

Docket No. 50-346
License No. NPF-3
Serial No. 1459
Enclosure


APPLICATION FOR AMENDMENT
TO
FACILITY OPERATING LICENSE NO. NPF-3
FOR
DAVIS-BESSE NUCLEAR POWER STATION
UNIT NO. 1

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

The proposed changes (submitted under cover letter Serial No. 1459) concern:

Technical Specification 3.9.1.

By:


D. C. Shelton, Vice President, Nuclear

Sworn and subscribed before me this 4th day of January, 1988.


Notary Public, State of Ohio

My commission expires 5/15/91

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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 No. NPF-3, Appendix A, Technical Specifications.

- A. Time Required to Implement: This change will be implemented immediately.
- B. Reason for Change (DCR No. 87-0013): Clarify the boron concentration requirements, in Technical Specification 3.9.1, for refueling conditions. Specifically, this revision clarifies that the boration requirements are not applicable when the reactor vessel is completely defueled.
- C. Safety Evaluation: See attached Safety Evaluation (Attachment No. 1).
- D. Significant Hazards Consideration: See attached Significant Hazards Consideration (Attachment No. 2).

SAFETY EVALUATION

DESCRIPTION

The purpose of this safety evaluation is to review proposed changes to the Davis-Besse Nuclear Power Station, Unit No. 1 Operating License, Appendix A, Technical Specifications. The changes are being made to clarify the statement in Technical Specification Limiting Condition for Operation (LCO) 3.9.1, which sets the requirements for boron concentration in all filled portions of the Reactor Coolant System (RCS) and the refueling canal during refueling operations.

The proposed changes to the Technical Specifications are:

1. Delete the asterisked footnote to the Applicability Statement of LCO 3.9.1, that reads: "The reactor shall be maintained in MODE 6 when the reactor vessel head is unbolted or removed." This footnote is being removed because it is an incomplete, unnecessary and misleading re-statement of the definition of Mode 6 in Technical Specification Table 1.1, Operational Modes.
2. Delete the parenthetical phrase "With the reactor vessel head unbolted or removed," at the beginning of LCO 3.9.1. This phrase is being removed because it is an incomplete, unnecessary and inappropriate re-statement of the Applicability Statement of LCO 3.9.1.

DISCUSSION

Technical Specification Limiting Condition for Operation 3.9.1 requires that in Mode 6 (refueling), the boron concentration of the water in the reactor vessel and of all the water volumes that connect directly with the reactor vessel meet the more restrictive of the following two reactivity conditions:

- K_{eff} is 0.95 or less.
- Boron concentration is greater than or equal to 1800 ppm.

This requirement guarantees an adequate shutdown margin during Mode 6 operations. It also makes a return to criticality accident in Mode 6 not credible, i.e., fuel cannot reach criticality as a consequence of fuel assembly or control rod assembly mishandling, or of a makeup system malfunction accident (reference Davis-Besse Updated Safety Analysis Report).

LCO 3.9.1 only applies when the plant is in Mode 6, refueling. According to Technical Specification Table 1.1, Operational Modes, the following conditions must all be satisfied to be in Mode 6:

- (1) $K_{eff} < 0.95$
- (2) $\frac{\text{Rated thermal power}}{\text{}} (\%) = 0$
- (3) Average coolant temperature $< 140^{\circ}\text{F}$
- (4) Reactor vessel head unbolted or removed
- (5) Fuel in the vessel

Therefore, when the vessel head is unbolted or removed and fuel has been removed from the core, the vessel is no longer in Mode 6 and LCO 3.9.1 does not apply.

The asterisked footnote to the LCO applicability statement states: "The reactor shall be maintained in MODE 6 when the reactor vessel head is unbolted or removed". To avoid confusion, this footnote should be deleted. This footnote is an incomplete and an unnecessary re-statement of the definition of Mode 6 in Technical Specification Table 1.1. Since it does not mention the provision of the Mode 6 definition, that there be fuel in the reactor, it could lead to the erroneous conclusion that boration of the RCS is required even when the reactor vessel is defueled.

To avoid confusion, the parenthetical phrase "With the reactor vessel head unbolted or removed," which appears at the beginning of LCO 3.9.1, should also be removed. Given the applicability statement for LCO 3.9.1, and the definition of Mode 6 in Technical Specification Table 1.1, this phrase is also incomplete and inappropriate since it could be misinterpreted to assert applicability of LCO 3.9.1 when the reactor vessel is defueled.

The phrase and footnote in question are therefore not needed and potentially confusing. They can be removed without changing the intended applicability of LCO 3.9.1.

SYSTEM AND COMPONENTS AFFECTED

Reactor Coolant System/Reactor Vessel.
Refueling Mechanism/Refueling Canal.

