

BWR OWNERS' GROUP
STATEMENT REGARDING
"POSITION-CHANGEABLE MOTOR-OPERATED VALVES"
ASSOCIATED WITH GENERIC LETTER 89-10

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I. INTRODUCTION AND SUMMARY

Generic Letter (GL) 89-10 requests that licensees conduct motor-operated valve (MOV) reviews within existing, approved design basis assumptions. At the same time, the Generic Letter, as clarified in GL 89-10, Supplement 1, requests that licensee reviews include consideration of position-changeable valves in safety-related systems to demonstrate that MOVs, which are subject to potential inadvertent operation from the control room, are capable of recovering from mispositioning.

On May 24, 1990, the BWR Owners' Group (BWROG) met with the Staff to discuss its development of generic MOV methodology to assist individual BWR licensees in responding to "item a" of GL 89-10. At that meeting, and in subsequent correspondence to the NRC dated June 13, 1990 (See Reference 1), the BWROG presented the assumptions underlying its methodology, and advised the Staff that it did not plan to include position-changeable valve analyses as part of the GL 89-10 review. The bases for the BWROG's position are that consideration of position-changeable valves is technically unnecessary to address the concerns of GL 89-10, is outside the existing approved BWR design basis and has not been adequately justified by the Staff as a backfit.

By letter to the BWROG dated November 16, 1990, the Staff indicated that the BWROG position is unacceptable. See Reference 1. The principal basis for the Staff's conclusion was that the 1985 Davis-Besse event demonstrated the need for industry-wide reviews of position-changeable valves.

In response, the BWROG submits this position statement in support of its request for NRC management review of this issue. The BWROG's position is based on the following:

1. Consideration of position-changeable valves is not technically warranted. Technical concerns arising from the 1985 Davis-Besse event, which involved position-changeable valves, is separately addressed by other actions currently being implemented under Inspection & Enforcement (IE) Bulletin (Bulletin) 85-03 and GL 89-10, and endorsed by the BWROG -- such as verification of MOV design basis, control circuit configuration and thrust/torque requirements, as well as review of MOV maintenance procedures and practices. Furthermore, the existing approved BWR design basis ensures the capability to cope with a single active component failure or single operator error (e.g., inadvertent valve opening or closing). To request review of additional position-changeable valve scenarios amounts to postulating a dual failure.

2. An adequate backfitting analysis under 10 CFR 50.109 has not been performed to justify position-changeable valve reviews. The Staff has indicated that the request to consider position-changeable valves -- a matter beyond the approved BWR design basis -- constitutes a backfit. See Reference 2 at p. 2 and this Enclosure at Section IV. However, the analysis used by the Staff to justify GL 89-10 -- NUREG/CR-5140 -- does not include any quantification or estimate of the safety benefit and cost of this backfit position.

In sum, the BWROG believes that consideration of position-changeable valves is not technically warranted nor has the Staff's position been justified from a backfit perspective. Should the Staff not agree with our position, we request that this submittal be evaluated as a backfitting appeal under NRC Manual Chapter 0514-044 on the basis that an adequate supporting analysis has not been provided to justify this proposed action.

II. SUMMARY OF POSITIONS

A. BWROG Understanding of NRC Positions

1. Technical

As the BWROG understands the Staff's position, the Staff is generally concerned about overall individual safety system reliability; more specifically, the inability to reopen safety-related MOVs following inadvertent closure from the control room. It appears that the Staff wants to ensure that plant operators can reposition inadvertently mispositioned MOVs to their correct position (from the control room) notwithstanding the potentially greater than design basis pressure differential that may exist across the mispositioned MOV. The Staff apparently views the June 9, 1985 Davis-Besse loss of feed-water event as such an incident and one which could have been averted if the licensee had performed a position-changeable valve review prior to the event and taken appropriate corrective actions. Further, the BWROG believes the Staff views the Davis-Besse incident to be directly applicable to all Light Water Reactor (LWR) types.

Further, the Staff has stated its intent that licensees prevent control room inadvertent operation of all safety-related system MOVs or provide assurances that any mispositioned MOV is capable of recovering from that mispositioned state. The Staff's request to consider mispositioning apparently arises from concerns about an operator action which may misposition valves in redundant "trains" of safety-related systems. The Staff has stated that it considers it inappropriate for licensees to rely upon single-failure criterion and safety-related system redundancy to overcome the loss of a "train" due to a mispositioned MOV.

