February 27, 1996

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Mr. John P. Stetz
Vice President - Nuclear
Centerior Service Company
c/o Toledo Edison Company
Davis-Besse Nuclear Power Station
5501 North State Route 2
Oak Harbor, OH 43449

SUBJECT: AMENDMENT NO. 207 TO FACILITY OPERATING LICENSE NO. NPF-3 - DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1 (TAC NO. M93816)

Dear Mr. Stetz:

The Commission has issued the enclosed Amendment No. 207 to Facility Operating License No. NPF-3 for the Davis-Besse Nuclear Power Station, Unit No. 1. The amendment revises the Technical Specifications (TS) in response to your application dated September 29, 1995.

This amendment revises the following TS sections: 3/4.1.2.8, Reactivity Control Systems - Borated Water Sources - Shutdown; 3/4.1.2.9, Reactivity Control Systems - Operating; 3/4.5.1, Emergency Core Cooling Systems (ECCS) - Core Flooding Tanks; 3/4.5.2, Emergency Core Cooling Systems - ECCS Subsystems - $T_{avg} \geq 280°F$; 3/4.5.4, ECCS - Borated Water Storage Tank; 3/4.9.1, Refueling Operations - Boron Concentration; Bases 3/4.1.2, Boration Systems; Bases 3/4.5.2 and 3/4.5.3, ECCS Subsystems; and Bases 3/4.9.1 Boron Concentration. The amendment increases the minimum available borated water volume requirement for the boric acid addition system, the minimum and maximum boron concentration requirements for the borated water storage tank, the minimum boron concentration requirement for the core flood tanks; increases the minimum volume of trisodium phosphate dodecahydrate (TSP); deletes the surveillance requirements for verification of the density and solubility of TSP; and modifies the refueling boron concentration and the associated Action statement.

A copy of the Safety Evaluation is also enclosed. Notice of issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,
ORIGINAL SIGNED BY:
Linda L. Gundrum, Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosures: 1. Amendment No. 207 to License No. NPF-3
2. Safety Evaluation

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 27, 1996

Mr. John P. Stetz
Vice President - Nuclear
Centerior Service Company
c/o Toledo Edison Company
Davis-Besse Nuclear Power Station
5501 North State Route 2
Oak Harbor, OH 43449

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Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosures: 1. Amendment No. 207 to License No. NPF-3
2. Safety Evaluation

cc w/encls: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

TOLEDO EDISON COMPANY

CENTERIOR SERVICE COMPANY

AND

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

DOCKET NO. 50-346

DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 207
License No. NPF-3

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by the Toledo Edison Company, Centerior Service Company, and the Cleveland Electric Illuminating Company (the licensees) dated September 29, 1995, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-3 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 207, are hereby incorporated in the license. The Toledo Edison Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented not later than 90 days after issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Linda L. Gundrum

Linda L. Gundrum, Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of issuance: February 27, 1996

ATTACHMENT TO LICENSE AMENDMENT NO. 207

FACILITY OPERATING LICENSE NO. NPF-3

DOCKET NO. 50-346

Replace the following pages of the Appendix "A" Technical Specifications with the attached pages. The revised pages are identified by amendment number and contain vertical lines indicating the area of change.

Remove	Insert
3/4 1-14	3/4 1-14
3/4 1-16	3/4 1-16
3/4 1-17	3/4 1-17
3/4 5-1	3/4 5-1
3/4 5-5	3/4 5-5
3/4 5-7	3/4 5-7
3/4 9-1	3/4 9-1
B 3/4 1-2	B 3/4 1-2
B 3/4 1-3	B 3/4 1-3
B 3/4 5-2	B 3/4 5-2
B 3/4 5-2a	B 3/4 5-2a
B 3/4 9-1	B 3/4 9-1

REACTIVITY CONTROL SYSTEMS

BORATED WATER SOURCES - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.8 As a minimum, one of the following borated water sources shall be OPERABLE:

a. A boric acid addition system with:

1. A minimum available borated water volume of 900 gallons,

2. $\geq$ 7875 and $\leq$ 13,125 ppm of boron, and

3. A minimum solution temperature of 105°F.

b. The borated water storage tank (BWST) with:

1. A minimum available borated water volume of 3,000 gallons,

2. A minimum boron concentration of 2600 ppm, and

3. A minimum solution temperature of 35°F.

APPLICABILITY: MODES 5 and 6

ACTION:

With no borated water sources OPERABLE, suspend all operations involving CORE ALTERATION or positive reactivity changes until at least one borated water source is restored to OPERABLE status.