DOCUMENTS AFFECTED

Davis-Besse Nuclear Power Station, Unit No. 1 Operating License, Appendix A Technical Specifications

SAFETY FUNCTION OF SYSTEMS AND COMPONENTS AFFECTED

Normally the RCS provides the mechanical piping, pressure boundary, and motive force to circulate reactor coolant through the reactor core for the purpose of cooling the core. The reactor vessel is an integral part of the pressure boundary of the RCS. During refueling, the RCS is vented because the reactor vessel head is removed. The RCS and reactor vessel then provide a watertight boundary for the borated water that ensures control of fuel reactivity, protection from radiation, and removal of decay heat.

The Refueling Mechanism provides a path and the necessary equipment to remove spent fuel and control components from the reactor core and add new and previously used fuel and control components during refueling operations. The refueling canal is a watertight connection between the opened reactor vessel and the fuel transfer tubes that allows the movement of spent and new fuel assemblies and control components underwater, for protection from radiation, control of fuel reactivity and removal of decay heat.

EFFECTS ON SAFETY

The proposed changes to the Davis-Besse Technical Specification Limiting Condition for Operation 3.9.1, clarify this LCO by eliminating one phrase and a footnote that are unnecessary and potentially misleading from the text of the LCO. Elimination of the phrase and the footnote does not change in any way the requirements and applicability of LCO 3.9.1; boron concentration requirements will continue to be observed, when required to prevent criticality. However with no fuel in the reactor vessel, there is no concern for criticality and therefore boron requirements are not applicable. In conclusion, the proposed changes have no effect on the safety functions of any plant equipment and system.

UNREVIEWED SAFETY QUESTION EVALUATION

The proposed changes to Davis-Besse Technical Specification Limiting Condition for Operation 3.9.1:

Do not increase the probability of an accident previously evaluated in the Updated Safety Analysis Report (USAR) because they have no effect on any system or equipment (10CFR50.59(a)(2)(i)).

Do not increase the consequences of an accident previously evaluated in the USAR because they do not change any assumptions made in previous accident analyses. An adequate shutdown margin will always be available when required (10CFR50.59(a)(2)(i)).

Do not increase the probability of a malfunction of equipment important to safety previously evaluated in the USAR because they do not affect any equipment (10CFR50.59(a)(2)(i)).

Do not increase the consequences of a malfunction of equipment important to safety previously evaluated in the USAR because they do not affect the safety function of any equipment, and an adequate shutdown margin will always be available when required (10CFR50.59(a)(2)(i)).

Do not create the possibility of an accident of a different type than any evaluated previously in the USAR because they have no effect on any system, equipment or procedure. The requirements for ensuring an adequate shutdown margin when needed remain unchanged; when the reactor vessel is defueled there is no concern for criticality and the requirements are not needed (10CFR50.59(a)(2)(ii)).

Do not create the possibility of a malfunction of equipment of a different type than any evaluated previously in the USAR because no equipment functions are affected in any way (10CFR50.59(a)(2)(ii)).

Do not reduce any margin of safety as defined in the basis for any Technical Specification because they do not modify in any way the basis for reactivity control and adequate shutdown margin during refueling operations (10CFR50.59(a)(2)(iii)).

In conclusion, no unreviewed safety question exists.

SIGNIFICANT HAZARDS CONSIDERATION

DESCRIPTION

The purpose of this License Amendment Request is to review proposed changes to the Davis-Besse Nuclear Power Station, Unit No. 1 Operating License, Appendix A, Technical Specifications. The changes are being made to clarify the statement in Technical Specification Limiting Condition for Operation (LCO) 3.9.1, which sets the requirements for boron concentration in all filled portions of the Reactor Coolant System (RCS) and the refueling canal during refueling operations.

The proposed changes to the Technical Specifications are:

1. Delete the asterisked footnote to the Applicability Statement of LCO 3.9.1, that reads: "The reactor shall be maintained in MODE 6 when the reactor vessel head is unbolted or removed." This footnote is being removed because it is an incomplete, unnecessary and misleading re-statement of the definition of Mode 6 in Technical Specification Table 1.1, Operational Modes.
2. Delete the parenthetical phrase "With the reactor vessel head unbolted or removed," at the beginning of LCO 3.9.1. This phrase is being removed because it is an incomplete, unnecessary and inappropriate re-statement of the Applicability Statement of LCO 3.9.1.

DISCUSSION

Technical Specification Limiting Condition for Operation 3.9.1 requires that in Mode 6 (refueling), the boron concentration of the water in the reactor vessel and of all the water volumes that connect directly with the reactor vessel meet the more restrictive of the following two reactivity conditions:

- K_{eff} is 0.95 or less.
- Boron concentration is greater than or equal to 1800 ppm.

This requirement guarantees an adequate shutdown margin during Mode 6 operations. It also makes a return to criticality accident in Mode 6 not credible, i.e., fuel cannot reach criticality as a consequence of fuel assembly or control rod assembly mishandling, or of a makeup system malfunction accident (reference Updated Safety Analysis Report).