2. Backfit

The NRC has indicated that it now considers the Generic Letter to be a backfit and that the "value-impact" analysis (NUREG/CR-5140) adequately justifies (as required by the Backfitting Rule, 10 CFR 50.109) the imposition of the backfit on all licensees. Because consideration of

osition-changeable valves goes beyond existing approved design bases. This aspect of the Generic Letter must be embraced by the NRC's recognition that GL 89-10 constitutes a backfit.

B. BWROG Positions

1. Technical

For the following reasons, the BWROG believes including "position changeable" valve reviews as part of GL 89-10 analyses is not warranted:

- a. The Generic Letter (without position-changeable valve analysis) appropriately addresses technical concerns (e.g., improper torque switch settings) regarding the Davis-Besse event.
- b. Licensee implementation of the position-changeable valve guidelines in the Generic Letter could have adverse effects on safety.
- c. Consideration of position-changeable valves for the purpose of the Generic Letter, while not having considered position-changeable valves in other accident evaluations (because such analyses are not within the plant's design bases) would likely further complicate design basis accident analyses, and in fact, could create design basis inconsistencies.

2. Backfit

- a. The NRC's "value-impact" analysis, NUREG/CR-5140, does not adequately evaluate and justify consideration of position-changeable valves.
- b. Due to the failure to initially identify the issue as a backfit, the CRGR was apparently not able to adequately address the backfitting implications relating to position-changeable valves.
- c. This aspect of the Generic Letter should have been a rulemaking action since the intent is to expand the single-failure criterion of the General Design Criteria.

III. BWROG TECHNICAL ANALYSIS

A. Review of Davis-Besse Event

The Davis-Besse "Loss of Feedwater" Event of June 9, 1985 was one of several events which led the NRC to issue Bulletin 85-03 "Motor Operated Valve Common Mode Failures During Plant Transients Due to Improper Switch Settings." The BWROG's review of Information Notice 85-50 "Complete Loss of Main and Auxiliary Feedwater at a PWR Designed by B & W," and NUREG-1154 "Loss of Main and Auxiliary Feedwater Event at the Davis-Besse Plant on June 9, 1985" (See Reference 3), indicates that the main concerns related to several design and maintenance problems with the once-through steam generators (OTSG)/Auxiliary feedwater (AFW) Containment Isolation Valves, AF-599 and AF-608. The failure of these valves to open after being erroneously mispositioned, contributed to the complexity of the event and led to manual actions to restore feedwater to

the OTSG's. However, the Staff states in Supplement 1 to the GL 89-10 that "This event raised a significant concern regarding the ability of MOVs to operate under design-basis conditions." (Emphasis added.)

A short event chronology, based on NUREG-1154, clarifies the role of these valves:

- Transient initiator was a control system perturbation causing #1 main feedpump (MFP) flow increase with subsequent MFP turbine trip on overspeed.
- Reactor trips and Main Steam isolation valves (MSIV) close.
- A single operator action caused the erroneous closure of several valves, including containment isolation valves AF-599 and AF-608 preventing AFW flow from reaching either steam generator.
- Valves AF-599 and AF-608 did not automatically reopen and could not be reopened from the control room.
- Subsequent actions to mitigate the event included manually opening the isolation valves AF-599 and AF-608, manually starting the AFW pump turbines, and manually starting the Startup Feed Pump, restoring feedwater to the OTSGs.

Among the problems noted at Davis-Besse and addressed in Bulletin 85-03 and GL 89-10 are:

- Improperly set Open Torque Switch Bypass Limit Switches (OTSBLs). (The OTSBLs activated the torque switch before the valves were unseated or opened.)
- Inadequate maintenance instructions for OTSBLs setting.

The NRC Investigative Team concluded that the underlying cause of the loss of main and auxiliary feedwater event of June, 1981, was the licensee's lack of effective engineering for determining the proper settings for valve torque switch bypass contacts and improper implementation of specified settings. In its view, both of these failures contributed to the auxiliary feedwater system containment isolation valve malfunctions. The NRC further concluded that these causes could have been detected and corrected prior to the event by straightforward tests. See Reference 3.

