



Donald C. Shelton
Vice President - Nuclear
Davis-Besse

300 Madison Avenue
Toledo, OH 43652-0001
(419) 249-2300

Docket Number 50-346

License Number NPF-3

Serial Number 2067

July 20, 1992

United States Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Subject: Request for Relief to Allow Temporary Non-Code Repair of
Service Water Piping in Accordance with Nuclear Regulatory
Commission (NRC) Generic Letter (GL) 90-05

Gentlemen:

The purpose of this letter is to request NRC approval of a temporary non-Code repair of a through-wall leak discovered in Service Water (SW) system piping at the Davis-Besse Nuclear Power Station, Unit 1 (DBNPS). Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code specifies Code-acceptable repair methods for flaws that exceed Code acceptance limits in piping that is in service. A Code repair of flawed ASME Code piping in accordance with Section XI, IWA-4000 is required regardless of the operational mode of the plant when the flaw is detected. Toledo Edison has determined that a Code repair is impractical at the present time and requests approval of a temporary non-Code repair in accordance with NRC Generic Letter (GL) 90-05.

The through-wall leak was discovered during a SW system walk down on June 26, 1992, in a section of 4" diameter ASME Section III, Class 3 SW system piping located in the Decay Heat (DH) cooler room. The leak is in the same run of approximately 120' of SW piping that has experienced four other through-wall leaks since June 1990. Three of these previous leaks were identified during plant operation and were the subject of previous relief requests for NRC approval of temporary non-Code repairs (Serial 1825 dated July 10, 1990, and Serial 1955 dated July 3, 1991) during the last operating cycle. As these leaks have all occurred in the same run of SW piping, Toledo Edison has concluded that replacement of the affected piping run is the appropriate course of action.

9207300129 920720
PDR ADDCK 05000346
PDR

Operating Companies:
Cleveland Electric Illuminating
Toledo Edison

A001
11/11

It is noted that prior to modifications made to the SW system during the seventh refueling outage (7RFO), a Code repair and Code required post-repair testing in this section of SW piping could not be accomplished within the limiting 72 hour Technical Specification action statement. Service Water system modifications implemented during the 7RFO in 1991 permit taking the affected section of piping out of service during plant operation for a maximum of 30 days. This involves isolating the affected portion of the SW piping by removing spool pieces and installing blind flanges. With the blind flanges installed, SW flow is isolated from one of the two train 2 ECCS room coolers, the DH cooler room cooler and the train 2 hydrogen dilution blower. In this case, the 30 day hydrogen dilution blower action statement is limiting. The one train 2 ECCS room cooler with SW flow is sufficient to maintain ECCS operability provided SW temperature remains less than 78.5°F. Two ECCS room coolers are required for ECCS operability with the SW temperature exceeding 78.5°F. The 72 hour ECCS Action Statement would be immediately invoked if the SW temperature were to exceed 78.5°F, while the flawed section of piping was isolated using the blind flanges.

Although this ability to isolate the flawed piping for up to 30 days during plant operation exists, there is significant potential during the upcoming summer months that the SW temperature could increase above the 78.5°F limit. On July 1, 1992, SW temperature was 71°F and had risen three degrees in the previous week. In previous summers, SW temperature has reached approximately 84°F. Should the temperature exceed 78.5°F while the flawed piping was being replaced, SW flow could not be restored to the second train 2 ECCS room cooler within the 72 hour ECCS action statement and a plant shutdown would be required. Because of the potential for SW temperature increasing above 78.5°F during the remainder of the summer months, Toledo Edison has determined that it is impractical to perform a Code repair to the flawed piping at this time.

Although it may be possible to effect a Code repair in autumn when lake temperature is declining, Toledo Edison proposes to defer replacement of the flawed piping until no later than startup from the eighth refueling outage (8RFO). Current plans call for replacing the affected piping in February 1993, prior to the start of the 8RFO. Deferral of the piping replacement until February 1993 will allow adequate time for planning and shop fabrication of replacement sections of piping and fittings, and will allow the use of the additional manpower arriving on site in support of the 8RFO. In addition, if unforeseen problems were encountered during the pipe replacement, the limiting 30 day action statement would not expire prior to the beginning of the 8RFO.

The identified SW piping flaw has been evaluated using the guidance provided by NRC Generic Letter 90-05, Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping, dated June 15, 1990, and found to be acceptable for continued operation. Toledo Edison has concluded that the proposed alternative of a non-Code repair provides an acceptable level of quality and safety.

Docket Number 50-346

License Number NPF-3

Serial Number 2067

Page 3

Accordingly, Toledo Edison requests relief from the requirements of the ASME Code, Section XI, Article IWA-4000 to allow continued plant operation with a temporary non-Code repair to the affected SU system piping, as provided by GL 90-05. The detailed basis for the acceptability of these temporary non-Code repairs to the SW system piping leak is attached.

