

Docket No. 50-346
License No. NPF-3
Serial No. 1463
Enclosure
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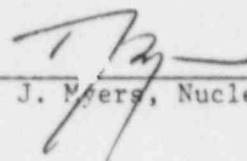
APPLICATION FOR AMENDMENT
TO
FACILITY OPERATING LICENSE NO. NPF-3
FOR
DAVIS-BESSE NUCLEAR POWER STATION
UNIT NO. 1

Attached are the requested changes to the Davis-Besse Nuclear Power Station, Unit No. 1 Facility Operating License No. NPF-3. Also included are the Safety Evaluation, Summary Significant Hazards Consideration, and the Significant Hazards Consideration.

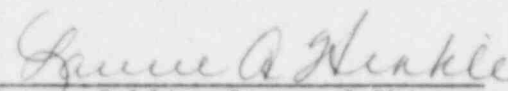
The proposed changes (submitted under cover letter Serial No. 1463) concern:

Section 3/4.3.2, Safety System Instrumentation, Safety Features Actuation System Instrumentation, Table 3.3-11, Steam and Feedwater Rupture Control System Instrumentation.

For D. C. Shelton
Vice President, Nuclear

By 
T. J. Myers, Nuclear Licensing Director

Sworn to and subscribed before me this 28th day of January, 1988.


Notary Public, State of Ohio

My Commission expires 5/15/91

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

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The following information is provided to support issuance of the requested changes to the Davis-Besse Nuclear Power Station Unit No. 1 Operating License Number NPF-3, Appendix A, Technical Specification Section 3.3.2.2, Table 3.3-11.

- A. Time required to implement: This change is to be implemented prior to the beginning of Cycle 6, which is presently scheduled for September, 1988.
- B. Reason for change (Facility Change Request No. 87-133): This change will decrease the probability of inadvertent Steam and Feedwater Rupture Control System (SFRCS) actuations by reducing the potential for hardware failures which can cause spurious trips of the SFRCS. This change is consistent with the Decay Heat Removal Task Force Final Report, Section 2.15.4.
- C. Safety Evaluation: See attached Safety Evaluation (Attachment No. 1).
- D. Summary Significant Hazards Consideration: See attached Summary Significant Hazards Consideration (Attachment No. 2).
- E. Significant Hazards Consideration: See attached Significant Hazards Consideration (Attachment No. 3).

SAFETY EVALUATION

DESCRIPTION OF PROPOSED ACTIVITY

This license amendment request is to change Technical Specification 3.3.2.2, Table 3.3-11 titled "Steam and Feedwater Rupture Control System Instrumentation" Functional Unit 1. This request proposes changing the designation of the low main steam pressure instrument channels to reflect the configuration being implemented via MOD 87-1107 which will remove eight (8) of the sixteen (16) pressure switches used to initiate the Steam and Feedwater Rupture Control System (SFRCS) on low steam generator pressure. At the present time, pressure switches PS 3687 A-H and PS 3689 A-H are in use. Following implementation of MOD 87-1107, pressure switches PS 3687 A, C, E and G and PS 3689 B, D, F and H will be in use. The total number of channels, channels to trip, minimum channels operable, and required action will be unchanged. The intent of decreasing the number of pressure switches is to reduce the possibility of spurious actuations of SFRCS. The desirability of reducing the number of pressure switches was identified by the Decay Heat Removal Task Force which was formed following the Davis-Besse incident of June 9, 1985.

The Technical Specification change consists of the deletion of eight of the sixteen pressure switches listed under low main steam pressure instrument channels in Table 3.3-11. The pressure switches to be removed are identified in Attachment A.

SYSTEMS AFFECTED

The proposed change affects the Steam and Feedwater Rupture Control System (SFRCS) and the Auxiliary Feedwater System (AFWS).

DOCUMENTS AFFECTED

1. Technical Specification 3.3.2.2, Table 3.3-11.

SAFETY FUNCTION OF SYSTEMS AFFECTED

The safety function of the SFRCS is to isolate the unaffected steam generator from either a main steam line break or main feedwater line break, to automatically start the AFWS in the event of a main steam line or main feedwater line break, to automatically start the AFWS on low steam generator level or the loss of all four RCPs, and to prevent steam generator overfill and subsequent spill over into the main steam lines.