SURVEILLANCE REQUIREMENTS

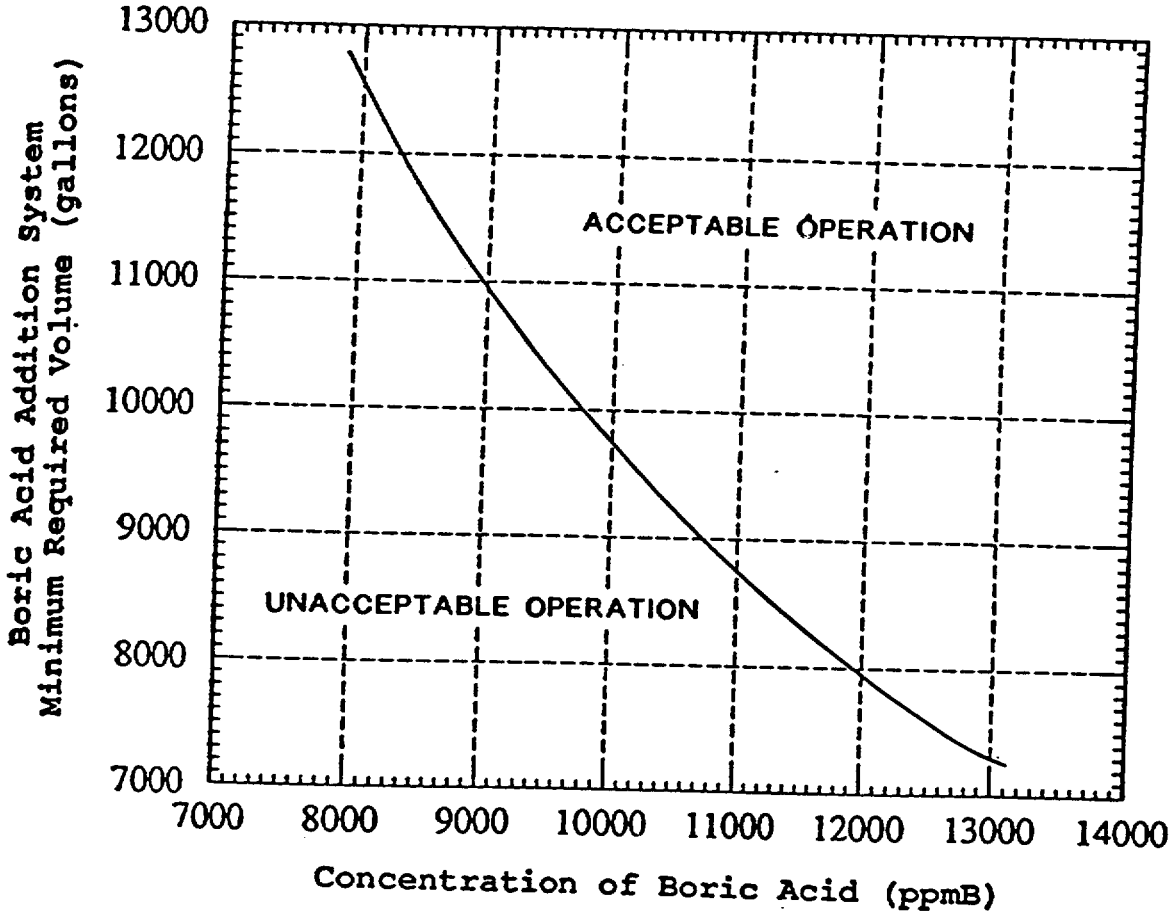
4.1.2.8 The above required borated water source shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1. Verifying the available borated water volume of the source,

2. Verifying the boron concentration of the water, and

Figure 3.1-1 Boric Acid Addition System Minimum Required Volume as a Function of Boric Acid Concentration Required in Modes 1-4



REACTIVITY CONTROL SYSTEMS

BORATED WATER SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.9 Each of the following borated water sources shall be OPERABLE:

a. The boric acid addition system (BAAS) with:

1. A minimum available borated water volume in accordance with Figure 3.1-1,

2. ≥ 7875 and ≤ 13,125 ppm of boron, and

3. A minimum solution temperature of 105°F.

b. The borated water storage tank (BWST) with:

1. An available borated water volume of between 482,778 and 550,000 gallons,

2. ≥ 2600 and ≤ 2800 ppm of boron, and

3. A minimum solution temperature of 35°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With the boric acid addition system (BAAS) inoperable, restore the BAAS to OPERABLE status within 72 hours or be in at least HOT STANDBY and borated to a SHUTDOWN MARGIN equivalent to 1% $\Delta k/k$ at 200°F within the next 6 hours; restore the BAAS to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

b. With the BWST inoperable because of boron concentration or temperature not within limits, restore the BWST to OPERABLE status within 8 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. With the BWST inoperable for reasons other than boron concentration or temperature not within limits, restore the BWST to OPERABLE status within one hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

CORE FLOODING TANKS

LIMITING CONDITION FOR OPERATION

3.5.1 Each reactor coolant system core flooding tank (CFT) shall be OPERABLE with:

a. The isolation valve open,

b. A contained borated water volume between 7555 and 8004 gallons of borated water,

c. ≥ 2600 and ≤ 3500 ppm of boron, and

d. A nitrogen cover-pressure of between 575 and 625 psig.

