

ENERGY NORTHWEST

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March 22, 2002
GO2-02-049

Docket No. 50-397

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Gentlemen:

Subject: **COLUMBIA GENERATING STATION, OPERATING LICENSE NPF-21;
REQUEST FOR ENFORCEMENT DISCRETION REGARDING
TECHNICAL SPECIFICATION COMPLETION TIME FOR INOPERABLE
PRIMARY CONTAINMENT ISOLATION VALVES**

This letter provides written follow-up of the Energy Northwest request for enforcement discretion regarding Technical Specification (TS) 3.6.1.3, "Primary Containment Isolation Valves (PCIVs)." Condition A of TS 3.6.1.3, when in Modes 1, 2, or 3, applies when one PCIV is inoperable in one or more penetration flow paths except due to leakage not within limit. The applicable action requires isolation of the affected penetration flow path within eight hours. This follow-up letter is submitted pursuant to a verbal request that was made via telephone conference conducted between approximately 0030 and 0126 on Thursday, March 21, 2002, between representatives of Energy Northwest and NRC personnel from Headquarters and the Region IV office. The NRC verbally granted Energy Northwest's request for enforcement discretion regarding TS 3.6.1.3, Condition A completion time during the telephone conference on Thursday, March 21, 2002. The written request for enforcement discretion is attached and summarized below.

Energy Northwest has determined that two PCIVs, MS-V-22A and MS-V-22D are currently inoperable and do not meet the three second isolation time limit as specified in Surveillance Requirement (SR) 3.6.1.3.6. The main steam isolation valve (MSIV) MS-V-22A has an isolation time of 2.74 seconds and MSIV MS-V-22D has an isolation time of 2.88 seconds. The surveillance test methodology for these valves included circuit response time and valve motion time. Energy Northwest has determined that circuit response time should not have been included in MSIV isolation time for the 3 second time limit included in SR 3.6.1.3.6 and therefore declared the two MSIVs noted above inoperable.

The apparent cause of the problem has been identified as the methodology used to measure the MSIV isolation time inappropriately included circuit response time.

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COLUMBIA GENERATING STATION, OPERATING LICENSE NPF-21; REQUEST FOR ENFORCEMENT DISCRETION REGARDING TECHNICAL SPECIFICATION COMPLETION TIME FOR INOPERABLE PRIMARY CONTAINMENT ISOLATION VALVES

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The attached request for enforcement discretion is being made to avoid an unnecessary plant transient as a result of complying with Technical Specification 3.6.1.3.

Columbia Generating Station has evaluated the situation described herein and determined that the impact on safety regarding relief from the eight hour completion time for isolating the technically inoperable PCIVs (MS-V-22A and MS-V-22D) is less than that presented by the unnecessary plant transient that would be incurred by placing the plant in mode 4. A separate request for a license amendment will be submitted to address and clarify the three second time limit included in SR 3.6.1.3.6 regarding MSIV isolation time. The duration of the attached request for enforcement discretion will allow Columbia Generating Station to operate with the current MSIV isolation times for MS-V-22A and MS-V-22D until the NRC approves the forthcoming license amendment request regarding SR 3.6.1.3.6.

This request has been reviewed by the Columbia Generating Station Plant Operations Committee.

Should you have any questions or desire additional information regarding this matter, please call Ms. CL Perino at (509) 377-2075.

Respectfully,

A handwritten signature in black ink, appearing to read "GO Smith", with a horizontal line underneath the name.

GO Smith
Vice President, Generation
Mail Drop PE04

Attachment

cc: EW Merschoff - NRC - RIV
JS Cushing - NRC - NRR
NRC Sr. Resident Inspector - 988C
DL Williams - BPA/1399
TC Poindexter - Winston & Strawn
JO Luce - EFSEC

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Columbia Generating Station hereby requests that the NRC grant discretion in enforcing TS LCO 3.6.1.3 relative to compliance with the 8-hour Completion Time of Required Action A.1 and allow the unit to remain in Mode 1 (Power Operation) until the forthcoming license amendment request is approved which will allow the current plant condition. The basis for this request is described below.

1. The Technical Specification (TS) or other license conditions that will be violated.

Columbia Generating Station is requesting enforcement discretion from TS 3.6.1.3, "Primary Containment Isolation Valves" (PCIVs). Condition A of Technical Specification 3.6.1.3, when in Modes 1, 2, or 3, applies when one PCIV is inoperable in one or more penetration flow paths except due to leakage not within limit. The applicable action requires isolation of the affected penetration flow path.

Currently two inboard main steam isolation valves do not meet surveillance requirement 3.6.1.3.6 in that their isolation time was slightly less than the prescribed 3.0 seconds.

