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Washington, D. C. 20555

Subject: Response to NRC Compliance Bulletin No. 88-08

Gentlemen:

Toledo Edison (TE) hereby submits the information requested by NRC Compliance Bulletin No. 88-08, "Thermal Stresses in Piping Connected to Reactor Coolant Systems", dated June 22, 1988 (Log No. 1-1855). Additionally, supplements 1 and 2 to Bulletin 88-08 (dated June 24, 1988 and August 4, 1988 respectively) were revieved. These supplements did not include any new requirements. The subject bulletin requested that licensees review their reactor coolant systems (RCS) to identity any connected unisolable piping that could be subjected to temperature distributions which result in unacceptable thermal stresses. The bulletin further requested licensees to take appropriate action, where such piping is identified.

The results of the review are included in the attached evaluation performed by Toledo Edison. Based on this evaluation it is concluded that the intent of Bulletin 88-08 will be satisfied upon completion of the items listed in the conclusion to this response.

Very truly yours,

RWG/dlm

cc: P. Byron, DB-1 NRC Resident Inspector
A. W. DeAgazio, DB-1 Senior NRC Project Manager
A. B. Davis, Regional Administrator, NRC Region III

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Response to NRC Bulletin No. 88-08

For

Davis-Besse Nuclear Power Station

Unit No. 1

This letter is submitted in conformance with Atomic Energy Act of 1954 Section 182a, in response to NRC Bulletin 88-08 (Log no. 1-1885) "Thermal Stresses in Piping Connected to Reactor Coolant Systems".

By: _____
D. C. Shelton, Vice President, Nuclear

Sworn and subscribed before me this 8th day of October, 1988.

_____
Notary Public, State of Ohio

LAURIE A. HINKLE
Notary Public, State of Ohio
My Commission Expires May 15, 1991

Response to NRC Compliance Bulletin No. 88-08

As discussed in NRC Compliance Bulletin 88-08, thermal fatigue of unisolable piping connected to the RCS can occur when the connected piping is isolated by a leaking block valve, the pressure upstream of the block valve is higher than RCS pressure, and the temperature upstream is significantly lower than RCS temperature. The actions requested in this bulletin should provide assurance that unisolable sections of piping connected to the RCS will not be subjected to stresses that could cause fatigue failure.

The following sections provide Toledo Edison's response for each of the applicable actions requested in Bulletin 88-08:

NRC Item 1:

Review systems connected to the RCS to determine whether unisolable sections of piping connected to the RCS can be subjected to stresses from temperature stratification or temperature oscillations that could be induced by leaking valves and that were not evaluated in the design analysis of the piping. If none are identified no further action is required.

TE Response

The following connections/penetrations were reviewed to determine whether unisolable sections of piping connected to the RCS could be subjected to temperature stratification or temperature oscillations that could be induced by leaking valves:

1. Pressurizer surge line (1)
2. Pressurizer spray/auxiliary spray line (1)
3. Core Flood/Low Pressure Injection (2)
4. High Pressure Injection (4)
5. Letdown (1)
6. Reactor Coolant drains/vents (several)
7. Decay heat drop line (1)
8. Sample line (1)
9. Pilot operated relief valve, PORV (1)

Note: Numbers shown in parenthesis are the number of penetrations into the RCS

The direction of flow for the Letdown line, Reactor Coolant Drain/Vent lines, Sample Line, and PORV connections is out of the RCS. Therefore, these penetrations will not be exposed to the thermal stress failure mechanism described in Bulletin 88-08.

The High Pressure Injection (HPI), Low Pressure Injection (LPI), Core Flood (CF) Systems, and the Decay Heat drop line all have a lower operating pressure than the RCS, hence there will be no leakage into the RCS from these penetrations. However, one HPI penetration which is being used for normal makeup will have in-flow to the RCS cold leg. The makeup system normal

operational discharge path to the RCS is through the HPI line to the loop 2-1(A) cold leg (Figure-1). Cross-connection to loop 2-2(A) HPI is through normally closed containment isolation valves HP2A and HP2B. Makeup flow leakage to the loop 2-2(A) cold leg must pass through these two valves. If HP2A leaked, pressure switch PS2883A on the manifold between these valves would alarm computer point PAH P465. Pressure indicator PI2883A would then alert operating personnel of the leakage so that corrective action can be initiated. Therefore, inadvertent makeup leakage into loop 2-2(A) HPI line can be adequately detected.