APPLICABILITY: MODES 1, 2 and 3*.

ACTION:

a. With one CFT inoperable because of boron concentration not within limits, restore the inoperable CFT to OPERABLE status within 72 hours or be in HOT STANDBY within the next 6 hours and reduce the RCS pressure to less than 800 psig within the following 12 hours.

b. With any CFT inoperable for reasons other than boron concentration not within limits, restore the CFT to OPERABLE status within one hour or be in HOT STANDBY within the next 6 hours and reduce the RCS pressure to less than 800 psig within the following 12 hours.

SURVEILLANCE REQUIREMENTS

4.5.1 Each core flooding tank shall be demonstrated OPERABLE:

a. At least once per 12 hours by:

1. Verifying the contained borated water volume and nitrogen cover-pressure in the tanks, and

2. Verifying that each tank isolation valve is open.

*With Reactor Coolant pressure > 800 psig.

SURVEILLANCE REQUIREMENTS (Continued)

4. Verifying that a minimum of 290 cubic feet of trisodium phosphate dodecahydrate (TSP) is contained within the TSP storage baskets.

5. Deleted

6. Deleted

e. At least once per 18 months, during shutdown, by

1. Verifying that each automatic valve in the flow path actuates to its correct position on a safety injection test signal.

2. Verifying that each HPI and LPI pump starts automatically upon receipt of a SFAS test signal.

f. By performing a vacuum leakage rate test of the watertight enclosure for valves DH-11 and DH-12 that assures the motor operators on valves DH-11 and DH-12 will not be flooded for at least 7 days following a LOCA:

1. At least once per 18 months.

2. After each opening of the watertight enclosure.

3. After any maintenance on or modification to the watertight enclosure which could affect its integrity.

g. By verifying the correct position of each mechanical position stop for valves DH-14A and DH-14B.

1. Within 4 hours following completion of the opening of the valves to their mechanical position stop or following completion of maintenance on the valve when the LPI system is required to be OPERABLE.

2. At least once per 18 months.

EMERGENCY CORE COOLING SYSTEMS

BORATED WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.5.4 The borated water storage tank (BWST) shall be OPERABLE with:

a. An available borated water volume of between 482,778 and 550,000 gallons,

b. $\geq$ 2600 and $\leq$ 2800 ppm of boron, and

c. A minimum water temperature of 35°F.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

a. With the BWST inoperable because of boron concentration or temperature not within limits, restore the BWST to OPERABLE status within 8 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With the BWST inoperable for reasons other than boron concentration or temperature not within limits, restore the BWST to OPERABLE status within one hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.5.4 The BWST shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1. Verifying the available borated water volume in the tank,

2. Verifying the boron concentration of the water.

b. At least once per 24 hours by verifying the water temperature when outside air temperature <35°F.

3/4.9 REFUELING OPERATIONS

BORON CONCENTRATION

LIMITING CONDITION FOR OPERATION

3.9.1 The boron concentration of all filled portions of the Reactor Coolant System and the refueling canal shall be maintained uniform and sufficient to ensure a K_{eff} of 0.95 or less, which includes a 1% $\Delta k/k$ conservative allowance for uncertainties.

APPLICABILITY: **MODE 6.**

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes and initiate and continue boration of $\geq$ 12 gpm of 7875 ppm boric acid solution or its equivalent until K_{eff} is reduced to $\leq$ 0.95. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.1.1 The above condition shall be determined prior to:

a. Removing or unbolting the reactor vessel head, and

b. Withdrawal of any safety or regulating rod in excess of 3 feet from its fully inserted position within the reactor pressure vessel.

4.9.1.2 The boron concentration of the reactor pressure vessel and the refueling canal shall be determined by chemical analysis at least once each 72 hours.

3/4.1.1.4 MINIMUM TEMPERATURE FOR CRITICALITY

This specification ensures that the reactor will not be made critical with the reactor coolant system average temperature less than 525°F. This limitation is required to ensure (1) the moderator temperature coefficient is within its analyzed temperature range, (2) the protective instrumentation is within its normal operating range, (3) the pressurizer is capable of being in an OPERABLE status with a steam bubble, and (4) the reactor pressure vessel is above its minimum RT_{NDT} temperature.

3/4.1.2. BORATION SYSTEMS

The boron injection system ensures that negative reactivity control is available during each mode of facility operation. The components required to perform this function include (1) borated water sources, (2) makeup or DHR pumps, (3) separate flow paths, (4) boric acid pumps, (5) associated heat tracing systems, and (6) an emergency power supply from operable emergency busses.