2. The circumstances surrounding the situation, including apparent root causes, the need for prompt action and identification of any relevant historical events.

During a review of MSIV surveillance test data, a question was raised regarding the definition of the term "isolation time" as it is used in surveillance requirement 3.6.1.3.6, "Verify the *isolation time* (emphasis added) of each MSIV is ≥ 3 seconds and ≤ 5 seconds." Specifically, a question was raised regarding whether the isolation time requirement of ≥ 3 seconds should include circuit response time and MSIV motion time from full open to full closed position.

A review of the data indicates that if the current surveillance methodology were changed to eliminate circuit response time (from switch actuation to start of valve motion), then two MSIVs did not meet the surveillance requirement of ≥ 3 seconds.

The apparent cause of the problem has been identified to be that the methodology used to measure the MSIV isolation time was based on the ASME IST definition of valve closure time that included the circuit response time.

Prompt action is necessary in that current operating procedures do not address operation of the station with two steam lines isolated, thereby requiring a plant shutdown if enforcement discretion is not granted.

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There are no relevant historical events at Columbia Generating Station regarding surveillance testing of MSIVs where isolation time was in question.

3. The safety basis for the request, including an evaluation of the safety significance and potential consequences of the proposed action. This evaluation should include at least a qualitative risk assessment, using both risk insights and informed judgements as appropriate.

The justification for this request for enforcement discretion, consistent with the proposed License amendment request to follow this letter, is based on Columbia Generating Station's determination that the average MSIV valve motion time of 3.12 seconds is bounded by the Westinghouse Cycle 16 analysis (Reference 1).

The analysis described in Reference 1, modeled the four sets of main steam line isolation valves (two valves per steam line) collectively as a single orifice that transitions from full open to full closed in 3 seconds (includes valve motion time only). The ASME overpressurization event occurs as a result of the pressure wave reflected back to the reactor pressure vessel by rapid MSIV closure. When analyzing the specific closure times from the last MSIV isolation time surveillances, performed on February 18 and February 22, 2002, it was determined that although two steam lines would be isolated in less than 3 seconds, the two remaining steam lines would be isolated in greater than 3 seconds. Specifically, the valve motion times, from start of motion to full closed are as follows:

"A" Steam Line	Inboard Valve MS-V-22A	2.74 seconds
	Outboard Valve MS-V-28A	3.29 seconds
"B" Steam Line	Inboard Valve MS-V-22B	3.70 seconds
	Outboard Valve MS-V-28B	3.42 seconds
"C" Steam Line	Inboard Valve MS-V-22C	3.97 seconds
	Outboard Valve MS-V-28C	3.42 seconds
"D" Steam Line	Inboard Valve MS-V-22D	2.88 seconds
	Outboard Valve MS-V-28D	3.42 seconds

The maximum magnitude pressure wave reflected back to the reactor pressure vessel is generated when the last steam line is isolated. Prior to that time, ample flow area exists to prevent rapid pressure buildup. For the valve data listed above, this would equate to a steam line isolation sequence and timing as follows:

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T = 0 seconds	All MSIVs commence closed direction stem motion
T = 2.74 seconds	Main steam line "A" isolated
T = 2.88 seconds	Main steam line "D" isolated
T = 3.42 seconds	Main steam line "B" isolated
T = 3.42 seconds	Main steam line "C" isolated

With individual steam line isolations occurring, individual (discreet) pressure waves are propagated back to the reactor pressure vessel. Each discreet wave is a fraction of the pressure wave that would be generated from simultaneous isolation of all four lines (and as modeled in Reference 1).

It can be seen from the above data that the maximum pressure wave propagation commences at 3.42 seconds from start of valve motion, concurrent with the isolation of the "B" and "C" steam lines. The peak pressure achieved from this series of isolation times will be less than that resulting from the 3 second simultaneous isolation time assumed in the Reference 1 analysis.

Averaging of the limiting (fastest) time for each of the four main steam lines yields an average valve motion time of 3.12 seconds. This average time is faster than the actual time for final steam line isolation, and as such, is a conservative value to use when determining if the measured valve isolation times are bounded by the 3 seconds assumed in the ASME overpressure analysis.