GL 89-10 suggests that any valve not blocked from inadvertent operation from the control room should be considered position-changeable, and that recovery of any valve from inadvertent operation should be included in the GL 89-10 program, including all testing requirements. Given the Davis-Besse scenario, which precipitated the original Bulletin 85-03, the possibility of mispositioning may indeed be a proper consideration for plants with poorly laid out control panels which may allow (as occurred at Davis-Besse) a single operator to simultaneously push two buttons to erroneously misposition four valves. There is no such panel design or logic at many PWRs or BWRs, and thus this concern is not universally applicable to all PWRs and BWRs.

Without debate, the Davis-Besse event demonstrates the need for design basis verification of safety-related MOVs, their control circuit configuration and control parameters (thrust/torque) verification, and review of MOV maintenance procedures and practices. These design basis reviews have been properly suggested in both Bulletin 85-03 and GL 89-10 and have been endorsed by the BWROG. Utilities recognize the merits of these reviews and have in the past and likely will in the future commit significant resources to ensure that MOVs will perform their design basis function on demand. However, as noted in the NRC investigative team's root cause statement and supported by statements in the NRC's "value impact" report, NUREG/CR-5140, the consideration of inadvertent mispositioning for all MOVs in safety-related systems in addition to the single failure criteria is not only beyond the original design basis of most plants but would not have prevented or mitigated the Davis-Besse event. Therefore, position-changeable valve reviews should not be within the scope of GL 89-10. Improperly set OTSBLs contributed to the Davis-Besse valves' inability to open, independent of the valves' position (i.e., normally open or mispositioned close). As NUREG/CR-5140 states, "multiple MOVs failed to operate due to mode failures stemming from improperly set switches in the valve mechanism" (emphasis added). NUREG/CR-5140 further states "poor valve maintenance practices, inadequate post-maintenance testing, and the deficiencies in periodic surveillance testing...led to the Davis-Besse... failures..."

The containment isolation valves at Davis-Besse were mispositioned by the operator incorrectly initiating Steam and Feedwater Rupture Control System (SFRCS) on low steam pressure rather than low steam generator level. More significant, the valves had a design basis safety function to open as well as to close. Therefore, proper valve maintenance and switch setting would have most likely ensured valve operation on demand, the very concerns adequately addressed by other actions requested by the NRC in Bulletin 85-03 and GL 89-10 which have already been accepted by the BWROG.

B. Human Factors and System Design Considerations

As the Davis-Besse event indicated, valve mispositioning is primarily due to human factors problems. In fact, a Davis-Besse review identified the SFRCS control panel design, and the lack of a SFRCS control panel on the simulator as a significant human factors concern. Therefore, the Davis-Besse control panel was redesigned. The new Davis-Besse simulator also will contain the SFRCS control panel modification. Since 1985, all utilities have spent substantial resources on human factors improvements. These improvements have been carefully evaluated and are designed to reduce the possibility of human errors such as valve mispositioning. This reduction in the probability of valve mispositioning does not appear to have been considered by the NRC in issuing GL 89-10.

It should also be noted that implementation of the Generic Letter, as written, could encourage utilities to de-energize selected MOVs in order to consider them "blocked from inadvertent position" within the meaning of GL 89-10. Rendering valves inoperable to prevent misoperation could outweigh other "safety improvements." Doing so would defeat the purpose of an MOV which is to allow remote (control room) operation on a timely basis. Blocking the

valve electrically requires additional time for plant operator action to unblock the valve for electrical operation. During an event, this condition could aggravate the complexity of the event or create new scenarios that have not been postulated or evaluated. These potential adverse effects of the GL 89-10 recommendation on valve mispositioning were not apparently considered by the NRC.

It should also be recognized that the Davis-Besse event was caused by a single act mispositioning four (4) valves simultaneously. BWRs have no similar arrangement where a single operator action can operate multiple valves. In fact, frequently, improper valve control switch operation is inhibited either by logic or other valve position. Thus, basic BWR design features inherently prevent multiple valve mispositionings.

C. BWR Design Basis Assessment

In addressing this issue, it is essential to understand the BWR Emergency Core Cooling System (ECCS) design basis and its relationship to a PWR such as Davis-Besse. See Reference 4. In the Reference 4 letter, the Staff states that: "...because the need to consider mispositioning arises from concern about the operability of one or more trains of safety-related systems, it is not appropriate for licensees to rely on the single-failure criterion and the redundancy of safety-related systems to overcome the loss of the train with the mispositioned MOV." (Emphasis added.)