With the RCS average temperature above 200°F, a minimum of two separate and redundant boron injection systems are provided to ensure single functional capability in the event an assumed failure renders one of the systems inoperable. Allowable out-of-service periods ensure that minor component repair or corrective action may be completed without undue risk to overall facility safety from injection system failures during the repair period. With either the borated water storage tank (BWST) boron concentration or BWST borated water temperature not within limits, the condition must be corrected in eight hours. The eight hour limit to restore the temperature or boron concentration to within limits was developed considering the time required to change boron concentration or temperature and assuming that the contents of the BWST are still available for injection.

The boration capability of either system is sufficient to provide a SHUTDOWN MARGIN from all operating conditions of 1.0% $\Delta k/k$ after xenon decay and cooldown to 200°F. The maximum boration capability requirement occurs from full power equilibrium xenon conditions and requires the equivalent of either 12,200 gallons of 7875 ppm borated water from the boric acid addition system (BAAS) or 86,700 gallons of 2600 ppm borated water from the BWST. The minimum value for the BAAS of 12,200 gallons at a concentration of 7875 ppm boron is a lower value than that shown in TS Figure 3.1-1 because the Bases value is the minimum required actual value, whereas TS Figure 3.1-1 shows the minimum indicated value, which was conservatively increased to account for instrument and chemical analysis tolerances.

3/4.1.2 BORATION SYSTEMS (Continued)

The requirement for a minimum available volume of 482,778 gallons of borated water in the BWST ensures the capability for borating the RCS to the desired level. The specified quantity of borated water is consistent with the ECCS requirements of Specification 3.5.4; therefore, the larger volume of borated water is specified.

With the RCS temperature below 200°F, one injection system is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the additional restrictions prohibiting CORE ALTERATIONS and positive reactivity changes in the event the single injection system becomes inoperable.

The boron capability required below 200°F is sufficient to provide a SHUTDOWN MARGIN of 1% $\Delta k/k$ after xenon decay and cooldown from 200°F to 70°F. This condition requires either 900 gallons of 7875 ppm borated water from the BAAS or 3,000 gallons of 2600 ppm borated water from the BWST.

The bottom 4 inches of the BWST are not available, and the instrumentation is calibrated to reflect the available volume. All of the boric acid addition tank volume is available. The limits on water volume, and boron concentration ensure a pH value of between 7.0 and 11.0 of the solution recirculated within containment after a design basis accident. The pH band minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion cracking on mechanical systems and components.

The OPERABILITY of one boron injection system during REFUELING ensures that this system is available for reactivity control while in MODE 6.

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

The specifications of this section (1) ensure that acceptable power distribution limits are maintained, (2) ensure that the minimum SHUTDOWN MARGIN is maintained, and (3) limit the potential effects of a rod ejection accident. OPERABILITY of the control rod position indicators is required to determine control rod positions and thereby ensure compliance with the control rod alignment and insertion limits.

The ACTION statements which permit limited variations from the basic requirements are accompanied by additional restrictions which ensure that the original criteria are met. For example, misalignment of a safety or regulating rod requires a restriction in THERMAL POWER. The reactivity worth of a misaligned rod is limited for the remainder of the fuel cycle to prevent exceeding the assumptions used in the safety analysis.

The position of a rod declared inoperable due to misalignment should not be included in computing the average group position for determining the OPERABILITY of rods with lesser misalignments.

With the RCS temperature below 280°F, one OPERABLE ECCS subsystem is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the limited core cooling requirements.

The Surveillance Requirements provided to ensure OPERABILITY of each component ensures that, at a minimum, the assumptions used in the safety analyses are met and that subsystem OPERABILITY is maintained.

The function of the trisodium phosphate dodecahydrate (TSP) contained in baskets located in the containment normal sump or on the 565' elevation of containment adjacent to the normal sump, is to neutralize the acidity of the post-LOCA borated water mixture during containment emergency sump recirculation. The borated water storage tank (BWST) borated water has a nominal pH value of approximately 5. Raising the borated water mixture to a pH value of 7 will ensure that chloride stress corrosion does not occur in austenitic stainless steels in the event that chloride levels increase as a result of contamination on the surfaces of the reactor containment building. Also, a pH of 7 is assumed for the containment emergency sump for iodine retention and removal post-LOCA by the containment spray system.

The Surveillance Requirement (SR) associated with TSP ensures that the minimum required volume of TSP is stored in the baskets. The minimum required volume of TSP is the volume that will achieve a post-LOCA borated water mixture pH of ≥ 7.0, conservatively considering the maximum possible sump water volume and the maximum possible boron concentration. The amount of TSP required is based on the mass of TSP needed to achieve the required pH. However, a required volume is verified by the SR, rather than the mass, since it is not feasible to weigh the entire amount of TSP in containment. The minimum required volume is based on the manufactured density of TSP (53 lb/ft^3). Since TSP can have a tendency to agglomerate from high humidity in the containment, the density may increase and the volume decrease during normal plant operation, however, solubility characteristics are not expected to change. Therefore, considering possible agglomeration and increase in density, verifying the minimum volume of TSP in containment is conservative with respect to ensuring the capability to achieve the minimum required pH. The minimum required volume of TSP to meet all analytical requirements is 250 ft^3. The surveillance requirement of 290 ft^3 includes 40 ft^3 of spare TSP as margin. Total basket capacity is 325 ft^3.

