

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

SHINGTON, D.C. 2000-0001

March 28, 1994

Docket No. 50-346

Mr. Donald C. Shelton Senior Vice President, Nuclear - Davis-Besse Centerior Service Company c/o Toledo Edison Company Davis-Besse Nuclear Power Station 5501 North State Route 2 Oak Harbor, Ohio 43449

Dear Mr. Shelton:

SUBJECT: AMENDMENT NO. 185 TO FACILITY OPERATING LICENSE NO. NPF-3 (TAC NO. M84986)

The Commission has issued Amendment No. 185 to Facility Operating License No. NPF-3 for the Davis-Besse Nuclear Power Station, Unit No. 1. The amendment revises the Technical Specifications in response to your application dated November 13, 1992, as supplemented on July 15 and November 10, 1993.

This amendment revises TS 3/4.3.1, "Reactor Protection System (RPS) Instrumentation," and 3/4.3.2.3, "Anticipatory Reactor Trip System (ARTS) Instrumentation," to:

- 1. Increase the channel functional test surveillance test interval for most RPS and ARTS instrument channels.
- 2. Allow plant operation to continue indefinitely with one RPS instrument channel placed in bypass.
- 3. Add an action statement to permit continued operation for 48 hours with two RPS channels inoperable.
- 4. Remove channel functional test surveillance requirements for source and intermediate range neutron flux instrumentation.
- 5. Decrease the channel calibration surveillance test interval for the "High Flux/Number of Reactor Coolant Pumps On" trip from once every eighteen months to quarterly.
- 6. Correct a typographical error in the numbering of page 3/4 3-30c.

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

### Sincerely,

Original signed by Garmon West

Garmon West, Asst. Project Manager Project Directorate III-3 Division of Reactor Projects III/IV/V Office of Nuclear Reactor Regulation

Enclosures:

- 1. Amendment No. 185 to License No. NPF-3
- 2. Safety Evaluation

cc w/enclosures: See next page

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### **\*SEE PREVIOUS CONCURRENCE**

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Mr. Donald C. Shelton Toledo Edison Company

cc:

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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. 185 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 November 13, 1992, as supplemented on July 15 and November 10, 1993, 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.
- 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:

9404060024 940328 PDR ADDCK 05000346 PDR PDR (a) <u>Technical Specifications</u>

The Technical Specifications contained in Appendix A, as revised through Amendment No.  $_{185}$ , 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

Formon West, fr.

Garmon West, Asst. Project Manager Project Directorate III-3 Division of Reactor Projects III/IV/V Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of issuance: March 28, 1994

### ATTACHMENT TO LICENSE AMENDMENT NO. 185

## 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. The corresponding overleaf pages are also provided to maintain document completeness.

> <u>Insert</u> Remove 3/4 3-2 3/4 3-2 3/4 3-3 3/4 3-3 3/4 3-4 3/4 3-5a 3/4 3-4 3/4 3-5a 3/4 3-7 3/4 3-7 3/4 3-8 3/4 3-8 3/4 30c 3/4 3-30c 3/4 3-30d 3/4 3-30d

# 3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR PROTECTION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1.1 As a minimum, the Reactor Protection System instrumentation channels and bypasses of Table 3.3-1 shall be OPERABLE with RESPONSE TIMES as shown in Table 3.3-2.

APPLICABILITY: As shown in Table 3.3-1.

ACTION:

As shown in Table 3.3-1.

SURVEILLANCE REQUIREMENTS

4.3.1.1.1 Each Reactor Protection System instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations during the MODES and at the frequencies shown in Table 4.3-1.

**4.3.1.1.2** The total bypass function shall be demonstrated OPERABLE at least once per 18 months during CHANNEL CALIBRATION testing of each channel affected by bypass operation.

4.3.1.1.3 The REACTOR PROTECTION SYSTEM RESPONSE TIME of each reactor trip function shall be demonstrated to be within its limit at least once per 18 months. Each test shall include at least one channel per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific reactor trip function as shown in the "Total No. of Channels" column of Table 3.3-1.

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# <u>TABLE 3.3-1</u>

# REACTOR PROTECTION SYSTEM INSTRUMENTATION

	FUNC	TIONAL UNIT	TOTAL NO. <u>OF CHANNELS</u>	CHANNELS TO TRIP	MINIMUM CHANNELS <u>OPERABLE</u>	APPLICABLE MODES	<u>ACTION</u>
	1.	Manual Reactor Trip	2	1	2	1, 2 and *	1
	2.	High Flux	4	2	3	1, 2	2#, 10
	3.	RC High Temperature	4	2	3	1, 2	3#, 10
	4.	Flux – ∆Flux – Flow	4	2(a)(b)	3	1, 2	2#, 10
	5.	RC Low Pressure	4	2(a)	3	1, 2	3#, 10
6. 7.	6.	RC High Pressure	4	2	3	1, 2	3#, 10
	7.	RC Pressure-Temperature	4	2(a)	3	1, 2	3#, 10
	8.	High Flux/Number of Reactor Coolant Pumps On	4	2(a)(b)	3	1, 2	3#, 10
	9.	Containment High Pressure	4	2	3	1, 2	3#, 10
	10.	Intermediate Range, Neutron Flux and Rate	2	N/A	2(c)	1, 2 and *	4
	11.	Source Range, Neutron Flux and Rat <b>e</b> A. Startup B. Shutdown	2 2	N/A N/A	2 1	2## and * 3, 4 and 5	5 6
	12.	Control Rod Drive Trip Breakers	2 per trip system	l per trip system	2 per trip system	1, 2 and *	7#, 8#
	13.	Reactor Trip Module	2 per trip system	l per trip system	2 per trip system	1, 2 and *	7#
	14.	Shutdown Bypass High Pressure	4	2	3	2**, 3** 4**, 5**	6#
	15.	SCR Relays	2	2	2	1, 2 and *	9#