The Makeup and Purification System was modified during the current (fifth) refueling outage to enhance feed and bleed cooling capability following a loss of all secondary side cooling. An additional HPI nozzle on the loop 1-2(B) HPI line is being utilized to inject makeup water in conjunction with the normal makeup HPI nozzle on loop 2-1(A) to achieve this enhancement. This flow path is currently planned to be normally isolated and would require leakage through two closed valves (either MU 6419 and MU 6421 or MU 6421 and MU 6423B) for any makeup water to reach RC loop 1-2(B). An alternative method of operation utilizes a minimum bypass flow path which has been provided to allow operation with the new line unisolated. In this case, the minimum bypass flow would protect loop 1-2(B) connection from thermal stresses. The piping, computer alarm configuration and instrumentation for the installed modification are identical to that described for the normal makeup flowpath such that inadvertent leakage into the loop 1-1(B) HPI line would be detected.

In addition, a makeup flow path into the ECCS injection line exists through normally closed isolation valves MU208, HP26 and HP2C or HP2D. This leakage path requires three normally closed valves to leak by for makeup water to reach the loop 1-1(B) or loop 1-2(B) HPI line. Detection of inadvertent leakage through this path would be accomplished by the same instrumentation described above.

The pressurizer surge line and the spray line were also considered in the review of RCS connected piping. A continuous flow of reactor coolant into the pressurizer is maintained via the spray line. The pressurizer surge line is always filled with reactor coolant, however, due to temperature stratification experienced on the surge line at the West German Muelheim-Kaerlich (B&W) plant, the B & W Owner's Group Materials Committee has been assigned a task to review the generic concern and recommend appropriate actions to determine if similar conditions exist at plants in the United States. Toledo Edison will implement applicable recommendations from this review.

NRC Item 2:

For any unisolable sections of piping connected to the RCS that may have been subjected to excessive thermal stresses, examine nondestructively the welds, heat-affected zones and high stress locations, including geometric discontinuities, in that piping to provide assurance that there are no existing flaws.

TE Response

A thermal sleeve in the HPI nozzle assembly for RCS normal makeup is utilized to provide a thermal barrier between cold HPI/MU fluid and the hot HPI nozzle. The purpose of the thermal sleeve is to reduce thermal shock and fatigue of the nozzle. A minimum bypass flow is provided via MU 58A and MU 58B (See Figure 1) to prevent temperature stratification in the thermal sleeve.

During the current refueling outage, it was discovered that the thermal sleeve had experienced a failure which appeared to have been the result of high cycle thermal fatigue. An investigation of the incident was conducted and a letter was transmitted to the NRC (Serial 1580, dated September 14, 1988) to document this occurrence. The results of nondestructive examinations (NDE) performed during the investigation were presented in that correspondence. Recommendations from the investigation and a schedule for implementation were also included in the Toledo Edison letter. Although not due to valve leakage, this is the only area which is known to have been subjected to excessive thermal stresses.

NRC Item 3:

Plan and implement a program to provide continuing assurance that piping identified in NRC Item 1 do not experience unacceptable thermal stresses by:

A. Redesigning and modifying these sections of piping,

or

B. Instrumenting this piping to detect adverse temperature distributions and establishing appropriate limits on temperature distribution

or

C. Providing means for insuring that pressure upstream from block valves which might leak is monitored and does not exceed RCS pressure.

TE Response

As previously stated in Toledo Edison response to NRC Item 1, current instrumentation installed upstream of the HPI line isolation valves would detect any inadvertent makeup leakage into the RCS. Therefore, inadvertent leakage into the HPI line can be adequately detected and action can be taken to prevent unacceptable thermal stresses.