Surveillance requirements for throttle valve position stops and flow balance testing provide assurance that proper ECCS flows will be maintained in the event of a LOCA. Maintenance of proper flow resistance and pressure drop in the piping system to each injection point is necessary to: (1) prevent total pump flow from exceeding runout conditions when the system is in its minimum resistance configuration, (2) provide the proper flow split between injection points in accordance with the assumptions used in the ECCS-LOCA analyses, and (3) provide an acceptable level of total ECCS flow to all injection points equal to or above that assumed in the ECCS-LOCA analyses.

BASES (Continued)

Containment Emergency Sump Recirculation Valves DH-9A and DH-9B are de-energized during MODES 1, 2, 3 and 4 to preclude postulated inadvertent opening of the valves in the event of a Control Room fire, which could result in draining the Borated Water Storage Tank to the Containment Emergency Sump and the loss of this water source for normal plant shutdown. Re-energization of DH-9A and DH-9B is permitted on an intermittent basis during MODES 1, 2, 3 and 4 under administrative controls. Station procedures identify the precautions which must be taken when re-energizing these valves under such controls.

Borated Water Storage Tank (BWST) outlet isolation valves DH-7A and DH-7B are de-energized during MODES 1, 2, 3, and 4 to preclude postulated inadvertent closure of the valves in the event of a fire, which could result in a loss of the availability of the BWST. Re-energization of valves DH-7A and DH-7B is permitted on an intermittent basis during MODES 1, 2, 3, and 4 under administrative controls. Station procedures identify the precautions which must be taken when re-energizing these valves under such controls.

3/4.5.4 BORATED WATER STORAGE TANK

The OPERABILITY of the borated water storage tank (BWST) as part of the ECCS ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. The limits on the BWST minimum volume and boron concentration ensure that:

1) sufficient water is available within containment to permit recirculation cooling flow to the core following manual switchover to the recirculation mode, and

2) The reactor will remain at least 1% $\Delta k/k$ subcritical in the cold condition at 70°F, xenon free, while only crediting 50% of the control rods' worth following mixing of the BWST and the RCS water volumes.

These assumptions ensure that the reactor remains subcritical in the cold condition following mixing of the BWST and the RCS water volumes.

With either the BWST boron concentration or BWST borated water temperature not within limits, the condition must be corrected in eight hours. The eight hour limit to restore the temperature or boron concentration to within limits was developed considering the time required to change boron concentration or temperature and assuming that the contents of the BWST are still available for injection.

The bottom 4 inches of the BWST are not available, and the instrumentation is calibrated to reflect the available volume. The limits on water volume, and boron concentration ensure a pH value of between 7.0 and 11.0 of the solution sprayed within the containment after a design basis accident. The pH band minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion cracking on mechanical systems and components.

3/4.9.1 BORON CONCENTRATION

The limitation on reactivity during REFUELING ensures that: 1) the reactor will remain subcritical during CORE ALTERATIONS, and 2) a uniform boron concentration is maintained for reactivity control in the water volumes having direct access to the reactor vessel. This limitation is consistent with the initial conditions assumed for the boron dilution incident in the accident analysis.

The ACTION statement's minimum boration flow rate of 12 gpm is less than the minimum boration flow rate of 25 gpm specified in TS 3/4.1.1.1, Reactivity Control - Shutdown Margin because the lower flow rate is based on only borating the reactor vessel.

3/4.9.2 INSTRUMENTATION

The OPERABILITY of source range neutron flux monitors ensures that redundant monitoring capability is available to detect changes in the reactivity condition of the core.

3/4.9.3 DECAY TIME

The minimum requirement for reactor subcriticality prior to movement of irradiated fuel assemblies in the reactor pressure vessel ensures that sufficient time has elapsed to allow the radioactive decay of the short lived fission products. This decay time is consistent with the assumptions used in the safety analyses.

3/4.9.4 CONTAINMENT PENETRATIONS

During CORE ALTERATIONS or movement of irradiated fuel within the containment, release of fission product radioactivity to the environment as a result of a fuel element rupture must be minimized. During MODES 1, 2, 3, and 4, this is accomplished by maintaining CONTAINMENT INTEGRITY as described in LCO 3.6.1.1. In other situations, the potential for containment pressurization as a result of an accident is not present, and therefore less stringent requirements are needed to isolate the containment from the atmosphere outside containment. Both containment personnel air lock doors may be open during CORE ALTERATIONS or during movement of irradiated fuel within the containment provided the conditions specified in LCO 3.9.4.b are met. The individual designated to be continuously available to close the air lock door must be stationed at the auxiliary building side of the air lock. A containment personnel air lock door is considered capable of being closed if the door is unblocked and there are no cables or hoses being run through the air lock. The LCO 3.9.10 requirement to maintain a minimum of 23 feet of water over the top of irradiated fuel assemblies seated within the reactor pressure vessel during movement of fuel assemblies within the reactor pressure vessel while in MODE 6 ensures that sufficient water depth is available to remove 99% of the assumed iodine gap activity released from the rupture of an irradiated fuel assembly. Further, sufficient time is available to close the personnel air lock following a loss of shutdown cooling before boiling occurs.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 207 TO FACILITY OPERATING LICENSE NO. NPF-3