The purpose of the low main steam pressure switches is to provide a means of detecting a rupture in the main steam or main feedwater piping. When the SFRCS is actuated in response to a low main steam pressure signal, the main turbine is tripped, main steam and main feedwater for both steam generators are isolated, auxiliary feedwater for the affected steam generator is isolated, and auxiliary feedwater is aligned to feed the unaffected steam generator via both auxiliary feedwater pumps with both auxiliary feedwater pump turbines receiving steam from the unaffected steam generator.

The safety function of the AFWS is to provide feedwater to the steam generators for the removal of reactor decay heat in the absence of main feedwater and to promote natural circulation of the reactor coolant system in the event of a loss of all four reactor coolant pumps.

EFFECTS ON SAFETY

The SFRCS consists of two identical redundant and independent actuation channels. Each actuation channel consists of two complimentary logic channels; logic channels 1 and 3 form actuation channel 1 and logic channels 2 and 4 form actuation channel 2. Attachment A illustrates the relationship among the pressure switches, logic channels and actuation channels.

Currently, two pressure switches per steam line provide input to each logic channel. Actuation of any of these pressure switches will trip the logic channel. When both complimentary logic channels trip, the actuation channel trips and SFRCS is actuated. Following implementation of the reduction in pressure switches, there will be one pressure switch per steam line providing input to each logic channel. When both complimentary logic channels trip, the actuation channel will still trip and tripping one actuation channel will still initiate SFRCS.

The proposed change to Technical Specification 3.3.2.2, Table 3.3-11 retains the requirements for total number of channels, number of channels to trip, minimum channels operable, and required action for the low main steam pressure instrument channels. Also, Technical Specification 4.3.2.2.1, Table 4.3-11 will continue to require a channel calibration at least once per 18 months, a channel functional test at least once per 31 days, and a channel check at least once per 12 hours.

As previously discussed, a signal from any of the pressure switches results in tripping its logic channel. If the complimentary logic channels is also tripped, such as during maintenance, SFRCS would be actuated, resulting in a main turbine trip and loss of the associated steam generator as a heat sink. Thus, a spurious signal from a pressure switch can result in a significant transient. It is therefore desirable to minimize the number of pressure switches while maintaining a sufficient number to meet the single failure criterion as specified in IEEE-279-1971.

At present there are redundant pressure switches for each steam line at each logic channel. Following reduction in the number of pressure switches, there will be one pressure switch for each steam line at each logic channel, but since there are redundant actuation channels, the single failure criterion is still met.

Following reduction in the number of pressure switches, the number of pressure switches will be consistent with the number of sensors for initiation of SFRCS on low steam generator level and feedwater reverse ΔP in that each function will have one sensor per steam generator per logic channel. These logic channels and the actuation channels are common to all inputs.

UNREVIEWED SAFETY QUESTION EVALUATION

The proposed action would not increase the probability of occurrence of an accident previously evaluated in the USAR because reducing the number of sensors has no effect on initiation of an accident. This probability is actually reduced because the probability of a spurious loss of main feedwater is reduced (10CFR50.59(a)(2)(i)).

The proposed action would not increase the consequence of an accident previously evaluated in the USAR because a sufficient number of pressure switches would be retained to ensure detection of low steam generator pressure with adequate redundancy. The single failure criterion would still be met. This probability is actually reduced because the probability of a spurious loss of main feedwater is reduced (10CFR50.59(a)(2)(i)).

The proposed action would not increase the probability of occurrence of a malfunction of equipment important to safety previously evaluated in the USAR because reducing the number of sensors has no effect on initiation of a malfunction (10CFR50.59(a)(2)(i)).

The proposed action would not increase the consequences of a malfunction of equipment important to safety previously evaluated in the USAR because the requirements for total number of channels, number of channels to trip, minimum channels operable, and required action, as well as all testing requirements, would remain unchanged. Also, a sufficient number of pressure switches would be retained to ensure detection of low steam generator pressure with adequate redundancy so that the single failure criterion would still be met (10CFR50.59(a)(2)(i)).

The proposed action would not create a possibility for an accident of a different type than any evaluated previously in the USAR because reducing the number of sensors has no effect on initiation of an accident (10CFR50.59(a)(2)(ii)).