### TABLE NOTATION

\*With the control rod drive trip breakers in the closed position and the control rod drive system capable of rod withdrawal.

\*\*When Shutdown Bypass is actuated.

#The provisions of Specification 3.0.4 are not applicable.

**##High voltage to detector** may be de-energized above 10<sup>-10</sup> amps on both Intermediate Range channels.

- (a) Trip may be manually bypassed when RCS pressure  $\leq$  1820 psig by actuating Shutdown Bypass provided that:
  - (1) The High Flux Trip Setpoint is  $\leq$  5% of RATED THERMAL POWER,
  - (2) The Shutdown Bypass High Pressure Trip Setpoint of  $\leq$  1820 psig is imposed, and
  - (3) The Shutdown Bypass is removed when RCS pressure > 1820 psig.
- (b) Trip may be manually bypassed when Specification 3.10.3 is in effect.
- (c) The minimum channels OPERABLE requirement may be reduced to one when Specification 3.10.1 or 3.10.2 is in effect.

#### ACTION STATEMENTS

- ACTION 1 With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and/or open the control rod drive trip breakers.
- ACTION 2 With the number of OPERABLE channels one less than the Total Number of Channels STARTUP and/or POWER OPERATION may proceed provided both of the following conditions are satisfied:
  - a. The inoperable channel is placed in the bypassed or tripped condition within one hour.
  - b. Either, THERMAL POWER is restricted to  $\leq$  75% of RATED THERMAL POWER and the High Flux Trip Setpoint is reduced to  $\leq$  85% of RATED THERMAL POWER within 4 hours or the QUADRANT POWER TILT is monitored at least once per 12 hours.

### TABLE 3.3-1 (Continued)

### ACTION STATEMENTS (Continued)

- ACTION 3 With the number of OPERABLE channels one less than the Total Number of Channels STARTUP and POWER OPERATION may proceed provided the inoperable channel is placed in the bypassed or tripped condition within one hour.
- ACTION 4 With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement and with the THERMAL POWER level:
  - a.  $\leq$  5% of RATED THERMAL POWER restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above 5% of RATED THERMAL POWER.
  - b. > 5% of RATED THERMAL POWER, POWER OPERATION may continue.

#### TABLE 3.3-1 (Continued)

#### ACTION STATEMENTS (Continued)

- ACTION 5 With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement and with the THERMAL POWER level:
  - a.  $\leq 10^{-10}$  amps on the Intermediate Range (IR) instrumentation, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above  $10^{-10}$  amps on the IR instrumentation.
  - b. >  $10^{-10}$  amps on the IR instrumentation, operation may continue.
- ACTION 6 With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, verify compliance with the SHUTDOWN MARGIN requirements of Specification 3.1.1.1 within one hour and at least once per 12 hours thereafter.
- ACTION 7 With the number of OPERABLE channels one less than the Total Number of Channels STARTUP and/or POWER OPERATION may proceed provided all of the following conditions are satisfied:
  - a. Within 1 hour:
    - 1. Place the inoperable channel in the tripped condition, or
    - 2. Remove power supplied to the control rod trip device associated with the inoperative channel.
  - b. One additional channel may be bypassed for up to 2 hours for surveillance testing per Specification 4.3.1.1.1, and the inoperable channel above may be bypassed for up to 30 minutes in any 24 hour period when necessary to test the trip breaker associated with the logic of the channel being tested per Specification 4.3.1.1.1. The inoperable channel above may not be bypassed to test the logic of a channel of the trip system associated with the inoperable channel.

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# TABLE 3.3-1 (Continued)

### ACTION STATEMENTS (Continued)

- ACTION 8 With one of the Reactor Trip Breaker diverse trip features (undervoltage or shunt trip devices) inoperable, restore it to OPERABLE status in 48 hours or place the breaker in trip in the next hour.
- ACTION 9 With one or both channels of SCR Relays inoperable, restore the channels to OPERABLE status during the next COLD SHUTDOWN exceeding 24 hours.
- ACTION 10 With the number of channels OPERABLE one less than the Minimum Channels OPERABLE requirement, within one hour, place one inoperable channel in trip and the second inoperable channel in bypass, and restore one of the inoperable channels to OPERABLE status within 48 hours or be in HOT STANDBY within the next 6 hours and open the reactor trip breakers.

