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Subject: Generic Letter 90-06, Resolution of Generic Issue 70, Power-Operated Relief Valve and Block Valve Reliability (TAC Number 77346)

Gentlemen:

Nuclear Regulatory Commission (NRC) Generic Letter (GL) 90-06 (Toledo Edison Log Number 3267), dated June 25, 1990, provided the NRC staff's position resulting from the resolution of Generic Issue 70 (GI-70), Power-Operated Relief Valve (PORV) and Block Valve Reliability. Generic Letter 90-06, also requested that Toledo Edison (TE) respond to three NRC recommendations regarding GI-70 for the Davis-Besse Nuclear Power Station (DBNPS) Unit Number 1.

The purpose of this letter is to update TE's response to the NRC after taking into consideration the recent NRC evaluations of other Babcock and Wilcox-type plants regarding Generic Letter 90-06. Toledo Edison had previously responded to the NRC by letters dated December 21, 1990 (TE Serial Number 1884), June 26, 1992 (TE Serial Number 2046), May 26, 1993 (TE Serial Number 2128), November 30, 1993 (TE Serial Number 2191), and March 30, 1994 (TE Serial Number 2211). In addition, the Babcock and Wilcox Owners Group (BWOG), of which TE is a member, reviewed this issue and submitted a letter (Number OG-1128) to the NRC dated January 18, 1993, on behalf of the owners.

The attachment to this letter consolidates TE's previous responses and incorporates the latest information provided by the NRC staff. This letter also withdraws the application for License Amendment submitted

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by TE on March 30, 1994 (Serial Number 2211). It should be noted that the March 30, 1994, application for License Amendment had superseded the request for changes to the Technical Specifications Bases submitted to the NRC by TE letter Serial Number 2046 dated June 26, 1992.

This completes TE's response to Generic Letter 90-06. Should you have any questions or require additional information, please contact Mr. William T. O'Connor, Manager - Regulatory Affairs, at (419) 249-2366.

Very truly yours,

for D C Shelton

FWK/laj

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TOLEDO EDISON RESPONSE TO GENERIC LETTER 90-06

Resolution of Generic Issue 70, Power-Operated Relief Valve and Block Valve Reliability, and Generic Issue 94, Additional Low-Temperature Overpressure Protection for Light-Water Reactors

On June 25, 1990, the Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 90-06, "Resolution of Generic Issue 70, 'Power-Operated Relief Valve and Block Valve Reliability,' and Generic Issue 94, 'Additional Low-Temperature Overpressure Protection for Light-Water Reactors'", pursuant to 10 CFR 50.54(f).

Generic Issue (GI) 70 involves the reliability of power-operated relief valves (PORVs) and associated block valves and their safety significance in pressurized water reactor (PWR) plants. The GL discussed the increasing reliance on PORVs to perform safety-related functions by some licensees and the corresponding need to improve the reliability of both PORVs and their associated block valves. The GL also recommended improvements to the Operating License Technical Specifications (TSs) be implemented at all affected facilities.

GI-94 addresses the implementation of the requirements set forth in the resolution of Unresolved Safety Issue (USI) A-26, "Reactor Vessel Pressure Transient Protection (Overpressure Protection)." As noted in the Generic Letter by the NRC, GI-94 does not apply to B&W type plants.

SAFETY FUNCTIONS OF PORV AND BLOCK VALVE

The NRC advised in GL 90-06 that over a period of time, the role of PORVs had changed such that PORVs are now relied upon by various plants to perform one, or more, of the following safety-related functions:

1. Mitigation of a design-basis steam generator tube rupture accident,

2. Low-temperature overpressure protection of the reactor vessel during startup and shutdown, or

3. Plant cooldown in compliance with NRC Branch Technical Position RSB 5-1 to Standard Review Plan (SRP) 5.4.7, "Residual Heat Removal (RHR) system."

As discussed by Toledo Edison in previous correspondence with the NRC:

1. Mitigation of a design-basis steam generator tube rupture (SGTR) accident at the Davis-Besse Nuclear Power Station (DBNPS) can utilize the PORV/block valve flowpath (valves RC2A and RC11) during the recovery sequence, however, its use is not the primary method of recovery. In accordance with emergency procedure DB-OP-02000, "RPS, SFAS, SFRCS Trip or Steam Generator Tube Rupture," control of the event is accomplished

by steaming the steam generators (SGs) through the turbine bypass valves (TBVs), or through the atmospheric vent valves (AVVs) if the condenser is not available. The TBVs and AVVs are controlled to assure that SG pressure is kept below the Main Steam Safety Valve (MSSV) lift setpoint. The RCS is depressurized by turning off the pressurizer heaters and using pressurizer spray.