Other Supporting Analyses

- Framatome ANP has performed sensitivity analyses to assess the impact of varying MSIV valve closing times on the ASME overpressurization event for several plants. Their results are documented in Reference 2. The results of these sensitivity analyses showed an increase in the peak vessel and peak dome pressure of up to 8 psid for a decrease in MSIV closure time from 3.0 to 1.0 seconds. Scoping analyses to assess the impact of a change in MSIV closure time from 3.0 seconds to 2.5 seconds for a similar BWR5 showed an increase in peak vessel and peak dome pressure of 3 psid. The BWR5 scoping analysis was performed with only 10 safety valves in service and did not credit scram on valve position. The high pressure (or ATWS) RPT was credited in the analysis. Based on the results of the analyses described above, the increase in peak vessel pressure for the MSIV ASME overpressurization event at Columbia Generating Station should be less than 4 psid if the MSIV full stroke closure time (simultaneous isolation of all four steam lines) were reduced from 3.0 to 2.5 seconds. The Westinghouse Cycle 16 analysis (Reference 1) showed a 36 psi margin to the ASME overpressurization limit.

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The BWR5 sensitivity study is particularly relevant to Columbia Generating Station since the rated power and rated steam flow are very similar (3489 MWt and 15.145 Mlb/hr for the BWR5; 3486 MWt and 14.93 Mlb/hr at Columbia Generating Station). When the transient model for the similar BWR5 was developed at Framatome, the model was tested using transient analysis input for previously documented analyses for Columbia Generating Station. The results showed that the plants are very similar except for the steam line geometry. However, differences in the steam line model should make little difference for the ASME MSIV closure overpressurization event since the MSIVs are located close to the reactor vessel where the differences between plants is small. The BWR5 scoping analysis was intentionally performed for a lower number of operable safety valves to identify how many would need to be in service to ensure that the overpressurization criteria are met. A higher number of available safety valves should result in a lower increase in peak pressure for a faster valve closure time.

- Consistent with the above conclusions, the NRC, in Reference 3, determined that for steam line isolation times of 2 seconds or greater, the impact on MCPR and vessel pressure is insignificant, and will not challenge the safety limits. In the analysis, an MSIV position switch scram was assumed for the effect on MCPR and a high flux scram was assumed for the assessment of the effect on overpressure protection. On that bases, the NRC concluded that the interpretation of the ASME code which allows as much as one second error in MSIV closure time is of no safety concern for plants with a technical specification minimum allowable MSIV closure time of 2.0 seconds or greater.

To address specific issues raised by the NRC regarding this request for enforcement discretion, the most limiting transient for Operating Limit MCPR determination at rated power for the current cycle (Cycle 16) is the Load Rejection without Bypass (Reference 1).

Regarding the impact on the LOCA analysis, this NOED has no impact since the Technical Specification requirement of isolation time of each MSIV ≤ 5 seconds was not violated.

The scram logic in a MSIV isolation event at CGS is that the scram has a nominal setpoint of MSIV position at 10% closed. However, for the MSIV closure transient analysis for the determination of MCPR, an analytical value of 15% closed is used. This value is more conservative than the nominal setpoint. In the transient analysis performed for 5% CGS power uprate by General Electric (Reference 4), reactor scram was initiated at 0.45 seconds after the initiation of MSIV closures, which corresponds to a MSIV position at 15% closed. The valves were fully closed at 3.0 seconds.

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Regarding the models used for the MSIV closure transient, Columbia Generating Station uses the Westinghouse codes BISON (Reference 5, 6) and BISON-SLAVE (Reference 5, 6). BISON is a system prediction code for reactor conditions, including the vessel pressure. BISON-SLAVE is a subset of BISON and is a hot-channel model for the MCPR calculations. Per NRC approved methodology, ASME Overpressure Transient analysis is performed for each cycle. The MSIV closure transient for MCPR is not among the potential limiting transients and is not analyzed for each cycle.

Qualitative Risk Assessment

Analysis by Columbia Generating Station has determined that this condition will not result in exceeding MCPR or ASME vessel protection limits. Therefore, there is no adverse affect on any station equipment. Accordingly, this request for enforcement discretion does not affect the baseline core damage probability.

4. The justification for the duration of the noncompliance.

Columbia Generating Station is submitting a license amendment request to clarify the methodology used to calculate isolation time regarding Surveillance Requirement 3.6.1.3.6. Application of the current methodology for calculating MSIV isolation time has not resulted in a violation of thermal limits, which protect against fuel failures. In addition, the slight decrease in individual MSIV isolation time from the Technical Specification surveillance requirement limit of 3.0 seconds does not result in exceeding the overpressure limit, which protects against breach of the primary pressure boundary. Therefore, the duration of the noncompliance is justified until the proposed license amendment is approved which will allow the current condition.

5. The basis for the conclusion that the noncompliance will not be of potential detriment to the public health and safety and that no significant hazard is involved.