# <u>TABLE 4.3-1</u>

# REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

DAV		REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS					
'IS-BESS	<u>Func</u>	TIONAL UNIT	CHANNEL CHECK	CHANNEL <u>CALIBRATION</u>	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED	
E, U	1.	Manual Reactor Trip	N.A.	N.A.	S/U(1)	N.A.	
TIN	2.	High Flux	S	D(2), and Q(6,9)	N.A.	1, 2	
	3.	RC High Temperature	S	R	SA(9)	1, 2	
	4.	Flux - $\Delta$ Flux - Flow	S(4)	M(3) and Q(6,7,9)	N.A.	1, 2	
	5.	RC Low Pressure	S	R	SA(9)	1, 2	
ω	6.	RC High Pressure	S	R	SA(9)	1, 2	
/4 3	7.	RC Pressure-Temperature	S	R	SA(9)	1, 2	
-7 Amendment N 185	8.	High Flux/Number of Reactor Coolant Pumps On	S	Q(6,9)	N.A.	1, 2	
	9.	Containment High Pressure	S	R	SA(9)	1, 2	
	10.	Intermediate Range, Neutron Flux and Rate	S	R(6)	N.A.(5)	1, 2 and *	
	11.	Source Range, Neutron Flux and Rate	S	R(6)	N.A.(5)	2, 3, 4 and 5	
	12.	Control Rod Drive Trip Breakers	N.A.	N.A.	M(8,9) and S/U(1)(8)	1, 2 and *	
o X, 1	13.	Reactor Trip Module Logic	N.A.	N.A.	M(9)	1, 2 and *	
59, <b>4</b> 2	14.	Shutdown Bypass High Pressure	S	R	SA(9)	2**, 3**, 4**, 5**	
3,708	15.	SCR Relays	N.A.	N.A.	R	1, 2 and *	
5,735,							

### **Notation**

- (1) If not performed in previous 7 days.
- (2) Heat balance only, above 15% of RATED THERMAL POWER.
- (3) When THERMAL POWER [TP] is above 50% of RATED THERMAL POWER [RTP], and at steady state, compare out-of-core measured AXIAL POWER IMBALANCE [API] to incore measured AXIAL POWER IMBALANCE [API] as follows:

 $\frac{\text{RTP}}{\text{TP}} [\text{API}_{o} - \text{API}_{I}] = \text{Offset Error}$ 

Recalibrate if the absolute value of the Offset Error is  $\geq 2.5\%$ 

- (4) AXIAL POWER IMBALANCE and loop flow indications only.
- (5) CHANNEL FUNCTIONAL TEST is not applicable. Verify at least one decade overlap prior to each reactor startup if not verified in previous 7 days.
- (6) Neutron detectors may be excluded from CHANNEL CALIBRATION.
- (7) Flow rate measurement sensors may be excluded from CHANNEL CALIBRATION. However, each flow measurement sensor shall be calibrated at least once per 18 months.
- (8) The CHANNEL FUNCTIONAL TEST shall independently verify the OPERABILITY of both the undervoltage and shunt trip devices of the Reactor Trip Breakers.
- (9) Performed on a STAGGERED TEST BASIS.
  - \* With any control rod drive trip breaker closed.
- **\*\*** When Shutdown Bypass is actuated.

# TABLE 3.3-17 (Continued)

# ACTION STATEMENTS

ACTION	18	-	With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirements, restore the inoperable channel to OPERABLE status within 72 hours or reduce reactor power to less than 45 percent of RATED THERMAL POWER within the next 6 hours.
ACTION	19	-	With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirements, restore the inoperable channel to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours.
ACTION	20	-	With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided both of the following conditions are satisfied:
			a) The control rod drive trip breaker associated with the inoperable channel is placed in the tripped condition within one hour.

b) The Minimum Channels OPERABLE requirement is met; however, one additional control rod drive trip breaker associated with another channel may be tripped for up to 2 hours for surveillance testing per Specification 4.3.2.3, after reclosing the control rod drive trip breaker opened in a) above.

# TABLE 4.3-17

# ANTICIPATORY REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHANNEL <u>T CHECK CALIBRATION</u>		CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE IS REQUIRED	
1. Turbi <b>ne</b> Trip <sup>(a)</sup>	S	Not Applicable	SA <sup>(c)</sup>	1 (p)	
2. Main Feed Pump Turbine Trip	S	Not Applicable	SA <sup>(c)</sup>	1	
3. Output Logic	Not Applicable	Not Applicable	M	1	

Trip automatically bypassed below 45 percent of RATED THERMAL POWER Applicable only above 45 percent of RATED THERMAL POWER Perform on a STAGGERED TEST BASIS (a) (b)

(c)

