train's HPI nozzles, which are required to count against the rapid RCS depressurization transient design cycle limits. By analysis, there are a limited number of transient cycles available throughout the life of the plant.

Hydrostatic testing of the HPI check valves, with the RCS out of service, was also considered and involves the following in-plant actions:

1. Erect scaffold to access the inner check valve [HP50, HP51, or HP59];
2. Remove valve insulation;
3. Disassemble the valve and install a hydrostatic plug;
4. Temporarily reassemble the valve;
5. Perform the system leakage test;
6. Disassemble the valve and remove the hydrostatic plug;
7. Reassemble the valve;
8. Reinstall valve insulation; and
9. Remove scaffold.

Radiological dose rates at check valves HP50, HP51, and HP59 are approximately 50, 50, and 130 milliRem/hour for trains 1-1, 1-2, and 2-1, respectively. It is estimated that the identified in-plant actions require approximately 23 man-hours per check valve to complete, resulting in a cumulative radiological exposure of approximately 5.3 man-Rem.

5. Proposed Alternative and Basis for Use

Proposed Alternative

FENOC proposes to use VT-2 visual examinations and reduced pressure testing as an alternative for the Code required pressure testing described in Section 3.0 above.

The Test Zone DH16 and RC01 components cited above will be VT-2 visually examined for leakage each refueling outage as part of the Class 1 system leakage test with all valves in the positions required for normal reactor operation startup. The visual examination will extend to and include the second closed valve at the test boundary extremity.

Within Test Zone DH16, the area between the check valve and stop valve is not normally pressurized. This piping segment will be VT-2 examined during the Class 2 DHR system leakage test conducted at or near the end of the inspection interval. This segment is pressurized to approximately 77 pounds per square inch absolute (psia) during this test.

Within Test Zone RC01, the area between the high pressure injection check valves is not normally pressurized. The HPI check valves will be VT-2 examined during the Class 2 HPI system leakage test conducted at or near the end of the inspection interval. This segment is pressurized to approximately 58 psia during this test.

Basis for Use

The components are ASME Code Class 1 and designed to RCPB conditions. However, these components are not typically subjected to RCPB operating conditions as they are not normally pressurized during RCS operation. VT-2 visual examinations of these components during the Class 2 system leakage testing will provide a measure of assurance of pressure boundary integrity as any through-wall leakage that would occur at normal RCS pressure would also reveal itself at the lower test pressures, albeit at lower flow rates. Should these components become pressurized as a result of check valve seat leakage, prior to the performance of the

Class 1 system leakage test, the affected piping segments would be VT-2 examined at the normal RCS pressure as they are also included within the required Class 1 examination boundary.

These piping segments contain stainless steel pipe, valves, and weld material. There are no primary water stress corrosion cracking (PWSCC) susceptible Alloy 600/82/182 materials in the piping segments.

Based on the reasons noted above, FirstEnergy Nuclear Operating Company (FENOC) believes that compliance with the specified ASME Code requirements, for the Test Zone DH16 and RC01 Class 1 components cited above, would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

6. Duration of Proposed Alternative

The proposed alternative shall be utilized during the third period of the DBNPS third ten-year inservice inspection interval, scheduled to expire September 20, 2012.

7. Precedent

The Nuclear Regulatory Commission approved similar requests, as demonstrated in the correspondence [with safety evaluations] cited below. The precedent address examinations and testing of similar ASME Class 1 pipe segments with components isolated from normal RCS operating pressures by valves required to remain closed.

- McGuire Nuclear Station, Units 1 and 2 – Relief 09-MN-005 for Alternative Leakage Testing for Various American Society of Mechanical Engineers (ASME), Boiler and Pressure Vessel Code (Code), Class 1 Piping and Components During the Third 10-Year Inservice Inspection (ISI) Interval (TAC Nos. ME1732 and ME1733), June 14, 2010.
- North Anna Power Station, Unit No. 2, Third 10-Year Inservice Inspection Plan – System Pressure Testing (TAC No. ME1104), October 9, 2009.