If the pressurizer spray is not available, then the use of the pressurizer vent line (valves RC239A and RC200) is directed by the procedure as the primary means of RCS pressure reduction. The use of the pressurizer vent line for pressure control during recovery from a SGTR was chosen because a restricting orifice in this vent line limits flow to provide a more controlled pressure reduction with less risk of unintentionally rupturing the pressurizer quench tank rupture disk. Both the PORV/block valve flowpath and the pressurizer vent line discharge to the pressurizer quench tank, but the PORV/block valve flowpath has the capability of a mass flow rate sufficient to rupture the pressurizer quench tank rupture disk.

2. Low-temperature overpressure protection (LTOP) is not an issue for B&W-designed plants like the DBNPS as noted by the NRC in GL 90-06 and NUREG-1316, "Technical Findings and Regulatory Analysis Related to Generic Issue 70." Therefore, Technical Specifications for the PORV and block valve are not needed for LTOP considerations at the DBNPS.

3. Regarding safety grade cooldown, the DBNPS received its Operating License in April 1977 and, therefore, is not committed to NRC Branch Technical Position RSB 5-1 in Standard Review Plan 5.4.7, "Residual Heat Removal System." The DBNPS is not required to meet the branch technical position regarding safety grade cooldown. In fact, the DBNPS is designed to remain in hot standby during natural circulation operation which is directed by DBNPS procedure DB-OP-06903, "Plant Shutdown and Cooldown". If plant conditions force a natural circulation cooldown, procedure DB-OP-06903, "Plant Shutdown and Cooldown," restricts the cooldown rate to 10°F/hour in order to prevent forming a steam space in the reactor vessel head. The use of the PORV/block valve flowpath (valves RC2A and RC11) for pressure control during a natural circulation cooldown (i.e. loss-of-offsite power and loss of Reactor Coolant Pumps) is not desired at the DBNPS and is not specified in the procedure. The use of the pressurizer vent line (valves RC239A and RC200) for depressurization during natural circulation cooldowns is desired and specified since the pressurizer vent line's depressurization rate is less than that

of the PORV/block valve flowpath and, therefore, more controllable with less risk of unintentionally rupturing the pressurizer quench tank rupture disk.

GENERIC LETTER RECOMMENDATIONS

GL 90-06 Enclosure A, Section 3 recommended the following summarized actions:

Item 3.1.1. Include the Power-Operated Relief Valve (PORV) and block valve within the Nuclear Quality Assurance (QA) program, implement an appropriate maintenance program (based on manufacturer's recommendations or guidelines) and maintenance training program for the PORV and its block valve, and procure spare and replacement parts (as well as complete components) in accordance with original construction codes and standards.

Item 3.1.2. Include the PORV and block valve within the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Inservice Test Program, and include the PORV's block valve in the expanded MOV test program discussed in NRC GL 89-10, "Safety-Related Motor Operated Valve Testing and Surveillance," dated June 28, 1989. Stroke test the PORV during Modes 3 or 4.

Item 3.1.3. Convert to the Model Technical Specifications on the PORV and block valve contained within GL 90-06 (Attachment A-4 of Enclosure A) for B&W-designed plants.

Toledo Edison Response To Recommendation Item 3.1.1:

The PORV (RC2A) and block valve (RC11) are categorized as "Q" components in the DBNPS Quality Assurance Program, and are maintained in accordance with the requirements of 10 CFR 50 Appendix B.

The PORV was manufactured by the Crosby Valve and Gage Company. Maintenance on the PORV is conducted in accordance with the plant procedure for PORV maintenance DB-MM-09000 "Pressurizer PORV Maintenance." This procedure references the vendor manual, "Installation, Operating and Maintenance Instruction for Pressurematic Valve Style HPV-SN Solenoid Pilot Operated Relief Valve."

The block valve consists of a Limitorque valve operator and a gate valve manufactured by Velan Valve Corporation. Preventive maintenance is performed for the valve operator in accordance with the DBNPS maintenance procedure DB-ME-09301, "Preventive Maintenance for Type SMB and SMC Limitorque Valve Operators," which is based on the manufacturer's recommendations in the "Limitorque Instruction and Maintenance Manual." The block valve maintenance is performed in accordance with procedure DB-MM-09051, "Velan Forged Gate Valve Maintenance," which was developed based on information received from the valve manufacturer. Valve maintenance is implemented by trained maintenance personnel.

