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SUBJECT: Responds to GL 90-06, "Resolution of GI 70, 'PORV & Block Valve Reliability' & GI 94, 'Addl LTOP for LWR," per 10CFR50.54(f).

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January 18, 1993
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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
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Subject: Davis-Besse, Docket No. 50-346
Crystal River 3, Docket No. 50-302
Oconee Nuclear Station, Docket Nos. 50-269,-270,-287
Arkansas Nuclear I, Docket No. 50-313
Three Mile Island Unit I, Docket No. 50-289

B&WOG response to "Staff Review of 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,' Pursuant to 10CFR50.54(f)"", Dated October 29, 1992, signed by Ronald W. Hernan. Note: The referenced letter was sent to GPUN for TMI-1; similar letters have been sent to Davis-Besse and ANO-1.

Gentlemen:

BACKGROUND

All B&WOG utilities with operating plants responded to Generic Letter 90-06 in December, 1990. The staff has reviewed those responses and provided feedback in correspondence to GPUN (TMI-1), Toledo Edison (Davis-Besse) and Entergy (ANO-1). The NRC staff requested this letter in a telecon on December 17, 1992. There are two principle issues where the B&WOG utilities have different positions than the staff: 1) PORV stroke testing; and 2) proposed Technical Specification requirements leading to shutdown for an inoperable PORV and block valve. The stroke testing issue will be addressed by the individual utilities. The B&WOG is providing a generic response to the staff for the shutdown topic. The issue is:

- The B&WOG utilities have declined to make certain technical specification changes as presented in the generic letter. In particular the B&WOG utilities do not believe the shutdown requirements for an inoperable PORV or block valve, shown in example Technical Specification 3.4.4, are appropriate measures. The staff states that they "will not accept, without sufficient justification, the position that the technical specification upgrades are unnecessary because the PORVs are not the primary

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means of dealing with the three safety functions identified in the generic letter." The three safety functions noted by the generic letter are:

1. Mitigation of a design basis tube rupture accident.
2. LTOP
3. Plant cooldown per RSB 5-1 to SRP 5.4.7 (RHR System).

Of the three functions, LTOP is not an issue for the B&WOG plants as noted in G.L. 90-06 and NUREG-1316. Therefore use of LTOP as justification for imposing a mode change requirement for an inoperable PORV is inappropriate and inconsistent with G.L. 90-06. Although the NRC staff has denied the ANO-1, TMI-1, and Davis-Besse positions, we maintain that the use of equipment other than the PORV to manage SGTR and plant cooldown is an appropriate basis for not requiring shutdown for an inoperable PORV.

The staff has further recognized that "most of the safety enhancement for the proposed backfit is derived from the increase in feed and bleed capability." The B&WOG notes that our plants have the ability to provide feed and bleed core cooling through the pressurizer safety valves without use of the PORV. An inoperable PORV does not degrade the capability to cool the core, and therefore we do not regard this as an adequate reason to require shutdown. We request the staff's reconsideration of their position based on this information.

The PORV design at all B&WOG plants is an electromatic D.C. solenoid actuated pilot operated relief valve. B&W plants do not use air actuated PORVs. One PORV is installed, on the top of the pressurizer as are two spring loaded safety valves. The PORV piping has an A.C. motor operated normally open gate valve installed between the PORV and the pressurizer. The PORV and block valve have the capability of being supplied from vital power as required by NUREG 0737, and also have a sensor at the PORV discharge for detecting an open PORV. PORV relief capacities vary slightly, but a typical rating is about 105,000 lbm./hour of steam; some plants are slightly larger. A separate pressurizer vent line, which has a typical capacity about 1/6 as large as the PORV is also installed on the pressurizer.

B&WOG Position on Technical Specification Changes

The typical present BWOG plant Technical Specification requirement for an inoperable PORV requires block valve closure. Some variance exists among the plants, but no B&WOG plant has Technical Specifications requiring shutdown for an inoperable PORV.

The B&WOG maintains that shutdown for an inoperable PORV is not necessary because:

1. The PORV is not the primary method for depressurization for a SGTR. Plant specific emergency operating procedures (EOPs) based on the B&WOG Abnormal Transient Operating Guidelines (ATOG) concept give first priority to use of other equipment and only resort to use of the PORV if the other equipment is unavailable.

To depressurize for a SGTR the preferred method is normal pressurizer spray, driven by reactor coolant pump head rise. In the absence of normal pressurizer spray, some plants have high pressure auxiliary pressurizer spray provided by the makeup system, other plants use the normal pressurizer vent. Either the auxiliary spray or the pressurizer vent is preferred to the PORV because smoother depressurization control can be afforded as compared to the more abrupt depressurization of the PORV. The potential for blowing the quench tank (reactor coolant drain tank) rupture disc is greater when the PORV is used. The EOPs also require steaming the steam generators to maintain RCS heat removal either for keeping RCS pressure below the secondary relief pressure for the affected generator or to help RCS depressurization; therefore steam generator heat removal can also be used for depressurization.

2. No B&WOG operating plant has the assumption of loss-of-offsite power coincident with SGTR as part of the design basis accident licensing analysis presented in the FSAR. As a result the RC Pumps are available for pressurizer spray. The FSAR does not specifically cite the method for depressurization to be used. All plants have provisions for managing SGTR if off-site power is not available even though this is not a design basis requirement.

3. No B&WOG operating plant is committed to the provisions of Standard Review Plan 5.4.7 and its Branch Technical Position RSB 5-1 as a part of its License. We believe it is inappropriate to backfit this requirement via a Generic Letter requesting a PORV Technical Specification.