It must be recognized that BWR event and accident responses have significantly different operational modes than PWRs. For small break LOCAs, PWRs rely on charging pumps and high-pressure safety injection (HPSI) to maintain inventory, increased boron concentration to maintain subcriticality, and use their steam generators to remove decay heat in a slow, controlled manner. These designs intentionally have no means for quickly depressurizing the primary system, which would induce boiling in the core region. With PWRs, the need to depressurize rapidly during a small break LOCA does not exist, since PWRs typically have no primary coolant high pressure lines outside containment with exception of the chemical and volume control system (CVCS) letdown system and these lines are small. This is one of the fundamental differences between the BWR "direct cycle" and PWR "indirect cycle" designs. For a large break LOCA, PWR redundancy is similar to that of a BWR. Due to the design philosophy differences, PWRs have "redundant trains." The redundant trains, however, are constructed identically with identical components designed to operate at identical differential pressures. There is little diversity in system operating means or pressures.

In comparison, for small break LOCAs, BWRs have diverse systems operated by diverse means at diverse pressures. This diversity decreases the possibility of common mode failure.

The BWR design has the unique operating flexibility for rapid depressurization that allows the reduction of virtually every valve dP to very low levels during an accident scenario. While not standard operating practice, this reduction of valve dPs can be achieved if necessary.

Also, BWRs have high pressure systems (HPCI, HPCS) which are designed to operate against full reactor pressure. In addition, many BWRs have a RCIC system as an additional source (not safety-related) of high pressure makeup water. If these high pressure systems become inoperable for any reason (including the failure to reopen an inadvertently positioned MOV), the diverse automatic depressurization system (ADS) (safety-related) can reduce reactor pressure in minutes. With low reactor pressure, any of the low pressure high volume systems (LPCI, LPCS) can supply the necessary makeup coolant. These diverse systems also feature a multiplicity of pumps. These diverse systems can be operated to quickly reduce MOV differential pressure to normal surveillance/operability test pressures. These features are inherent in the BWR design and significantly reduce the probability that an MOV could not recover from mispositioning.

For large break LOCAs in BWRs, the event rapidly evolves to the conditions described above following ADS operation. Reactor pressure rapidly decays to values significantly below design basis levels, thus rapidly reducing pressure across injection valves.

For valves not communicating with the reactor, required plant operator action times are in fractions of hours at minimum. Most non-primary containment isolation valves have plant operator action times in hours to tens of hours.

Regarding inadvertent valve closures or openings, the BWR ECCS design basis includes consideration of a single active component failure or a single operator error. The diverse and redundant BWR ECCS network design provides adequate core and containment cooling with a single active component failure/single operator error (e.g., inadvertent valve opening or closing). The system with an inadvertent valve action is not required to be restored following such operator error. Hence, inadvertent valve operation is already encompassed by the BWR design basis.

IV. BACKFIT DISCUSSION

The BWROG has two primary backfit-related concerns. The first concern involves whether the scope of the Generic Letter should be limited to a plant's approved design basis. If this were the case, there would be no need for BWROG members to consider mispositioned valve scenarios, since these scenarios are generically outside BWR design bases. Second, assuming that the NRC intended that the scope of the Generic Letter go beyond a plant's design basis, (a) was the NRC's position that licensees consider mispositioned valves identified by the NRC as a backfit and (b) was an adequate backfit analysis performed?

The BWROG's review of the NRC record regarding mispositioned valves indicates that the NRC intended that the Generic Letter recommend that licensees consider only scenarios which are within plant design bases. Thus, there should be no need for BWR licensees to consider valve mispositioning. However, it appears that the Staff has expanded the scope of the Generic Letter to beyond design basis events. To this extent, the NRC has not performed the requisite backfit analysis to support this expansion; and should

either (1) support its position with an adequate backfit analysis or (2) not take the position that licensees must analyze mispositioned valve scenarios if those scenarios require analyses not originally included in the plant's design basis.