If you have any questions regarding this relief request, please call Mr. R. W. Schrauder, Manager - Nuclear Licensing at (419) 249-2366.

Very truly yours,



PWS/dlc

Attachment:

cc: A. B. Davis, Regional Administrator, NRC Region III
J. B. Hopkins, NRC/NRR DB-1 Senior Project Manager
W. Levis, NRC Region III, DB-1 Senior Resident Inspector
Utility Radiological Safety Board

BASIS FOR ACCEPTABILITY OF A TEMPORARY NON-CODE
REPAIR OF THE SERVICE WATER PIPING LEAK

Description of Flaw Detection

On June 26, 1992, a through-wall leak was discovered during walk down of the moderate energy service water (SW) system piping. The leak was found in a horizontal run of service water piping 4"-HBC-44 (See P&ID M-041B, F-5, attached) in the Decay Heat (DH) cooler room. A pipe clamp with a rubber gasket was used to minimize the leakage. Prior to installation of the clamp and gasket, the leak rate at this location was approximately 1.0 to 1.5 gallons per minute. The affected SW piping is schedule 40 rated at 150 psi ASME(SA53, Grade B carbon steel) Section III, Class 3. Ultrasonic testing (UT) was used to characterize the flaw in support of the assessment of structural integrity in accordance with GL 90-05.

Flaw Characterization

The flaw was characterized by ultrasonic testing on June 26, 1992. The flaw is an approximately circular cavity in the pipe wall about 0.4" to 0.5" in diameter. Corrosion is the apparent cause of this flaw in the service water piping. The location of the flaw is in the same run of approximately 120' of SW piping that has experienced four other through-wall leaks since June 1990. Three of these previous leaks were identified during plant operation and were the subject of previous relief requests for NRC approval of temporary non-Code repairs (Serial 1825 dated July 10, 1990, and Serial 1955 dated July 3, 1991) during the last operating cycle. All of the flaws occurred in straight horizontal runs of piping with the flaws located between the 5 and 7 o'clock positions. Additionally, there is normally no flow through this run of piping. Microbiologically induced corrosion (MIC) is the most probable corrosion mechanism.

Flaw Evaluation Results

Because of past experience with SW piping through-wall leaks, a bounding flaw size of 1" was evaluated to provide acceptance criteria for ultrasonic testing or radiography. The bounding flaw size was analyzed using the "through-wall flaw" approach presented in section C.3.a of Enclosure 1 to NRC Generic Letter 90-05, Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping. The individual maximums of deadweight, pressure, thermal and safe shutdown earthquake (SSE) stresses at any location in the piping run were combined to provide a maximum total stress (16,845 psi). This is conservative for any location in the piping run. Consistent with the guidance provided by the NRC Safety Evaluation (Log Number 3303, dated August 20, 1990, TAC No. M77037) of a previous Toledo Edison request for approval of a non-Code repair under GL 90-05, the nominal pipe thickness (t_{nom}) was substituted for the Code minimum pipe thickness (t_{min}) in the current evaluation. For 4", Schedule 40 pipe t_{nom} is 0.237".

An assumed 1" flaw ($a = 0.5$ ") located anywhere in the affected 4" service water pipe results in a stress intensity factor of $32.6 \text{ ksi}(\text{in})^{0.5}$. This is less than the $35 \text{ ksi}(\text{in})^{0.5}$ acceptance criteria for ferritic steels cited by GL 90-05. Since the 0.4" to 0.5" flaw size determined by UT is less than the 1" bounding flaw evaluated in this pipe run a temporary non-Code repair is acceptable.

Determination of Impracticality of Repair

Toledo Edison has determined that it is impractical to perform a Code repair to the affected piping at the present time. Prior to modifications made to the SW system during the seventh refueling outage (7RFO), a Code repair and Code required post-repair testing could not be accomplished within the limiting 72 hour Technical Specification action statement. Service Water system modifications implemented during the 7RFO in 1991 permit taking the affected section of piping out of service during plant operation for a maximum of 30 days. This involves isolating the affected portion of the SW piping using valve SW-257. Closure of SW-257 removes SW flow from both train 2 emergency core cooling system (ECCS) room coolers, rendering one train of ECCS inoperable and invoking a 72 hour Technical Specification action statement. This closure of SW-257 permits removal of spool pieces in the affected section of SW piping, allowing the installation of blind flanges. The 72 hour ECCS action statement is exited when SW-257 is reopened, restoring SW flow to one of the train 2 ECCS room coolers, and operability of the affected ECCS train. With the blind flanges installed, SW flow is isolated from the other train 2 ECCS room cooler, the DH cooler room cooler and the train 2 hydrogen dilution blower. The 30 day hydrogen dilution blower action statement is now limiting since one train 2 ECCS room cooler is sufficient to maintain ECCS operability provided SW temperature remains less than 78.5°F . Two ECCS room coolers are required for ECCS operability with the SW temperature exceeding 78.5°F . The 72 hour ECCS Action Statement would be immediately invoked if the SW temperature were to exceed 78.5°F while the flawed section of piping was isolated using the blind flanges.