4. As noted before, B&WOG plants do not require the PORV for feed and bleed core cooling. B&WOG plants (except for Davis-Besse) have very high head/high flow Makeup/HPI pumps that can provide flow to the pressurizer safety valves for feed and bleed core cooling if the PORV is not available. The Davis-Besse Makeup system (which is separate from the HPI system) has been redesigned so that it can provide feed and bleed core cooling through the pressurizer safety valves. Various evaluations have demonstrated this design capability. For example an NRC sponsored study states "one HPI pump delivering flow at the setpoint pressure of the pressurizer SRV's is sufficient to prevent core uncovery if initiated by 2400 s." (See NUREG/CR-4966, Volume 2, page 18).

   As such the PORV is not the only method for core cooling for events, such as loss of all feedwater, that are beyond the design basis.

5. The importance of the need for the PORV seems to be exaggerated by the shutdown requirement of the proposed Technical Specification. NUREG 1316 references a Brookhaven National Laboratory (NUREG/CR-4999) study that estimated the risk reduction from improved PORV and block valve reliability. That study showed only a small potential decrease of core melt frequency due to increased valve reliability (approximately 1 to 3 E-7). The study did not include feed and bleed. Separately,

however, the staff notes that most of the safety enhancement for the proposed backfit is derived from the increase of feed and bleed capability.

The B&WOG contends that the improvement in plant safety is insignificant. For example, the CR-3 Probabilistic Risk Assessment (PRA) demonstrates that the expected improvement in PORV reliability does not have a significant impact on core damage frequency at CR-3. The reduction in risk due to the estimated improvement in PORV and block valve reliability is minimal. The CR-3 PRA indicates, assuming an optimistic 75% increase in PORV and block valve reliability, that the resulting decrease in core damage frequency is approximately 4.5×10^{-7} per year. This is equivalent to a 3% decrease - from approximately 1.5×10^{-5} per year to 1.455×10^{-5} per year, and is due to the role of the PORV in depressurization during a steam generator tube rupture event. Enhancement of feed-and-bleed cooling has no effect on core damage frequency for CR-3.

Other B&WOG PRAs indicate similar results:

- The Oconee PRA did not explicitly model the PORV for feed and bleed cooling, since only one of three relief paths (two SRVs, one PORV) are required for success. However, explicit consideration of an inoperable PORV produces a negligible increase of plant risk.

- The TMI-1 and ANO-1 PRAs also show insignificant differences of results for an inoperable PORV.

- The Davis-Besse PRA indicates the effect of the PORV on cooldown (SGTR, natural circulation cooldown, and feed and bleed) to be so small as to be considered trivial.

6. Cost evaluations of the proposed shutdown requirement appear to be underestimated by the NUREG 1316 cost/benefit analysis. There is a high potential for substantial costs in replacement power due to outages resulting from the proposed shutdown requirements. For failures that might occur under the proposed Technical Specification, a shutdown in one hour would be required. If, after shutdown, work on the PORV itself was necessary to restore the valve to operable status, the unit would likely have to be placed in cold shutdown (MODE 5) due to the environmental conditions in the general area of the valve. Such an outage would be expected to typically last a minimum of 10 days (costing 7-10 million dollars in terms of replacement power costs).

7. The three selection criteria of the NRC's Interim Policy Statement on Technical Specification Improvement do not appear to have been reviewed by the staff in order to make their decision on what constraints should be put on the PORV in regard to Technical Specifications. The B&WOG has reviewed the PORV under the three criteria and find it does not meet any of the three:

Criterion 1: Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.

B&WOG Evaluation of Criterion 1: The PORV is not used to detect a significant abnormal degradation of the reactor coolant pressure boundary.

Criterion 2: A process variable that is an initial condition of a DBA or Transient Analyses that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

B&WOG Evaluation of Criterion 2: The PORV is not a process variable.

Criterion 3: A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a DBA or Transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

B&WOG Evaluation of Criterion 3: The DBA or Transient applicable to Criterion 3 is the SGTR. As noted previously, the safety analysis basis for SGTR is not explicit for the method of depressurization but normal pressurizer spray can be assumed to be available since the FSAR analysis does not assume loss of off-site power. In addition, based upon the ATOG concept if normal spray is not available the auxiliary spray or pressurizer vent are preferable to the PORV for this event. Thus, since several options are available to perform this function and since use of the PORV during a SGTR is not a design basis requirement it is inappropriate to identify the PORV as the primary success path for mitigation of a SGTR.

Risk significant provisions: In addition to the three criteria, the Interim Policy Statement also recommends that constraints of prime importance in limiting the likelihood or severity of the accident sequences that are found to dominate risk be included within the Technical Specifications.

B&WOG evaluation of risk significance provisions: The B&WOG elected to include the PORV in the Technical Specifications because of its risk importance. The risk element of interest is prevention of a small break LOCA via the PORV path caused by a failed open PORV. This is not the same as the elements (SGTR, feed and bleed, etc.) covered by the staff in G.L. 90-06 or NUREG 1316. The B&WOG basis is documented in the new Standard Technical Specifications (NUREG 1430, September 1992). Prevention of a small break LOCA via the PORV does not require PORV operability for opening control.

Thus the criteria of the Interim Policy Statement do not support the shutdown request of the staff. The risk basis for inclusion of the PORV in the Technical Specifications is not the same as that cited by the staff in G.L. 90-06.

For these reasons the B&WOG does not believe it is appropriate to shutdown for an inoperable PORV or block valve as given by the staff in the proposed Technical Specification. If any clarification is needed or more information is required the B&WOG will be pleased to provide it.

Very truly yours,

Blair Wunderly, Chairman
B&WOG Technical Specification Committee

xc: B&WOG Technical Specification Committee members
B&WOG Utility Licensing Managers
B&WOG Steering Committee members