A. Scope of the Generic Letter

The NRC states in the Generic Letter that licensee evaluations are intended to ensure that safety-related MOVs can perform under "existing, approved design basis" conditions. In fact, the NRC notes that the Generic Letter is necessary to assure that licensees meet the requirements of General Design Criteria 1, 4, 18, and 21. (See Reference 5 at 2.) Since the General Design Criteria encompasses only design basis events, it would be reasonable to conclude that any scenario outside a plant's design basis should not be considered within the scope of the Generic Letter. Supplement 1 to the Generic Letter further supports this view when it states: "This Generic Letter supplement has been prepared to assist licensees and permit holders in developing programs that will provide assurance of MOV operability under design-basis conditions." (Emphasis added.) It is unclear why the NRC has summarily rejected this position during several discussions between the BWROG and the NRC. Therefore, discussed below are the BWROG's bases for concluding that position-changeable valve reviews should not be considered within the scope of GL 89-10.

1. Evaluation Of the Scope of GL 89-10

It is not clear whether the NRC contemplated during its consideration of Bulletin 85-03 or GL 89-10 that a licensee would have to analyze scenarios involving position-changeable valves if such consideration was outside the plant's design basis. The NRC acknowledged in Supplement 1 to GL 89-10 that, after its re-evaluation of the Generic Letter, it considered the letter (in general) a backfit because the NRC had determined that MOV tests beyond those acceptable in the past are necessary to satisfy NRC regulations. See Reference 2 at 2. It is significant that the NRC did not identify as part of the backfit, licensee consideration beyond design basis evaluations involving position-changeable valves.

It is, therefore, reasonable to believe that the NRC did not expressly classify position-changeable valves as a backfit because the NRC does not expect licensees to consider position-changeable valves unless it is a part of the current NRC approved design basis. The following discussion of NRC positions presented during CRGR review supports our conclusion:

a. Review of Bulletin 85-03

The NRC first addressed the issue of position-changeable valves as part of the Committee to Review Generic Requirements (CRGR) review of Bulletin 85-03. It is noteworthy that the CRG specifically questioned (as noted in the minutes from CRGR Meeting No. 82) whether the NRC Staff was suggesting in Bulletin 85-03 that licensees consider scenarios similar to Davis-Besse (i.e., mispositioned valves) even if those scenarios were outside the design basis for a given plant. The CRGR noted that, "if the staff intended an expansion

of the existing design basis, it did not appear that adequate justification for such a generic measure had been offered in the [CRGR] review package." See Reference 6 at 3. In resolution of this CRGR concern, the minutes note that, "[a]fter discussion of these points, the staff agreed that the wording of the proposed bulletin should be modified to state explicitly that licensees/permittees should review carefully their existing, approved design bases" (Emphasis in original.)

The CRGR also addressed whether Bulletin 85-03 constituted a backfit and concluded that backfit concerns were made moot by the Staff's clarification of its intent with regard to the design basis question. As noted, the intent was that only scenarios within a plant's design basis would be considered.

b. Review of Bulletin 85-03, Supplement 1

The NRC again addressed the issue of position-changeable valves as part of its consideration of Supplement 1 to Bulletin 85-03. The minutes from CRGR Meeting No. 133 note that the BWROG believed that mispositioned valves (sometimes referred to as inadvertent valve opening or closing) were beyond the BWR plant design basis and, thus, not within the scope of the Bulletin. See Reference 7 at 1. The Meeting 133 minutes also note that the BWROG had indicated its intent to re-evaluate certain MOVs (and consider mispositioned valve positions) with the understanding that the applicability of such an analysis was limited and that it would be performing this evaluation with full disclosure that doing so was applying assumptions that went beyond the existing BWR design basis. Id.

More specifically, the minutes note that the BWROG had not committed to include the MOVs in the Bulletin 85-03 program, but was agreeing to perform a mispositioning review with the understanding that such a review was being performed only to develop data on selected valve differential pressures for inadvertent operation. Because of this agreed upon view, the CRGR did not address at this meeting the backfit implications of position-changeable valves. See Reference 7, Enclosure 4 at 1.

c. Review of Generic Letter 89-10

CRGR discussions of a draft document (that eventually became Generic Letter 89-10) were initially held during CRGR Meeting Number 148. See Reference 8. Meeting minutes note that the Generic Letter requested that "all power reactor licensees implement a program to establish, maintain, and periodically verify the design basis operability of all safety-related motor-operated valves (MOV) in their plants." This stated purpose limits licensee review of MOVs to events within the design basis. Therefore, the CRGR did not address at this meeting the backfit implications of position-changeable valves.