DAVIS-BESSE, UNIT 1



UNITED STATES NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

# SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 185 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 application for amendment dated November 13, 1992, as supplemented on July 15 and November 10, 1993, along with a safety evaluation, Centerior Energy, the licensee for Davis-Besse Nuclear Power Station (DBNPS), Unit 1, requested NRC's approval to implement proposed modifications to operating license NPF-3, incorporating changes to technical specifications (TS) allowing longer surveillance test intervals (STIs) and allowable out-of-service times (AOTs) for the reactor protection system (RPS) and anticipatory reactor trip system (ARTS) instrumentation. The supplemental letter dated November 10, 1993, responded to the NRC staff's request for additional information relative to the TS changes and did not alter the proposed action or affect the determination published in the Federal Register. Most of the proposed changes would implement the NRC-approved Babcock and Wilcox (B&W) Topical Report, BAW-10167, "Justification for Increasing the Reactor Trip System On-Line Test Intervals," and supplements, for DBNPS TS, and remaining changes are in accordance with the Restructured B&W TS. The proposed changes would revise TS 3/4.3.1, "Reactor Protection System Instrumentation," and 3/4.3.2.3, "Anticipatory Reactor Trip System Instrumentation," to:

- 1. Increase the channel functional test surveillance test interval for most RPS and ARTS instrument channels.
- 2. Allow plant operation to continue indefinitely with one RPS instrument channel placed in bypass.
- 3. Add an action statement to permit continued operation for 48 hours with two RPS channels inoperable.

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- 4. Remove channel functional test surveillance requirements for source and intermediate range neutron flux instrumentation.
- 5. Decrease the channel calibration surveillance test interval for the "High Flux/Number of Reactor Coolant Pumps On" trip from once every eighteen months to quarterly.
- 6. Correct a typographical error in the numbering of page 3/4 3-30c.

The first five above proposed TS modifications would minimize the potential number of spurious channel trips (except for Number 2) causing reactor trips during surveillance testing, increase operational effectiveness of plant personnel, and allow resources to be used for other tasks such as preventive maintenance. In addition, the increased AOTs should result in fewer human errors since more time would be allowed to perform test, maintenance and repair actions. However, the modification to include an indefinite bypass for the RPS instrument channel will decrease the availability and as a result, the reliability of the trip system.

The July 15 and November 10, 1993, letters provided supplemental information that did not change the initial proposed no significant hazards consideration determination.

#### 2.0 EVALUATION

The B&W Owner's Group (BWOG) as part of their response to the TS improvement program (TSIP) submitted Topical Report BAW-10167, "Justification for Increasing the Reactor Trip System On-line Test Intervals" to justify increasing the Surveillance Testing Intervals (STI) from the current one month interval to a six month (with a staggered test schedule) interval. In addition, the current allowable out-of-service time (AOT) limits for each instrument channel would be modified as discussed in the evaluation and conclusion of this report. These modifications apply only to the RPS and ARTS instrument strings which are defined as including all components downstream of the process sensors to and including the bistable. The BWOG analyses did not include manual reactor trip actions nor did they include the diverse trip system installed in response to 10 CFR 50.62 (ATWS Rule). The staff reviewed BAW-10167 and supplements including the BWOG's responses to the staff's questions on these submittals. After the staff completed its review, the NRC issued two safety evaluation reports (SERs): STI-SER dated December 5, 1988, for justification for increasing on-line test intervals for the reactor trip system (RTS) instrumentation channels, and an AOT-SER dated July 8, 1992, for justification for indefinite AOT for RTS instrumentation channels.

### 2.1 Pre-Approved TS Revisions and Associated Conditions

The above SERs approved TS changes relating to extending STIs, test/maintenance AOTs, and bypass time for RTS instrument channels. In the

SERs, the NRC staff approved extensions to STIs/AOTs as well as to the time during which the instrument channels could be bypassed. However, the staff stipulated certain conditions that licensees must meet to include these preapproved changes in the plant-specific TS. The pre-approved changes and associated conditions are addressed below.

- 2.1.1 <u>Pre-Approved TS Revisions</u>
- 2.1.1.1 SER issued on December 5, 1988 (STI-SER). In this SER, the staff approved the following TS changes relating to STI for RTS instruments.
  - (1) Extending the STI for RPS instrument strings from 1 month to 6 months on a staggered test schedule is acceptable because it conforms to the BWOG TS improvement proposal accepted by the staff.
  - (2) The current STIs for the reactor trip modules (RTM) and for reactor trip breakers (RTB) at monthly intervals on a staggered test schedule are acceptable because they conform to the BWOG TS improvement proposal accepted by the staff.
  - (3) The current 1 hour AOT could be extended up to 48 hours because the staff agreed with BWOG's statement that a 1 hour AOT is too short a time interval to perform repairs. Accordingly, removing the current 1 hour AOT for an inoperable channel from the current TS is acceptable to the staff because it conforms to the BWOG TS improvement proposal accepted by the staff.

<u>NOTE</u>: BAW-10167 requested that the staff grant an indefinite AOT for one inoperable channel for Functional Units with a total of four channels. In this condition, a 2 out of 4 trip-logic configuration would be altered to a 2 out of 3. The 2 out of 3 configuration was not the original design basis and was not analyzed during the licensing process for the plant. The staff concluded that 48 hours was sufficient to make repairs. Therefore, based on the B&W risk analysis, IEEE 279 considerations and on previous staff analyses for B&W plants, the staff approved 48 hours AOT for an inoperable channel.