Although this ability to isolate the flawed piping for up to 30 days during plant operation exists, there is significant potential during the summer months that the SW temperature could increase above the 78.5°F limit. On July 1, 1992, SW temperature was 71°F and had risen three degrees in the previous week. In previous summers, SW temperature has reached approximately 84°F . Should the temperature exceed 78.5°F while the flawed piping was being replaced, SW flow could not be restored to the second train 2 ECCS room cooler within the 72 hour ECCS action statement and a plant shutdown would be required. Because of the potential for SW temperature increasing above 78.5°F during the remainder of the summer months, Toledo Edison has determined that it is impractical to perform a Code repair to the flawed piping at this time.

Although it may be possible to effect a Code repair in autumn when lake temperature is declining, Toledo Edison proposes to defer replacement of the flawed piping until no later than startup from the eighth refueling outage (8RFO). Current plans call for replacing the affected piping in February 1993, prior to the start of the eighth refueling outage (8RFO). Deferment of the piping replacement until February 1993 will allow adequate time for planning and shop fabrication of replacement sections of piping and fittings, and will allow the use of the additional manpower arriving on site in support of the 8RFO. In addition, if unforeseen problems were encountered during the pipe replacement, the limited 30 day action statement would not expire prior to the beginning of the 8RFO. Based on the foregoing evaluation of the flaw and continued structural integrity of the affected piping, Toledo Edison proposes to continue operation with the pipe clamp and rubber gasket in place to limit leakage until no later than startup from the 8RFO. The 8RFO is scheduled to begin on March 1, 1993.

Description and Evaluation of Temporary Repair

The temporary repair of the piping flaw consists of a pipe clamp and rubber gasket. The clamp does not serve any structural function for this application, and its effect on the piping system is negligible due to the very small additional loading involved. Systems interactions (such as flooding, spraying water on equipment and loss of system flow) have been evaluated, assuming the absence of the clamp and considering the flaw location and area sump capacity, and found to be negligible.

The components in the DH cooler room are spray protected and no adverse effects will be created by water spray from the leak in the service water piping. The leakage through the pipe flaw without the pipe clamp installed does not spray on any electrical component. In addition, the pipe clamp has a rubber gasket to seal the defect area and minimize any leakage.

The potential for flooding of the DH cooler room as a result of the service water leaks has been reviewed. The DH cooler room has two 75 gallon per minute (gpm) capacity sump pumps. The sump pumps have level switches and associated alarms, and are powered from an essential bus. Should the pipe clamp come loose and the leak rate become severe enough to potentially flood the room, the level alarms associated with the sump pumps will alert the control room. At the current leak rate of approximately 1.0 - 1.5 gpm without the pipe clamp installed, flooding is not a concern. Should the defects open to the maximum allowable size, the leak rates will still be within the capacity of the sump pumps. Weekly inspections of the pipe clamp and assessment of leakage provide assurance that the pipe clamp is intact and flooding of the rooms is not occurring.

The train 2 ECCS room coolers are supplied from the Number 2 Service Water loop. Consequently, the flow rates through these coolers could be affected by the pipe leak. However, with the non-Code repair in place, flow through these ECCS room coolers is unaffected by the leak. At the current leak rate with the non-Code repair removed, the maximum

Docket Number 50-346
License Number NPF-3
Serial Number 2067
Attachment
Page 4

flow reduction through any one of these coolers is approximately 1.0 - 1.5 gpm which is acceptable. Weekly inspection of the non-Code repair provides assurance that the Number 2 Service Water loop ECCS room coolers will not have reduced flow.

Augmented Inspections

On July 6, 1992, Toledo Edison performed augmented ultrasonic (UT) examinations at five other SW piping locations with similar geometry and flow characteristics to the flaw location. None of these locations exhibited unacceptable indications with a measured wall thickness less than the Code-required minimum wall thickness.

A qualitative assessment of leakage through the temporary non-Code repair to determine any degradation of structural integrity will be made weekly during walkdown inspections. An assessment of the integrity of the non-Code repair will be made at least quarterly using RT or UT.

Conclusion

Based on the foregoing, continued operation with the identified service water system flaw and temporary non-Code repair is acceptable until startup from the eighth refueling outage.

**OVERSIZE
DOCUMENT
PAGE PULLED**

SEE APERTURE CARDS

NUMBER OF OVERSIZE PAGES FILMED ON APERTURE CARDS

1

9208030333

APERTURE CARD/HARD COPY AVAILABLE FROM
RECORDS AND REPORTS MANAGEMENT BRANCH