LCO 3.9.1 only applies when the plant is in Mode 6, refueling. According to Technical Specification Table 1.1, Operational Modes, the following conditions must all be satisfied to be in Mode 6:

- (1) $K_{eff} \leq 0.95$
- (2) Rated thermal power (%) = 0
- (3) Average coolant temperature $\leq 140^{\circ}\text{F}$
- (4) Reactor vessel head unbolted or removed
- (5) Fuel in the vessel

Therefore, when the vessel head is unbolted or removed and fuel has been removed from the core, the vessel is no longer in Mode 6 and LCO 3.9.1 does not apply.

The asterisked footnote to the LCO applicability statement states: "The reactor shall be maintained in MODE 6 when the reactor vessel head is unbolted or removed". To avoid confusion, this footnote should be deleted. This footnote is incomplete in that it does not state fuel is in the reactor vessel and is an unnecessary re-statement of the definition of Mode 6 in Technical Specification Table 1.1. Since it does not mention the provision of the Mode 6 definition, that there be fuel in the reactor, it could lead to the erroneous conclusion that boration of the RCS is required even when the reactor vessel is defueled.

To avoid confusion, the parenthetical phrase "With the reactor vessel head unbolted or removed," which appears at the beginning of LCO 3.9.1, should also be removed. Given the applicability statement for LCO 3.9.1, and the definition of Mode 6 in Technical Specification Table 1.1, this phrase is also incomplete and inappropriate since it could be misinterpreted to assert applicability of LCO 3.9.1 when the reactor vessel is defueled.

The B&W Standard Technical Specifications, NUREG-0103, Revision 4, utilizes a footnote, however the footnote states that it applies when fuel is in the reactor vessel. This footnote is also redundant to the definition of Mode 6 in Table 1.1 of NUREG 0103, Revision 4.

The phrase and footnote in question are therefore not needed and potentially confusing. They can be removed without changing the intended applicability of LCO 3.9.1.

SYSTEM AND COMPONENTS AFFECTED

Reactor Coolant System/Reactor Vessel.
Refueling Mechanism/Refueling Canal.

SAFETY FUNCTION OF SYSTEMS AND COMPONENTS AFFECTED

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opened reactor vessel and the fuel transfer tubes that allows the movement of spent and new fuel assemblies and control components underwater, for protection from radiation, control of fuel reactivity and removal of decay heat.

EFFECTS ON SAFETY

The proposed changes to the Davis-Besse Technical Specification Limiting Condition for Operation 3.9.1, clarify this LCO by eliminating one phrase

and a footnote that are unnecessary and potentially misleading from the text of the LCO. Elimination of the phrase and the footnote does not change the requirements and intended applicability of LCO 3.9.1; boron concentration requirements will continue to be observed, when required to prevent criticality. However with no fuel in the reactor vessel, there is no concern for criticality and therefore boron requirements are not applicable. In conclusion, the proposed changes have no effect on the safety functions of any plant equipment and system.

SIGNIFICANT HAZARDS CONSIDERATION

The proposed changes do not involve a significant hazards consideration because the operation of the Davis-Besse Nuclear Power Station, Unit No. 1, in accordance with these changes would not:

Involve a significant increase in the probability or consequences of an accident previously evaluated because the proposed change does not modify the basis for reactivity control. In addition, requirements to maintain an adequate shutdown margin remain unchanged. Boron concentration requirements will still be required during refueling (Mode 6) and any time there is fuel in the vessel. The proposed change clarifies that boration requirements are not applicable when the reactor vessel is completely defueled and therefore, not a criticality concern (10CFR50.92(c)(1)).

Create the possibility of a new or different kind of accident from any accident previously evaluated because the proposed change has no effect on any system, equipment or procedures. The requirements to maintain an adequate shutdown margin remain unchanged; when defueled, there is no criticality concern and therefore boron concentration requirements are not needed (10CFR50.92(c)(2)).

Involve a significant reduction in a margin of safety because the proposed change does not modify the basis for reactivity control. In addition, requirements to maintain an adequate shutdown margin remain unchanged. Boron concentration requirements will still be required during refueling (Mode 6) and any time there is fuel in the vessel. The proposed change clarifies that boration requirements are not applicable when the reactor vessel is completely defueled and therefore, not a criticality concern. (10CFR50.92(c)(3)).

CONCLUSION

On the basis of the above, Toledo Edison has determined that the amendment request does not involve a significant hazards consideration.

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REFERENCES

1. Davis-Besse Nuclear Power Station Updated Safety Analysis Report.
2. Bechtel Drawing No. 7749-C-193, Revision 5.
3. Davis-Besse Nuclear Power Station, Plant Procedure PP 1501.01, Revision 8.
4. Davis-Besse Nuclear Power Station, Written Safety Evaluation for FCR 87-0134.
5. Davis-Besse Nuclear Power Station, Fuel Handling Manual.