The Institute of Nuclear Power Operations accredited training program at the DBNPS includes the elements necessary to provide training in the maintenance and repair of the PORV and block valve.

Consistent with the guidance of Generic Letter 90-06, Toledo Edison may procure replacement parts and spares, as well as complete components required for its DBNPS PORV and block valve (and associated control systems) in accordance with the original construction codes and standards.

It should also be noted that the pressurizer vent line's valves RC239A and RC200 are nuclear safety-related "Q" valves, tested under the DBNPS Motor-Operated Valve Reliability and Improvement Program (GL 89-10) and are included in the second Ten-Year Interval Pump and Valve Testing Program.

Toledo Edison Response To Recommendation Item 3.1.2:

The PORV and block valve are included in the DBNPS's Second Ten-Year Interval Pump and Valve Testing Program. Toledo Edison tests the PORV in Mode 3 (Hot Standby) during cooldown to or heatup from Mode 5 (Cold Shutdown) in accordance with procedure DB-SP-03363, "Pressurizer Power Operated Relief Valve Cycle Test," if the PORV has not been cycled within the previous three months. Procedure DB-SP-03363 verifies the PORV (RC2A) will fully open and then close when its associated solenoid is cycled (the PORV is a solenoid actuated, pilot operated relief valve and, as such, control air is not used to actuate this valve). The PORV disc movement is confirmed by exercising the valve while observing the PORV solenoid position and flow indicators. The PORV is cycled and not stroke tested in Mode 3 because stroke testing requires that a timed pressure drop must be observed over several minutes which could potentially lead to an RCS system pressure transient and the generation of radioactive waste.

As detailed in Attachment 1 to TE's letter Serial Number 2128, dated May 26, 1993 to the NRC, testing has been performed on the DBNPS's Crosby style PORV without failure at low and high pressure/temperatures.

The PORV is stroke tested at refueling intervals while the plant is in Mode 5 per Technical Specification (TS) 4.0.5 and procedure DB-SP-03366, "Reactor Coolant System Vent Path Operability." Procedure DB-SP-03366 also verifies that the PORV flowpath is capable of passing flow per TS 4.4.11, "Reactor Coolant System Vent" requirements. Since the PORV does not have direct position indication, the amount of opening (valve lift) must be inferred. This inference is based on a timed measurement of the pressurizer pressure decrease.

The present testing requirements of the PORV to meet TS 4.4.11 and TS 4.0.5, in conjunction with the procedurally required cycle test (procedure DB-SP-03363) of the PORV in Mode 3, represents the current testing requirements for the PORV. The presently existing PORV testing requirements provides assurance of PORV operability for the DBNPS.

The block valve (RC11) is tested in accordance with the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, Subsection IWV, 1986 Edition. The block valve and its motor operator are included in the DBNPS Motor-Operated Valve Reliability and Improvement Program under NRC Generic Letter 89-10.

Toledo Edison Response To Recommendation Item 3.1.3:

The DBNPS Technical Specification 3/4.4.11, "RCS-RCS Vents," includes requirements on the Reactor Coolant System loop high point vents, the pressurizer vent flow path through valves RC239A and RC200, and the PORV and block valve. These requirements are applicable during Modes 1, 2, and 3. No Technical Specifications are applicable to the PORV or block valve during Modes 4 or 5 because the PORV is not required for low-temperature overpressure protection (LTOP) at the DBNPS. The Decay Heat Removal System utilizes a relief valve (DH-4849) sized to provide low-temperature overpressure protection during Modes 4 and 5. The Limiting Condition for Operation for DH-4849 for LTOP considerations is prescribed by Technical Specification 3/4.4.2, "Safety Valves - Shutdown."

The Model Technical Specifications (TS) contained within GL 90-06 are sufficiently addressed already by existing procedures or Technical Specifications at the DBNPS. Similar to Model TS 4.4.4.1.a, DBNPS procedure DB-SP-03363 cycles the PORV through full travel in Mode 3 during cooldown to or the subsequent heatup from Mode 5 if the PORV has not been cycled within the previous three months.

Similar to Model TS 4.4.4.1.b, existing DBNPS TS 4.4.3, RCS-Safety Valves and Pilot Operated Relief Valve-Operating, requires that a channel calibration check be performed every 18 months for the PORV.