2.1.1.2 SER issued on July 8, 1992 (AOT-SER). In this SER, the staff approved placing one RTS channel in bypassed state for an indefinite period for repairs.

### 2.1.2 <u>Associated Conditions for Approval</u>

- (1) Since effects of drift in both sensors and the instrument strings were not considered sufficiently in the BAW-10167 analysis and its supplements, the licensee is required to confirm that they have reviewed drift information including as-found and as-left values for each instrument channel involved, and have determined that drift occurring in that channel over the period of the extended STI will not cause the setpoint to exceed the allowable value as calculated for that channel by the plant's setpoint methodology, and would not allow the process value to exceed the safety limit used in the safety analysis and specified in the Technical Specifications.
- (2) The licensee shall maintain on site records of the as-found and as-left values showing actual calculations and supporting data that are available for planned future staff audits. The on site records shall consist of monthly information taken over an extended period of time (approximately 2-3 years) and the plant specific setpoint methodology used to derive the safety margins.
- (3) The licensee must confirm that the B&W RTS instrumentation was originally reviewed and accepted as a four channel system with the capability of an indefinite bypass of one channel.

### 2.2 Proposed Changes and Evaluation

AOT becomes an issue when the inoperable channel cannot be repaired while at power. When an RPS channel is bypassed, all functions in the channel are prevented from providing a trip signal. However, the monitoring functions of the channel are not removed from service, but the trip logic is altered from a 2 out of 4 to a 2 out of 3. If the inoperable channel was placed in the tripped mode, the trip logic would be altered to a 1 out of 3 logic. The BWOG evaluation indicated that the 2 out of 3 configuration provides acceptable reliability to trip on demand as well as protection against spurious trips. The 1 out of 3 configuration is intolerant of a single spurious trip. In addition, testing the 1 out of 3 configuration in the tripped mode requires more human actions to switch the channel from tripped to bypassed mode and back again and, therefore, increases the susceptibility of the RTS trip logic to human error and thus may contribute to a higher RTS spurious trip rate. The BWOG evaluation concluded that extended operation with an inoperable channel in bypassed was safer than the channel in the tripped mode. However, no details were provided regarding the reduced reliability of a 2 out of 3 trip system when compared to 2 out of 4 trip system.

Because the 2 out of 4 trip configuration is more reliable when compared to the 2 out of 3 configuration, the staff expects that the licensee will continue to give high priority to the expeditious repair or replacement of a bypass channel instead of routinely placing a channel in the bypass mode for an indefinite time.

As designed, the RTS instrumentation logic has a two-out-of-four general coincidence configuration whereas the reactor trip breakers operate in a one-out-of-two twice scheme. Each of the four instrument channel logics include instrument strings consisting of dedicated sensors through bistables, and a reactor trip module (RTM) which processes the binary signals received from all four instrument strings. The RTM produces a two-out-of-four coincident logic which initiates opening of its assigned reactor trip circuit breakers.

An inoperable instrument string is normally placed in bypass until the AOT expires. Until the proposed indefinite bypass, the current TS allowed AOT is 1 hour. A bypassed instrument string causes its output relays in each of 4 RTMs to remain in an untrippable mode, and therefore, until the AOT expires, the RTS trip initiation logic is reduced from a two-out-of-four configuration to a two-out-of-three configuration, resulting in a reduced redundancy. If the bypassed-inoperable channel is not restored within the AOT, the current TS requires that the inoperable channel be placed in a tripped mode with the remaining RTS channels in a one-out-of-three configuration. The above logic configuration changes do not affect the one-out-of-two twice logic of the reactor trip breakers needed for reactor trip.

The staff evaluated the licensee's proposed plant specific TS changes. If any of the proposed changes were consistent with the pre-approved change(s) they were accepted based on the pre-approved changes as described above. The staff verified that the licensee has met the applicable condition(s) which were stipulated by the NRC for the pre-approved changes.

- 2.2.1 Proposed Revisions
- 2.2.1.1 Table 4.3-1, "Reactor Protection System Instrumentation Surveillance Requirements."

(1) <u>Proposed changes</u>: For Functional Units 3 (RC High temperature), 5 (RC Low Pressure), 6 (RC High pressure), 7 (RC Pressure-Temperature), 9 (Containment High Pressure), and 14 (Shutdown Bypass High Pressure) change CHANNEL FUNCTIONAL TEST frequencies from "M" monthly to "SA(9)" semi-annually with Note 9 applying. Add Note (9) to column "CHANNEL FUNCTIONAL TEST" for Functional Units 12 (Control Rod Drive Trip Breakers) and 13 (Reactor Trip Module Logic). Add a statement for note 9 to the Table 4.3-1 to read, "Performed on a staggered test basis." <u>Evaluation</u>: The above described changes are acceptable because they conform to the BWOG TS improvement proposal accepted by the staff as described in Sections 2.1.1.1(1) and 2.1.1.1(2) of this report.