TOLEDO EDISON COMPANY

CENTERIOR SERVICE COMPANY

AND

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1

DOCKET NO. 50-346

1.0 INTRODUCTION

By letter dated September 29, 1995, the Toledo Edison Company, Centerior Service Company, and the Cleveland Electric Illuminating Company (the licensees), submitted a request for changes to the Davis-Besse Nuclear Power Station (DBNPS), Unit No. 1 Technical Specifications (TS). The requested amendment would revise the following TS sections: 3/4.1.2.8, Reactivity Control Systems - Borated Water Sources - Shutdown; 3/4.1.2.9, Reactivity Control Systems - Operating; 3/4.5.1, Emergency Core Cooling Systems (ECCS) - Core Flooding Tanks; 3/4.5.2, Emergency Core Cooling Systems - ECCS Subsystems - $T_{avg} \geq 280°F$; 3/4.5.4, ECCS - Borated Water Storage Tank; 3/4.9.1, Refueling Operations - Boron Concentration; Bases 3/4.1.2, Boration Systems; Bases 3/4.5.2 and 3/4.5.3, ECCS Subsystems; and Bases 3/4.9.1 Boron Concentration. The amendment increases the minimum available borated water volume requirement for the boric acid addition system, the minimum and maximum boron concentration requirements for the borated water storage tank, the minimum boron concentration requirement for the core flood tanks; increases the minimum volume of trisodium phosphate dodecahydrate (TSP); deletes the surveillance requirements for verification of the density and solubility of TSP; and modifies the refueling boron concentration and the associated Action statement.

2.0 BACKGROUND

In general, the operating cycles of nuclear power plants are being extended to 24 months by making the appropriate changes in fuel loading and consequential changes in reactivity control. Many plants have already made this change. DBNPS already has approval to use 5 weight percent enriched fuel to accommodate the longer cycle (Amendment No. 181 dated November 19, 1993). The changes that are the subject of this request relate to the compensatory adjustments that are required for additional reactivity control by increased boron concentration in selected systems and the resulting increase in the TSP

required to neutralize the acidity of the borated water mixture in the containment sump during post-LOCA recirculation.

3.0 EVALUATION

3.1 Boric Acid Addition System (BAAS)

The BAAS provides sufficient concentrated boric acid solution to increase the reactor coolant system (RCS) boron concentration from hot, full power (HFP) boron concentration to cold, shutdown (CSD) boron concentration at any time during the operating cycle. The borated water storage tank (BWST) provides an alternate capability to the BAAS. To maintain this capability with the more reactive core for achieving a 24-month operating cycle, the proposed TS changes are as follows:

TS 3/4.1.2.8, Reactivity Control Systems - Borated Water Sources - Shutdown

It is proposed to increase the minimum BAAS volume Limiting Condition for Operation (LCO) from 700 gallons to 900 gallons and increase the minimum BWST boron concentration LCO from 2100 ppm to 2600 ppm.

An administrative change to the BAAS boron concentration requirement of "Between 7875 and 13,125 ppm" to $\geq$ 7875 and $\leq$ 13,125 ppm", is also proposed.

TS 3/4.1.2.9, Reactivity Control Systems - Borated Water Sources - Operating:

It is proposed to revise Figure 3.1.1, "Boric Acid Addition System Minimum Required volume as a Function of Boric Acid Concentration Required in Modes 1-4," in order to increase the minimum required volume.

It is proposed to increase the minimum and maximum BWST boron concentrations from 2100 ppm and 2200 ppm to 2600 ppm and 2800 ppm, respectively.

It is also proposed to make administrative changes to the BAAS boron concentration requirement of "Between 7875 and 13,125 ppm" to $\geq$ 7875 and $\leq$ 13,125 ppm" and to the BWST requirement of "Between 2100 and 2200 ppm" to "$\geq$ 2600 and $\leq$ 2800 ppm," using the proposed revised values.

Bases 3/4.1.2, Boration Systems:

For the maximum boration requirements from HFP to 200°F, it is proposed to increase the minimum volume requirement for the BAAS from 9,071 gallons at a minimum boric acid concentration of 7875 ppm to 12,200 gallons, and to increase the minimum volume requirement for the BWST from 75,300 gallons at a minimum boron concentration of 2100 ppm to 86,700 gallons at a minimum boron concentration of 2600 ppm. It is also proposed to add a statement explaining why the volume requirement of 12,200 gallons is a lower value than that shown in TS Figure 3.1-1.