Model TS 4.4.4.2 would require the block valve to be cycled every 92 days. The DBNPS block valve is already cycled through a complete cycle in accordance with TS 4.0.5 and the Inservice Testing Program every 92 days.

Model TS 4.4.4.3 would require the transfer of emergency power to the PORV and block valve motive and control circuits be demonstrated every 18 months. However, the normal power supply to the PORV and block valve at the DBNPS is already Class 1E essential power.

Toledo Edison has reviewed the effect of the PORV/block valve flowpath on cooldown (SGTR, cooldown by natural circulation, and "feed and bleed" core cooling) and found the effect under the DBNPS Probabilistic Safety Assessment to be so small as to be considered insignificant.

Furthermore, since the design of the DBNPS does not rely upon the PORV and its associated block valve for recovery from design basis events, additional Technical Specifications are unnecessary.

DBNPS SPECIFIC PORV/BLOCK VALVE FUNCTIONS

At the DBNPS the PORV/block valve flowpath can be used to also perform the following functions:

1. Beyond-Design Basis Event "Feed and Bleed" Core Cooling.

   For the DBNPS, feed and bleed cooling would only be required in a beyond-design basis event involving the loss of primary-to-secondary heat transfer (e.g., loss of both main feedwater pumps, loss of both turbine driven auxiliary feedwater pumps, and loss of the motor driven feedwater pump). Upgrades to the Makeup (MU) System, as described in Toledo Edison's letter to the NRC dated September 18, 1990 (Serial Number 1836), have provided increased flow capability, train independence, reduction of common mode failure probability, and functionality following a seismic event and a loss of offsite power. As a result of these upgrades, feed and bleed cooling will not be lost upon a failure of either a MU pump or the PORV. Analytical results indicate that successful feed and bleed cooling will occur with the following minimum equipment combinations.

   - Two makeup pumps and the RCS pressurizer code safety valves,

     or

   - One makeup pump operating in piggyback with a Low Pressure Injection Pump, RCS pressurizer ASME Code safety valves, and the PORV.

   For the DBNPS, these upgrades, have allowed for the loss of the PORV flowpath without the loss of feed and bleed cooling capability. The loss of the PORV flowpath does not affect the capability to properly cool the core as long as two makeup pumps and the PSVs are available.

   The applicable Technical Specifications that ensure the operability of this flowpath are, Technical Specification 3.1.2.4 that requires two makeup pumps operable in Modes 1 through 4 (with RCS pressure greater than or equal to 150 psig) and TS 3.4.3 that requires both pressurizer code safety valves operable in Modes 1 through 3.

2. Removal of non-condensible gases from the pressurizer following an accident by using the PORV/block valve flowpath as one redundant method.

   USAR Section 6.3.3.1.4, Discussion of Non-condensible Gases, explains that small amounts of non-condensible gases can be released into the primary system during a small break accident. Although the probability for such an occurrence is believed to be small, the pressurizer vent path (through valves RC239A and RC200)

in lieu of the PORV/block valve flowpath will provide a means of venting these non-condensible gases and ensures the availability of an alternate means of depressurizing the RCS in the event of a steam generator tube rupture or natural circulation cooldown.

3. Prevention of challenges to the pressurizer ASME Code safety valves.

   The PORV setpoint is set to open prior to reaching the setpoint of the pressurizer ASME Code safety valves. Thus, the PORV will function to relieve pressure and prevent the actuation of the Code safety valves.

   The PORV's block valve (RC11) is provided to isolate the PORV flowpath should the PORV be inoperable in the open position or to isolate the PORV with a leaking disk. This prevents uncontrolled depressurization and excessive leakage of reactor coolant.

   As discussed earlier, operability requirements for this PORV/block valve flowpath is addressed by TS 3/4.4.11, "RCS-RCS Vents" and TS 3/4.4.3, "RCS-Safety Valves and Pilot-Operated Relief Valve-Operating."

CONCLUSION

Toledo Edison is in general agreement with NRC Recommendation Items 3.1.1 and 3.1.2 provided in GL 90-06. The DBNPS Quality Assurance Program, Pump and Valve Testing Program (in conjunction with procedure DB-SP-03363), and the maintenance and maintenance training programs will ensure reliable PORV and block valve operation. Regarding NRC Recommendation Item 3.1.3, the existing DBNPS TS for the PORV and block valve contain the appropriate shutdown requirements for the DBNPS system design and operation and no additional TS requirements are necessary.