(2) <u>Proposed changes</u>: For Functional Units 2 (High Flux), 4 (Flux-Delta Flux-Flow) change CHANNEL FUNCTIONAL TEST frequency from "M" monthly to "N.A." (not applicable), and add Note (9) to quarterly CHANNEL CALIBRATION.

<u>Evaluation</u>: The channel functional test is no longer applicable because these functional units are calibrated quarterly, and by the TS definition 1.9, the channel calibration includes the channel functional test. In accordance with Note (9), these tests would be performed on a staggered test basis. The STI-SER allows the STI for RTS channels to be a maximum of up to 6 months. Quarterly calibration of these channels on a staggered basis is acceptable to the staff because it conforms to the BWOG TS improvement proposal accepted by the staff as described in Section 2.1 of this report.

2.2.1.2 Table 4.3-17, "Anticipatory Reactor Trip System Instrumentation Surveillance Requirements"

<u>Proposed changes</u>: For Functional Units 1 (Turbine Trip) and 2 (Main Feed Pump Turbine Trip) change CHANNEL FUNCTIONAL TEST frequency from "M" monthly to "SA(c)" semi-annually with Note (c) applying. Add a statement for Note (c) to the Table 4.3-17 to read, "Perform on a staggered test basis."

<u>Evaluation</u>: The above described changes are acceptable because they conform to the BWOG TS improvement proposal accepted by the staff as described in Section 2.1.1.1(1) of this report.

2.2.1.3 Table 3.3-1, "Reactor Protection System Instrumentation," ACTION 2, ACTION 3.

<u>Proposed changes</u>: ACTION 2.a is revised to require an inoperable channel to be placed in either the bypassed or tripped condition within 1 hour. ACTION 2.b would be deleted.

<u>Evaluation</u>: In case the number of OPERABLE channels are one less than the Total Number of Channels, the existing ACTION 2 allows STARTUP and/or POWER OPERATION to proceed provided all of the following conditions are satisfied:

2.a The inoperable channel is placed in the tripped condition within 1 hour.

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2.b If minimum channels OPERABLE requirement is met, one additional channel may be bypassed for up to 2 hours for surveillance testing per Specification 4.3.1.1.1.

The revised action statement for 2.a allows the inoperable channel to be placed either in a bypassed or tripped condition within 1 hour, removes 2.b completely, and action 2.c becomes 2.b. Therefore, with the proposed TS revision, operators have a choice to place the inoperable channel either in a "tripped" condition or in a "bypassed" state within 1 hour. Removal of the requirement to place an inoperable channel only in a tripped condition within 1 hour, and allowing it to be placed in a bypassed state for an indefinite period conforms to the BWOG TS improvement proposal accepted by the staff as described in Section 2.1.1.2 of this report. The staff notes that placing an RTS channel in indefinite bypass reduces the reliability of the system but does not prevent the system from performing its safety function as discussed in the staff's safety evaluation dated July 8, 1992. Further, in most cases an AOT of 48 hours would be adequate to perform repairs. Since the bypass feature is used primarily during testing and maintenance and since the two-out-of-four configuration is the best state, the staff expects that the licensee will continue to give high priority to the repair of a bypassed channel.

Removal of 2.b is acceptable to the staff because it conforms to the BWOG TS improvement proposal accepted by the staff as described in Section 2.1 of this report. Changing the serial number of action 2.c to 2.b is an editorial change, and is acceptable to the staff.

<u>Proposed changes</u>: ACTION 3.a is revised to require an inoperable channel to be placed in either the bypassed or tripped condition within 1 hour. ACTION 3.b would be deleted and 3.a becomes 3.

<u>Evaluation</u>: In case the number of OPERABLE channels are one less than the Total Number of Channels, the existing ACTION 3 allows STARTUP and POWER OPERATION to proceed provided all of the following conditions are satisfied:

- **3.a** The inoperable channel is placed in the tripped condition within 1 hour.
- 3.b If Minimum Channels OPERABLE requirement is met, one additional channel may be bypassed for up to 2 hours for surveillance testing per Specification 4.3.1.1.1

The revised action statement 3.a allows the inoperable channel to be placed either in a bypassed or in a tripped condition within 1 hour, removes 3.b completely, and combines action statements of

3.a to 3. Therefore, with the proposed TS revision, operators have a choice to place the inoperable channel either in a "tripped" condition or in a "bypassed" state within 1 hour. As stated previously, removal of a requirement to place an inoperable channel only in a tripped condition within 1 hour, and allowing it to be placed in a bypassed state for an indefinite period conforms to the BWOG TS improvement proposal as described in Section 2.1 of this report. The staff again notes that placing an RTS channel in indefinite bypass reduces the reliability of the system but does not prevent the system from performing its safety function as discussed in the staff's safety evaluation dated July 8, 1992. Further, in most cases an AOT of 48 hours would be adequate to perform repairs. Since the bypass feature is used primarily during testing and maintenance and since the two-out-of-four configuration is the best state, the staff expects that the licensee will continue to give high priority to the repair of a bypassed channel.