The proposed action would not create a possibility for a malfunction of equipment of a different type than any evaluated previously in the USAR because reducing the number of sensors has no effect on initiation of a malfunction (10CFR50.59(a)(2)(ii)).

The proposed action would not reduce the margin of safety as defined in the basis for the Technical Specification because the system would continue to meet the single failure requirements of IEEE-279-1971 (10CFR50.59(a)(2)(iii)).

CONCLUSION

Based on the above, it is concluded that the proposed Technical Specification change does not constitute an unreviewed safety question.

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Attachment A

SFRCS Low Main Steam Pressure Instrument Channels

Pressure Switches	Steam Line	Logic Channel	Actuation Channel
*3689A 3689B	1	1	1
*3689C 3689D	2		
*3689E 3689F	1	3	
*3689G 3689H	2		
3687A *3687B	2	2	2
3687C *3687D	1		
3687E *3687F	2	4	
3687G *3687H	1		

*Pressure switches being removed.

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SUMMARY SIGNIFICANT HAZARDS CONSIDERATION

Description of Amendment Request: This amendment request proposes removing references to eight (8) of sixteen (16) pressure switches used to initiate the Steam and Feedwater Rupture Control System (SFRCS) on Steam Generator low pressure, from Technical Specification Table 3.3-11. Switches PS 3687 B, D, F and H and PS 3689 A, C, E and G are to be removed from the SFRCS logic during the fifth refueling outage, and therefore, references to these switches should be deleted.

Basis for Proposed No Significant Hazards Consideration Determination: The purpose for removal of the switches is to minimize spurious actuations of the SFRCS due to inadvertent pressure switch trips. Decreasing the number of switches will decrease the probability of SFRCS actuation due to switch malfunctions.

Reducing the number of switches from 16 to 8 will allow a minimum number of switches (to satisfy the single failure criterion of IEEE 279-1971) to be in place while continuing to provide adequate redundancy. The total number of channels, channels to trip the SFRCS, the minimum number of channels required operable, and the action statements will remain unchanged.

It has been concluded that this change will not result in a significant increase in the probability or consequence of a previously evaluated accident nor will it create the possibility of a new or different kind of an accident. A significant reduction in the margin of safety is not involved. Therefore, the proposed amendment is determined not to involve a significant hazards consideration.

SIGNIFICANT HAZARDS CONSIDERATION

DESCRIPTION OF PROPOSED ACTIVITY

The purpose of this Significant Hazards Consideration is to review a proposed change to the Davis-Besse Nuclear Power Station (DBNPS), Unit No. 1 Operating License, Appendix A, Technical Specifications Section 3.3.2.2, Table 3.3-11, to ensure that no significant hazards consideration exists. This change proposes reducing the number of switches referenced as main steam low pressure instrument channels. This change must be completed in order for the Technical Specifications to be consistent with the configuration modification being implemented during the fifth refueling outage, when eight (8) of the sixteen (16) pressure switches used to initiate the Steam and Feedwater Rupture Control System (SFRCS) on low steam generator pressure will be removed.

At the present time, pressure switches PS 3687 A-H and PS 3689 A-H are in use for SFRCS actuation. Following implementation of the new configuration, pressure switches PS 3687 A, C, E and G and PS 3689 B, D, F and H will be in use, the others having been removed. The total number of channels, channels to trip the SFRCS, the minimum number of channels operable, and the action statements of the Technical Specification will remain unchanged. Decreasing the number of pressure switches will reduce the probability of spurious actuation of SFRCS. Reducing the number of pressure switches was recommended by the Decay Heat Removal Task Force which was formed following the Davis-Besse incident of June 9, 1985.

The Technical Specification change consists of the deletion of eight of the sixteen pressure switches listed under low main steam pressure instrument channels in Table 3.3-11.

SYSTEMS AFFECTED

The proposed change affects the Steam and Feedwater Rupture Control System (SFRCS) and the Auxiliary Feedwater System (AFWS).