It is noteworthy that this same theme - limiting evaluations to design basis events - is found throughout the final version of the Generic Letter. Therefore, consideration of position-changeable valve reviews, if beyond the approved existing design basis, should not have been within the scope of the Generic Letter.

The CRGR made several comments on the proposed Generic Letter in a February 17, 1989, memorandum that outlined issues for discussion at CRGR Meeting No. 158. See Reference 9. The only CRGR comment that involved position-changeable valves related to why the Staff had referenced "all" safety-related MOVs and "all" MOVs in safety-related systems that might become mispositioned and affect system operability. The CRGR believed that this statement was redundant. Minutes from Meeting No. 158 do not provide additional discussion of the mispositioning issue.

The BWROG concludes that since the Staff did not specifically identify the mispositioned valve issue as a backfit and the CRGR did not discuss the backfit implications of the issue, the NRC did not intend that the Generic Letter expand the scope of mispositioned valve considerations to scenarios that are beyond a plant's design basis.

B. Consideration of Mispositioned Valve Scenarios as Backfit

Thus, from the language of GL 89-10 itself and the record of the NRC's review, it does not appear that the NRC intended for the Generic Letter to include events beyond a plant's design basis. However, to the extent the Staff interprets GL 89-10 to call for mispositioned valve reviews beyond the design basis, the BWROG has evaluated whether the Staff's position was identified as a backfit, and more importantly, whether the NRC has performed an adequate backfitting analysis. Such reviews constitute a backfit since they go beyond the reviews previously accepted as necessary to satisfy the NRC requirements and involve consideration of conditions beyond the approved BWR design basis.

1. Backfit Analysis/Regulatory Analysis Criteria

The Backfitting Rule (10 CFR 50.109) provides requirements that must be satisfied by the NRC before it may impose a backfit on a licensee. The NRC must perform a backfit analysis to justify the proposed backfit unless the NRC demonstrates that the backfit is necessary to (1) bring a facility into compliance with a license, Commission rules, orders, or written licensee commitments; (2) ensure that the facility provides adequate protection to the health and safety of the public and is in accord with the common defense and security; or (3) the regulatory action involves defining or redefining what level of protection to the public health and safety or common defense and security should be regarded as adequate. See 10 CFR 50.109(a)(4).

Any backfit analysis must show that the backfit provides a substantial increase in the overall protection of the public health and safety or the common defense and security, and that the direct and indirect costs of implementation of the backfit are justified in view of this increased protection. See 10 CFR 50.109(a)(3). The NRC backfit justification may be found in several forms, but usually involves (1) a value-impact analysis and (2) a backfit/regulatory analysis that places in context the value-impact results and the regulatory objective.

Whenever a NRC backfit action is proposed to improve safety at a cost that the NRC believes is justified, Staff procedures note that an NRC backfit/regulatory analysis must be prepared. The analysis should follow the general guidelines of Section IV.B(v) of the CRGR Charter. See Reference 10.

An analysis that generally addressed the above criteria was provided to the CRGR in Enclosures 4 and 5 to a September 29, 1988, memorandum from Eric S. Beckjord, Director, Office of Nuclear Regulatory Research to Edward L. Jordan, Chairman, CRGR. See Reference 11. These Enclosures never stated that the Staff believed that the Generic Letter was a backfit. While it is fortuitous that the NRC's analysis may have adequately evaluated several backfit aspects of the Generic Letter, the analysis did not identify as a backfit licensee reviews of mispositioned valve scenarios that are beyond a plant's design basis. Accordingly, the Staff's analysis provided no support for this backfit.

2. Adequacy of NUREG/CR-5140 as Support for a Backfit Regarding Mispositioned Valves

NUREG/CR-5140, "Value Impact Analysis For Extension of NRC Bulletin 85-03 To Cover All Safety-Related MOVs" (July 1988), provided an NRC-sponsored analysis of costs to licensees for the implementation of Generic Letter 89-10 "recommendations." This type of analysis should consider direct and indirect costs, and, if practicable, provide a probability risk assessment (PRA), or other quantified estimates, of the safety benefit of the proposed action. However, it does not appear that the NRC provided an adequate cost/benefit justification for a request to have licensees consider mispositioned valve scenarios that are beyond a plant's design basis. In fact, the Staff did not identify GL 89-10 as a backfit until issuance of Supplement 1. Because the Staff did not identify its position as a backfit until after the issuance of the Generic Letter, it would seem that the underlying analysis to support the Generic Letter could not have provided specific backfit justification for the position-changeable valve analysis.