Removal of 3.b is acceptable to the staff because, if per 3.a the inoperable channel is bypassed, surveillance tests on an additional channel could be performed without a resulting reactor trip while in this condition. Combining action statement 3.a in 3 is an editorial change, and is acceptable to the staff.

Note: The proposed revision does not clearly specify in what conditions the inoperable channel would be placed in a "tripped" condition, or in what conditions it would be placed in the "bypassed" state. The staff notes that as long as no additional channel is being assigned for surveillance testing, the inoperable channel should be placed in a bypassed condition, so that the 2 out-of 3 trip logic configuration is maintained. This approach is consistent with that which was evaluated and approved by the staff in the STI-SER and AOT-SER as discussed below. If an additional channel is being assigned for the surveillance testing, and if this test would be performed by placing the channel being tested in a "tripped" state, the 2 out of 3 configuration would still be maintained (with a 1 out of 2 configuration for channels which are still in operation) while the inoperable channel is in a "bypassed" state. If the channel being tested is placed in a "bypassed" state during the test, then there would be concurrently 2 channels in the "bypassed" state, thereby reducing the trip logic configuration to 2 out-of 2, which was not evaluated and approved by the staff in the STI-SER and AOT-SER. Therefore, to maintain a 2 out-of 3 trip configuration, in this situation, the inoperable channel should be placed in the tripped state, if the additional channel is being tested in the bypassed state. This

will reduce the trip logic to a 1 out of 2. The original design of the RTS was configured using four monitoring channels and trip logic channels which initiate a reactor trip when any two of the four operable channels sense that the monitored process variable(s) has reached the trip setting.

The staff notes that placing an RTS channel in indefinite bypass reduces the reliability of the system but does not prevent the system from performing its safety function as discussed in the staff's safety evaluation dated July 8, 1992. Further, in most cases an AOT of 48 hours would be adequate to perform repairs. Since the bypass feature is used primarily during testing and maintenance and since the two-out-of-four configuration is the best state, the staff expects that the licensee will continue to give high priority to the repair of a bypassed channel.

2.2.1.4 Table 3.3-1, "Reactor Protection System Instrumentation," Functional Units 2 through 9

> <u>Proposed changes</u>: Add 10 to ACTION column for Functional Units 2 (High Flux), 3 (RC High temperature), 4 (Flux-Delta Flux-Flow), 5 (RC Low Pressure), 6 (RC High pressure), 7 (RC Pressure-Temperature), 8 (High Flux/Number of Reactor Coolant Pumps On), and 9 (Containment high Pressure). Add ACTION 10 statement to Table 3.3-1 to read, "With the number of channels OPERABLE one less than the Minimum Channels OPERABLE requirement, within one hour, place one inoperable channel in trip and the second inoperable channel in bypass, and restore one of the inoperable channels to OPERABLE status within 48 hours or be in HOT STANDBY within the next 6 hours and open the reactor trip breakers."

> <u>Evaluation</u>: With the number of channels OPERABLE one less than the Minimum Channels OPERABLE requirement, the existing TS 3.0.3 requires action be initiated within 1 hour to place the unit in a mode in which the technical specification does not apply by placing the unit as applicable in:

1. At least HOT STANDBY within 6 hours,

- 2. At least HOT SHUTDOWN within the following 6 hours, and
- 3. At least COLD SHUTDOWN within the subsequent 24 hours.

The new ACTION 10 would require that 1) within 1 hour, one inoperable channel be placed in trip, and the second inoperable channel be placed in bypass, 2) 48 hours be allowed to restore one of the inoperable channels to OPERABLE status, or be in HOT STANDBY within the next 6 hours, and 3) reactor trip breakers be opened. The proposed new ACTION is adopted from the Restructured Standard Technical Specifications (RSTS) for B&W Plants (NUREG-1430, Section 3.3.1). The AOT is acceptable to staff because it conforms to the proposal accepted by the staff as described in Section 2.1.1.1(3) of this report and is more conservative than the BWOG TS, NUREG-1430.

2.2.1.5

Table 4.3-1, "Reactor Protection System Instrumentation Surveillance Requirements." Functional Units 10 and 11

<u>Proposed changes</u>: Change CHANNEL FUNCTIONAL TEST interval for Functional Unit 10 (Intermediate Range, Neutron flux and rate) from "S/U(5)(1)" (which means prior to reactor startup with Notes (5) and (1) applying) to "N.A.(5)" (which means not applicable with Note 5 applying), and for Functional Unit 11 (Source Range, Neutron Flux and Rate) from "M and S/U(1)(5)" (which means monthly while in Modes 2 through 5 and prior to reactor startup with Notes (1) and (5) applying) to "N.A.(5)" (which means not applicable with Note 5 applying). Note 5 reads as follows:

"Verify at least one decade overlap if not verified in previous 7 days." To provide an editorial clarification to Note 5, change to: "CHANNEL FUNCTIONAL TEST is not applicable. Verify at least one decade overlap prior to each reactor startup if not verified in previous 7 days."