For the boration requirements below 200°F, it is proposed to increase the

For the boration requirements below 200°F, it is proposed to increase the minimum volume requirement for the BAAS from 700 gallons to 900 gallons, and to increase the minimum BWST boron concentration from 2100 ppm to 2600 ppm.

The reload report for Cycle 11 will include the necessary reanalyses for inadvertent boron dilution as well as for any adjustment to lithium control to maintain the RCS pH. The proposed changes ensure an adequate concentration of boron is available in the BAAS to maintain a 1%"k/k shutdown margin. Based on the above considerations, the staff finds these changes appropriate and acceptable.

3.2 Core Flooding Tanks (CFTs)

The CFTs provide the immediate reflood of the reactor following a design basis large break LOCA to ensure that the fuel cladding peak temperature will remain below the 10 CFR 50.46 criteria of 2200°F prior to the refill of the reactor by the ECCS high pressure injection and low pressure injection systems.

The licensee proposes the following changes to TS 3/4.5.1, Emergency Core Cooling Systems (ECCS) - Core Flooding Tanks":

The CFTs minimum boron concentration is proposed to be increased from 2100 ppm to 2600 ppm for consistency with the BWST minimum boron concentration. This minimum boron concentration is used in the analysis for post-LOCA shutdown margin (SDM) analysis.

An administrative change to the CFT boron concentration requirement of "Between 2100 and 3500 ppm" to "$\geq$ 2600 and $\leq$ 3500 ppm", using the revised value, is also proposed.

Since these proposed changes ensure the minimum boron concentration is consistent with the assumptions used for core flooding tank injection in the Updated Safety Analysis Report, the staff finds them acceptable.

3.3 Trisodium Phosphate (TSP) Baskets

The safety function of the TSP contained in baskets in containment is to neutralize the acidity of the post-LOCA borated water mixture during containment emergency sump recirculation. The BWST water has a nominal pH value of approximately 5. Raising the borated water mixture to a pH value of 7 will ensure that chloride stress corrosion does not occur in austenitic stainless steel in the event that chloride levels increase as a result of contamination on surfaces inside containment. Also, a pH of 7 is assumed for the containment emergency sump for iodine retention and removal post-LOCA by the containment spray system. The surveillance testing ensures that there is adequate TSP to perform the required pH adjustment. The following changes are

proposed for TS 3/4.5.2, ECCS - ECCS Subsystems - $T_{avg} \geq 280°F$, and the associated Bases 3/4.5.2 and 3/4.5.3, ECCS Subsystems:

> Surveillance Requirement (SR) 4.5.2.d.4, which presently requires verification of a minimum TSP volume of 72 cubic feet, is proposed to be changed to require verification of a minimum volume of 290 cubic feet.
>
> SR 4.5.2.d.5, which presently requires verification of TSP density, is proposed to be deleted.
>
> SR 4.5.2.d.6, which presently requires verification of TSP solubility, is proposed to be deleted.

The proposed change to SR 4.5.2.d.4 to increase the amount of TSP from 72 cubic feet to 290 cubic feet ensures the capability to buffer the post-LOCA sump mixture to a minimum pH of 7, assuming the maximum volume and maximum boron concentrations for the BWST, CFTs, and the RCS. To accommodate the additional required volume of TSP, new TSP baskets will be installed on the 565-foot elevation of containment during the upcoming tenth refueling outage (10 RFO). The new TSP baskets will have at least a 250 cubic foot capacity. The present baskets, which have a capacity of 75 cubic feet, will be retained. This provides a total capacity of 325 cubic feet.

The licensee proposes to delete SR 4.5.2.d.5 which requires verification of TSP density. The required amount of TSP is based on the mass of TSP required to achieve the desired pH. The required minimum volume verified by SR 4.5.2.d.4 is based on the manufactured density of TSP (53 pounds/cubic foot). Since TSP can have a tendency to agglomerate from high humidity in the containment, the density may increase and the volume decrease during normal plant operation, however, the required mass of TSP would remain available. Therefore, verifying the minimum volume of TSP in containment is conservative with respect to achieving a minimum required pH, and neither density nor solubility verification is required.

SR 4.5.2.d.6 is proposed for deletion since it does not serve a meaningful purpose. TSP is chemically stable and its neutralization capabilities will not change. Based on operating experience, TSP remains sufficiently soluble even if it is caked or hardened.

Deletion of SR 4.5.2.d.5 and SR 4.5.2.d.6 will remove the need to perform the associated surveillance tests. This will reduce the radiation dose incurred in collecting and analyzing the samples needed to perform the tests, and will eliminate a source of radwaste.