More specifically, in regard to position-changeable valves, the NUREG/CR-5140 noted that "[p]assive valve mispositioning is an error of commission, and is generally not included in PRA analyses. Hence, it [is included in the NUREG] as a supplementary consideration, instead of a quantitative consideration." See Reference 12 at 4-1. The NRC's supplementary consideration of this issue only involved a brief statement in the NUREG which concluded generally that the inadvertent closure of a valve that should remain open is difficult to model since there is almost an infinite number of possibilities. The Staff also noted, regarding the mispositioned valve scenario, that "the likelihood of developing a high DP across the valve increases, and hence, the probability of failure due to improper switch settings also increases. If both of these PRA modeling related considerations were included, the value impact calculated would be even more favorable." See Reference 12 at 5-50.

While the Staff's general consideration of position-changeable valves may be acceptable for an issue that does not involve a backfit, such an approach is clearly inadequate support for a backfit-related decision. If the Staff performed a PRA analysis of position-changeable valves (which may be difficult to do) to support its current backfit position, it is not certain (as the NRC infers) that there would be a decrease in the probability of a core melt, thereby making the value-impact more favorable. Moreover, it is not certain that any decrease in core melt frequency (benefit) would not be offset by the additional cost that licensees would incur to implement the position-changeable valve scenario for all safety related systems. Also, it is not evident that every position-changeable valve scenario results in an increase in dP across the valve.

Thus, a review of the record indicates that no estimate of the safety benefit and no cost analysis was performed for the request to consider position-changeable valve scenarios that are beyond the design basis. Accordingly, for this issue, the NRC has not provided an adequate backfitting analysis under 10 CFR 50.109.

C. Previous BWROG Commitments

In a March 28, 1988 BWROG letter, the BWR Owners' Group noted that "[t]he BWROG [] intends to re-evaluate valve differential pressures on the nine (9) NRC-selected MOVs [less than the scope suggested by Bulletin 85-03, Supplement 1], considering inadvertent valve operation. The BWROG will be doing this re-evaluation with the understanding that such assessment is requiring assumptions outside the existing BWR ECCS design basis and will report its findings to the Staff." See Reference 13. The BWROG letter continues by clearly indicating that the BWROG considered mispositioned valves only as a compromise with the NRC, and did not intend its efforts to be used either as a future commitment by BWROG members or as agreement with the Supplement. See References 6, 14, 15, 16, 17, 18, 19, 20. The minutes from CRGR meeting No. 133 also reflect that the BWROG had not committed to the NRC's position regarding Bulletin 85-03, Supplement 1. See Reference 7, Enclosure 4 at 1.

Recently, however, the NRC incorrectly characterized the BWROG's March 1988 position as a commitment to consider position-changeable valve scenarios that are outside plant design bases. See Reference 4. The Reference 4 letter stated that, "As a result of discussions between the staff and the BWROG following the issuance of the supplement [to IEB 85-03], the BWROG agreed to address the mispositioning of certain [9] MOVs." As previously noted in statements by the BWROG and the NRC, the implication of this characterization (that the BWROG unilaterally agreed to expand the scope of MOV analyses to mispositioned valve scenarios) is incorrect.

Notwithstanding any conclusion reached by the NRC or the CRGR on BWROG commitments regarding Bulletin 85-03, those commitments should not be used as the NRC's basis for backfitting the position-changeable valve issue or as a basis for why a backfit analysis was not required. It is noteworthy that the NRC clearly stated that the Generic Letter supersedes the recommendations in Bulletin 85-03 and its Supplement. See Reference 5 at 7. It follows that any BWROG commitments in the context of Bulletin 85-03 should not be extended to Generic Letter 89-10.

D. Conclusion

The above discussions demonstrate that the NRC maintained a consistent position regarding the scope of IEB 85-03 and the intended scope of the Generic Letter in that licensees were not requested to consider position-changeable valve scenarios that were beyond a plant's design basis. To the extent the NRC now requests such a beyond-design-basis review, this position constitutes a backfit, for which the NRC has not provided the requisite analysis of the costs and safety benefit.