REFERENCES

1. Davis-Besse Nuclear Power Station, Unit No. 1 Operating License, Appendix A, Technical Specifications Section 3.3.2.2, Table 3.3-11
2. Davis-Besse Nuclear Power Station, Unit No. 1 Updated Safety Analysis Report (USAR), July, 1987
3. Institute of Electrical and Electronics Engineers (IEEE) Standard 279-1971, Criteria for Protection Systems for Nuclear Power Generating Stations

SAFETY FUNCTION OF SYSTEMS AFFECTED

The safety function of the SFRCS is to isolate the unaffected steam generator from either a main steam line break or main feedwater line break, to automatically start the AFWS in the event of a main steam line or main feedwater line break, to automatically start the AFWS on low steam generator level or the loss of the reactor coolant pumps (RCPs), and to prevent steam generator overfill and subsequent spill over into the main steam lines.

The purpose of the main steam low pressure switches is to provide a means of detecting a rupture in the main steam or main feedwater piping. When the SFRCS is actuated in response to a low main steam pressure signal, the main turbine is tripped, main steam and main feedwater for both steam generators are isolated, auxiliary feedwater for the affected steam generator is isolated, and auxiliary feedwater is aligned to feed the unaffected steam generator via both auxiliary feedwater pumps with both auxiliary feedwater pump turbines receiving steam from the unaffected steam generator.

The safety function of the AFWS is to provide feedwater to the steam generators for the removal of reactor decay heat in the absence of main feedwater and to promote natural circulation of the reactor coolant system in the event of a loss of the RCPs.

EFFECTS ON SAFETY

The SFRCS consists of two identical redundant and independent actuation channels. Each actuation channel consists of two complimentary logic channels; logic channels 1 and 3 form actuation channel 1 and logic channels 2 and 4 form actuation channel 2.

Currently, two pressure switches per steam line provide input to each logic channel. Actuation of any of these pressure switches will trip the logic channel. When both complimentary logic channels trip, the actuation channel trips and SFRCS is actuated. Following implementation of the reduction in pressure switches, in accordance with current logic there will be one pressure switch per steam line providing input to each logic channel. When both complimentary logic channels trip, the actuation channel will still trip and tripping one actuation channel will still initiate SFRCS.

The proposed change to Technical Specification 3.3.2.2, Table 3.3-11 retains the Technical Specification requirements for total number of channels, number of channels to trip the SFRCS, minimum number of channels operable, and action statements for the low main steam pressure instrument channels. Technical Specification 4.3.2.2.7, Table 4.3-11 will continue to require a channel calibration at least once per 18 months, a channel functional test at least once per 31 days, and a channel check at least once per 12 hours.

As previously discussed, a signal from any of the pressure switches results in tripping its logic channel. If the complimentary logic channel is also tripped, such as during maintenance, SFRCS would be actuated, resulting in a main turbine trip and loss of the associated steam generator as a heat sink. Thus, a spurious signal from a pressure switch can result in a significant transient. It is therefore desirable to minimize the number of pressure switches, and thereby the probability of spurious switch actuation while maintaining a sufficient number to meet the single failure criterion as specified in IEEE 279-1971.

At present there are redundant pressure switches for each steam line at each logic channel. Following reduction in the number of pressure switches, there will be one pressure switch for each steam line at each logic channel, but since there are redundant actuation channels, the single failure criterion is still met.

Following reduction in the number of pressure switches, the number of pressure switches will be consistent with the number of sensors for initiation of SFRCS on low steam generator level and feedwater reverse ΔP in that each function will have one sensor per steam generator per logic channel. These logic channel and the actuation channel designations are common to all SFRCS inputs.

SIGNIFICANT HAZARDS CONSIDERATION

The proposed change does not involve a significant hazards consideration because the operation of the DBNPS, Unit No. 1, in accordance with these changes would:

Not involve a significant increase in the probability or consequence of an accident previously evaluated in the USAR, because a sufficient number of pressure switches would be retained to ensure detection of low steam generator pressure with adequate redundancy. The single failure criterion would still be met. The probability of an accident is reduced because the probability of a spurious loss of main feedwater (due to spurious SFRCS actuation) is reduced (10CFR50.92(c)(1)).

Not create the possibility of a new or different kind of accident from any accident previously evaluated, because reducing the number of sensors has no effect on initiation of an accident (10CFR50.92(c)(2)).

Not involve a significant reduction in a margin of safety because the system would continue to meet the single failure requirements of IEEE 279-1971 (10CFR50.92(c)(3)).

CONCLUSION

Based on the above, it is concluded that the proposed Technical Specification change does not involve a significant hazards consideration.