As discussed in the response to question 3, the measured limiting isolation times for the MSIVs, when averaged, remain bounded by the Cycle 16 Licensing analysis (Reference 1). Therefore, there is no anticipated violation of thermal limits, and thus, the predicted fuel failures. Also since the ASME overpressure limit is still satisfied, there is no breaching of the primary pressure boundaries. Therefore, there will be no detriment to the public health and safety.

There are no significant hazards associated with this request for enforcement discretion. This is demonstrated as follows:

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The MSIV closure transient is discussed in FSAR section 15.2.4. The sequence of events for this transient is given in FSAR Table 15.2-5 that assumes a time of 3.0 sec for all MSIVs to be closed. A review was performed of the Cycle 16 analysis, which modeled the four sets of MSIVs (two valves per steam line) collectively as a single orifice that transitions from full open to full closed in 3 seconds (includes valve motion time only). The overpressurization event occurs as a result of the pressure wave reflected back to the reactor pressure vessel by rapid MSIV closure. When analyzing the specific closure times from the last MSIV stroke time surveillances, performed on February 18 and February 22, 2002, it was determined that although two steam lines would be isolated in less than 3 seconds, the two remaining steam lines would be isolated in greater than 3 seconds. Averaging of the limiting (fastest) isolation time for each of the four main steam lines yields an average valve motion time of 3.12 seconds. This average time is within the bounds of the analysis assumptions. There is no effect on the probability of a previously evaluated accident because two main steam lines isolating at the slightly faster time does not alter any event sequence considered in the accident analysis.

Therefore, this request for amendment does not involve a significant increase in the probability or consequences of the MSIV closure accident previously evaluated.

The request for enforcement discretion does not create the possibility of a new or different kind of accident from any accident previously evaluated. The safety function of the MSIVs is to mitigate release of radioactive material and is not a system that potentially causes accidents.

The request for enforcement discretion does not involve a significant reduction in a margin of safety. Analysis indicate that for closure times of 2 seconds or greater the impact on MCPR and vessel pressure is insignificant and will not challenge safety limits. The justification for this request for enforcement discretion, consistent with the proposed license amendment request to follow this letter, is based on Columbia Generating Station's determination that the average MSIV valve motion time of 3.12 seconds is bounded by the Westinghouse Cycle 16 analysis. Therefore, this request does not involve a significant reduction in the margin of safety.

This request was evaluated and found to be acceptable from a risk standpoint. Therefore, this does not involve any net increase in radiological risk.

6. The basis for the conclusion that the noncompliance will not involve adverse consequences to the environment.

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As discussed in the response to question 3, the measured limiting isolation times for the MSIVs, when averaged, remain bounded by the Cycle 16 Licensing analysis (Reference 1). Therefore, there is no anticipated violation of thermal limits, and thus, the predicted fuel failures. Also since the ASME overpressure limit is still satisfied, there is no breaching of the primary pressure boundaries. Therefore, this noncompliance does not involve adverse consequences to the environment.

7. Any proposed compensatory measures.

No compensatory measures are necessary.

8. A statement that the request has been approved by POC

This request for enforcement discretion was reviewed by the Plant Operations Committee and approved by the Plant General Manager in a special meeting on March 21, 2002.

9. The request must specifically address which of the NOED criteria for appropriate plant conditions specified in Section B is satisfied and how it is satisfied.

NRC IM part 9900 Section B, Criteria, that are satisfied:

2.0(1) "regular" NOED. Forced compliance would involve plant risks due to an unnecessary plant transient which may affect the radiological health and safety of the public.

2.1(1)(a) The NOED is intended to avoid unnecessary transients as a result of compliance with the license condition and, thus minimize potential safety consequences and operational risks.

10. A license amendment request is required and is being submitted separately.

11. This is not a severe weather or other natural phenomenon related NOED.

References:

1. Westinghouse Report CE NPSD-883-P, Rev. 0 "WNP-2 Cycle 16 Reload Licensing Report," March 2001
2. Framatome ANP Memorandum From DG Carr to JL Rakilos, "MSIV Closure Time Impact on ASME Overpressurization Analysis" dated March 20, 2002
3. NRC Memorandum from DG Eisenhut to R Spessard, "Stop Watches Calibration and ASME Requirements on Transient Analysis" dated January 12, 1983

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4. GE Nuclear Energy Report GE-NE-208-08-0393, "WNP-2 Power Uprate Transient Analysis Task Report," September 1993
5. Westinghouse Report RPA 90-90-P-A, "BISON - A One Dimensional Dynamic Analysis Code for Boiling Water Reactors," December 1991
6. Westinghouse Report CENPD-292-P-A, "BISON - One Dimensional Dynamic Analysis Code for Boiling Water Reactors: Supplement 1 to Code Description and Qualification," July 1996