References

1. Letter from G. J. Beck, Chairman, BWROG, to Ledyard B. Marsh, NRC Chief, Mechanical Engineering Branch, "Design Basis Assumptions for BWR Residual Heat Removal System Differential Pressure Methodology Evaluation for Generic Letter 89-10" (June, 13 1990).
2. Generic Letter No. 89-10, Supplement 1, "Results of the Public Workshops" (June 13, 1990).
3. NUREG-1154, "Loss of Main and Auxiliary Feedwater Event at the Davis-Besse Plant on June 9, 1985" (July 1985).
4. Letter from Ledyard B. Marsh, NRC Chief, Mechanical Engineering Branch, to G. J. Beck, Chairman, BWROG (November 16 1990).
5. Generic Letter No. 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance - 10 C.F.R. 50.54 (f)" (June 21, 1989).
6. Memorandum from Victor Stello, Jr., NRC Chairman, CRGR, to William J. Dircks; Minutes of CRGR Meeting Number 82 (November 12, 1985).
7. Memorandum from Edward L. Jordan, Chairman, CRGR, to Victor Stello, Jr., NRC Executive Director for Operations; Minutes of CRGR Meeting Number 133 (May 6, 1988).
8. Memorandum from Edward L. Jordan, Chairman, CRGR, to Victor Stello, Jr., NRC Executive Director for Operations; Minutes of CRGR Meeting Number 148 (November 7, 1988).
9. Memorandum from James H. Conran, Senior Program Manager, CRGR Staff; through C. J. Heltemes, Jr., Deputy Director, OAEOD, to Edward L. Jordan, Chairman, CRGR et. al.; Issue Identification for Meeting No. 158 Agenda Item (February 17, 1989).
10. Memorandum from Thomas E. Murley, Director NRR to all NRR Employees; NRR Office Letter No. 500 - "Procedures for Controlling the Development of New and Revised Generic Requirements" (July 25, 1990).
11. Memorandum from Eric S. Beckjord, Director, Office of Nuclear Regulatory Research, to Edward L. Jordan, Chairman, CRGR; "Proposal to Expand Periodic In-Situ Testing and Surveillance Requirements for Safety-Related Motor-Operated Valves (MOVs) (Generic Issue II.E.6.1, 'In-Situ Testing of Valves') (September 29, 1988).
12. NUREG/CR-5140, "Value Impact Analysis for Extension of NRC Bulletin 85-03 to Cover All Safety-Related MOVs" (July 1988).
13. Letter from R. F. Janecek, Chairman, BWROG, to J. H. Sniezek, Acting Director, NRR; "IE Bulletin 85-03, "Motor-Operated Valve Common Mode Failures During Plant Transients Due to Improper Switch Settings" (March 28, 1988).

14. Letter from Edward L. Jordan, NRC Director, Division of EP&ER, to Terrance A. Pickens, Chairman, BWROG (October 10, 1986).
15. Letter from T. A. Pickens, Chairman, BWROG, to J. M. Taylor, NRC Director, Office of Inspection and Enforcement, "BWR Owners' Group Generic Response to IE Bulletin 85-03" (September 2, 1986).
16. Letter from T. A. Pickens, Chairman, BWROG, to Edward L. Jordan, NRC Director, Division of EP&ER, "IE Bulletin 85-03: Motor-Operated Valve Common Mode Failures During Plant Transients Due to Improper Switch Settings" (January, 20 1987).
17. Letter from Edward L. Jordan, NRC Director, Division of EP&ER, to Terrance A. Pickens, Chairman, BWROG (January 30, 1987).
18. Letter from Edward L. Jordan, NRC Director, Division of EP&ER, to Terrance A. Pickens, Chairman, BWROG (March 13, 1987).
19. Letter from R. F. Janecek Chairman, BWROG, to Charles E. Rossi, NRC Director, Division of Operational Events Assessment, "IE Bulletin No. 85-03: Motor-Operated Valve Common Mode Failures During Plant Transients Due to Improper Switch Settings" (August 5 1987).
20. Letter from R. F. Janecek, Chairman, BWROG, to J. H. Sniezek, NRC Acting Director Officer of NRR, "IE Bulletin 85-03: Motor-Operated Valve Common Mode Failures During Plant Transients Due to Improper Switch Settings" (March 28, 1988).