Evaluation: The licensee stated that although the current surveillance requirements for these Functional Units are prior to startup for both 10 and 11, and on a monthly basis during shutdown only for 11 (Source Range, Neutron Flux and Rate), the licensee also performs a CHANNEL FUNCTIONAL TEST on these Functional Units on a monthly basis while the plant is in mode 1. Monthly testing is done to assure that the surveillance requirements are always current in the event the plant experiences a reactor trip or an unplanned shutdown. To alleviate this burden, the licensee considered increasing the monthly surveillance interval for source range instrumentation to semi-annually in accordance with the staff's approval of BAW-10167 changes. However, it was noted that the B&W RSTS eliminated the CHANNEL FUNCTIONAL TESTS for source range (RSTS 3.3.9) and intermediate range (RSTS 3.3.10) instrumentation on the basis that they perform only a monitoring function except for the control rod withdrawal inhibit, which is only required during low power physics testing. For instrumentation that performs a monitoring function, the RSTS considers an 18 month interval for channel calibrations and channel checks each shift to be the appropriate surveillance requirements. As in the RSTS, the control rod withdrawal inhibit function is verified under the existing DBNPS Special Test

Exception 3.10.2, Physics Tests, by Surveillance Requirement 4.10.2.2. This is acceptable to the staff, including the editorial clarification to Note 5, because it conforms to the BWOG TS improvement proposal accepted by the staff as described in Section 2.1 of this report.

2.2.1.6

Table 4.3-1, "Reactor Protection System Instrumentation Surveillance Requirements." Functional Unit 8

<u>Proposed change</u>: Change CHANNEL CALIBRATION interval for Functional Unit 8 (High Flux/Number of Reactor Coolant Pumps On) from "R" (Refueling outage-18 months) to "Q(6,9)" (quarterly with Notes 6 and 9 applying). Change CHANNEL FUNCTIONAL TEST interval from "M" (Monthly) to "N.A." (not applicable).

<u>Evaluation</u>: The Functional Unit 8 "High Flux/Number of Reactor Coolant Pumps On" trip uses inputs from Functional Units 2 (High Flux) and 4 (Flux- Delta Flux- Flow), respectively which are calibrated quarterly. Because Functional Units 2 and 4 are required to be calibrated more frequently than Functional Unit 8, the potential exists for adjustments made during calibration of Functional Units 2 and 4 to adversely affect the calibration of Functional Unit 8. To avoid such a situation, it is therefore appropriate for Functional Unit 8 to have the same CHANNEL CALIBRATION interval as Functional Units 2 and 4. This is acceptable to the staff because it conforms to the BWOG TS improvement proposal accepted by the staff as described in Section 2.1 of this report.

As a part of implementing BAW-10167 requirements, CHANNEL FUNCTIONAL TEST interval for Functional Unit 8 should have been revised from the current "M" (monthly) to "SA(9)" (which means semi-annually on a staggered test schedule basis), but because the quarterly CHANNEL CALIBRATION includes channel functional tests, the quarterly test interval is conservative compared to a semiannual interval and is, therefore, acceptable. Removing the CHANNEL FUNCTIONAL TEST interval for Functional Unit 8 is acceptable to the staff because it conforms to the proposal accepted by the staff as described in Section 2.1 of this report and is more conservative than the BWOG TS, NUREG-1430.

2.2.1.7 The proposed change revises the Page Number "3/4 30 c" to "3/4 3-30c." This change is an editorial change and is acceptable to the staff.

# 2.3 <u>Verification of Conditions</u>

In its November 13, 1992 submittal, the licensee confirmed that it reviewed instrument drift data for affected instrument strings for the period from January 1988 through July 31, 1992, and evaluated affects of these data on TS limits, safety limits and margins of instrument string uncertainties. The results of this review indicated that non-technical field adjustments would be required in instruments for a few functional units. The licensee will implement all required changes prior to implementation of the proposed TS revision. The licensee has maintained records of the as-found and as-left calibration data for each affected instrument string, and also the records of the evaluations to determine the effects of the "as-found" and "as-left" data on instrument setpoint and safety limits. The licensee confirmed that the Davis-Besse, Unit 1 RTS instrumentation is a four-channel system with the capability of an indefinite bypass of one channel, and the reactor protection system was originally reviewed and accepted by the staff as a four-channel system.

Based on the above evaluation, the staff concludes that the proposed revision to the TS of the Davis-Besse Nuclear Power Station, Unit 1 are acceptable because they conform to the BWOG TS improvement proposal accepted by the staff as described in Section 2.1 of this report. The staff notes that placing an RTS channel in indefinite bypass reduces the reliability of the system but does not prevent the system from performing its safety function, as discussed in the staff's safety evaluation dated July 8, 1992, and meets the relevant requirements of "Standard Review Plan" (NUREG-0800) Sections 7.1 and 7.2. Further, in most cases an AOT of 48 hours would be adequate to perform repairs. Since the bypass feature is used primarily during testing and maintenance and since the two-out-of-four configuration is the best state, the staff expects the licensee will continue to give high priority to the repair of a bypassed channel.

### 3.0 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.

### 4.0 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 effluents 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 (58 FR 41516). 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.

### 5.0 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.

Principal Contributor: S. V. Athavale

Date: March 28, 1994