The staff has independently calculated the amount of TSP needed to neutralize the boric acid in the increased concentrations proposed by the TS changes. The licensee computed a value of 250 cubic feet. The required minimum volume specified in SR 4.5.2.d.4 of 290 cubic feet maintains an adequate margin and compares favorably with the staff's result of 263 cubic feet. The effects of the sump water mixture on component integrity and environmental qualification of safety-related components has been adequately considered. The effects of a

seismic event on the additional TSP baskets has been evaluated to ensure that there is no impact to safety-related systems and/or components in the vicinity. Based on the above, the proposed change to SR 4.5.2.d.4, the deletion of SR 4.5.2.d.5, and the deletion of SR 4.5.2.d.6 are acceptable.

3.4 Borated Water Storage Tank (BWST)

The safety function of the BWST is to provide a sufficient supply of borated water to the ECCS to ensure adequate inventory to maintain the reactor with a 1% $\Delta k/k$ shutdown margin in the event of a LOCA and to ensure adequate inventory for containment sump recirculation.

The proposed change to TS 3/4.5.4, ECCS - Borated Water Storage Tank, will increase the current minimum of 2100 ppm and maximum of 2200 ppm boron to 2600 ppm and 2800 ppm, respectively. The minimum boron concentration is based on the required concentration to ensure a 1% $\Delta k/k$ shutdown margin post-LOCA. The maximum boron concentration was determined based on a post-LOCA boron precipitation analysis. Additionally, an administrative change is proposed to change the wording from "Between 2100 and 2200 ppm" to "$\geq$ 2600 and $\leq$ 2800 ppm", using the proposed revised values.

Based on the fact that the volume of water available in the BWST is unchanged and the concentration of boron is increased to ensure a 1% $\Delta k/k$ shutdown margin is maintained, and the safety function of the BWST is maintained, the staff finds these changes are acceptable.

3.5 Refueling Boron Concentration

The limitations on reactivity conditions during refueling ensure that the reactor will remain subcritical during core alterations, and that a uniform boron concentration is maintained for reactivity control in the water having direct access to the reactor vessel. The licensee proposes the following changes to TS 3/4.9.1, Refueling Operations - Boron Concentration, and Bases 3/4.9.1, Boron Concentration:

> Delete LCO 3.9.1.b requirement of a minimum refueling boron concentration requirement of 1800 ppm, and make the associated changes to the Action statement and the Bases.
>
> Change the Action statement for the boration requirement from "$\geq$ 10 gpm of 8750 ppm" to "$\geq$ 12 gpm of 7875 ppm," and to add a paragraph to the Bases explaining the reason the boration flow rate requirement differs from that specified in TS 3/4.1.1.1, Reactivity Control - Shutdown Margin.

These changes will eliminate an LCO which is no longer meaningful, and make the boration rate consistent with the minimum BAAS boron concentration requirement of TS 3/4.1.2.8 and TS 3/4.1.2.9.

The proposed changes to TS 3/4.9.1 to delete the minimum boron concentration requirement of LCO 3.9.1.b, and to modify the Action statement and the Bases

accordingly, are acceptable. The minimum refueling boron concentration requirement of 1800 ppm was applicable for cycle lengths of approximately 12 months, and maintained keff $\leq$ 0.95 as assumed in the accident analysis. However, as cycle length has increased, the 1800 ppm requirement is no longer limiting, and therefore is no longer meaningful. The LCO 3.9.1.a requirement to maintain keff $\leq$ 0.95 is alone sufficient to ensure that the accident analysis assumptions are satisfied. Prior to each entry into Mode 6, the concentration of boron necessary to achieve a keff of $\leq$ 0.95 will be calculated and disseminated to Operations by memorandum. Therefore, removal of LCO 3.9.1.b and related changes to the Action statement and the Bases do not adversely affect plant safety.

Changing the TS 3/4.9.1 Action statement boration requirement from " $\geq$ 10 gpm of 8750 ppm" of boric acid solution, to "$\geq$ 12 gpm of 7875 ppm" of boric acid solution maintains an equivalent boration rate while providing consistency with the TS 3/4.1.2.8 and 3/4.1.2.9 LCO and Bases with respect to the minimum BAAS boron concentration. The addition of an explanation to the Bases discussing the reason the boration flow rate requirement differs from the boration flow rate requirement of "$\geq$ 25 gpm of 7875 ppm boron" specified in TS 3/4.1.1.1 is an administrative change. Therefore, these changes do not adversely affect plant safety.

The existing minimum boration rates associated with TS 3/4.1.1.1, Reactivity Control Systems - Boration Control - Shutdown Margin, TS 3/4.9.1, Refueling Operations - Boron Concentration, and TS 3/4.10.4, Special Test Exceptions - Shutdown Margin, were reviewed and verified to remain bounding for the proposed changes. Therefore, the staff finds these proposed changes acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Ohio State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

This amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or changes a surveillance requirement. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluent that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding (60 FR 56371). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

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