Conclusion

Based on Toledo Edison's evaluation of the actions requested in the bulletin, the following action will be taken:

1. Implement applicable recommendations from the B&W Owner's Group review of potential surge line concerns

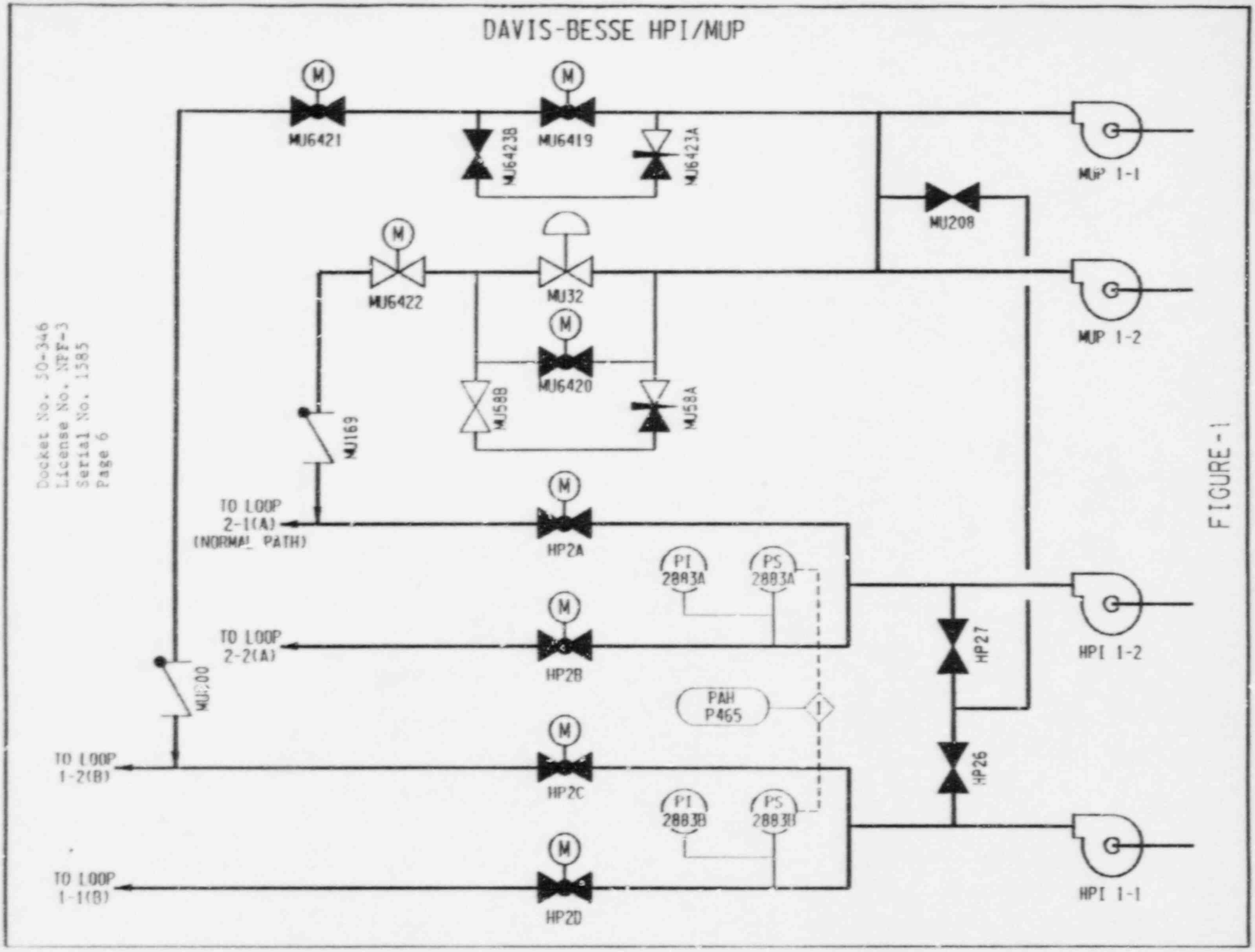
DAVIS-BESSE HPI/MUP
MU6421
MU6423B
MU6419
MU6423A
MUP 1-1
MU208
MU6422
MU32
MUP 1-2
MU6420
MU58B
MU58A
MU169
TO LOOP
2-1(A)
(NORMAL PATH)
HP2A
PI
2883A
PS
2883A
TO LOOP
2-2(A)
HP2B
HP27
HPI 1-2
MU200
PAH
P465
TO LOOP
1-2(B)
HP2C
HP26
PI
2883B
PS
2883B
TO LOOP
1-1(B)
HP2D
HPI 1-1

FIGURE-1