February 25, 2003

Mr. Mark B. Bezilla
Vice President
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
Post Office Box 4
Shippingport, PA 15077

SUBJECT: BEAVER VALLEY POWER STATION, UNIT NOS. 1 AND 2 - ISSUANCE OF AMENDMENT RE: REVISIONS TO ALLOWED OUTAGE TIMES OF EMERGENCY CORE COOLING SYSTEM ACCUMULATORS (TAC NOS. MB4692 AND MB4693)

Dear Mr. Bezilla:

The Commission has issued the enclosed Amendment No. 253 to Facility Operating License No. DPR-66 and Amendment No. 133 to Facility Operating License No. NPF-73 for the Beaver Valley Power Station, Unit Nos. 1 and 2. These amendments consist of changes to the Technical Specifications (TSs) in response to your application dated March 14, 2002.

These amendments revise TS 3/4.5.1, “Emergency Core Cooling Systems (ECCS) - Accumulators,” to extend the allowed outage time (AOT) of an inoperable accumulator to 72 hours when the accumulator boron concentration is not within limits and to 24 hours for all other conditions. The amendments also modify the required actions when exceeding the AOT and change the Surveillance Requirements to be consistent with the Improved Standard Technical Specifications, NUREG-1431, Revision 2, "Standard Technical Specifications - Westinghouse Plants."

A copy of our safety evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA/

Timothy G. Colburn, Senior Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-334 and 50-412

Enclosures: 1. Amendment No. 253 to DPR-66
2. Amendment No. 133 to NPF-73
3. Safety Evaluation

cc w/encls: See next page

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PUBLIC	MO’Brien	ACRS	PDI-1 R/F	TColburn
OGC	PHearn	RLaufer	GHill (4)	RDennig
SPeters	NSaltos	MReinhart	FAkstulewicz	BPlatchek, RGN-I

ACCESSION NO. ML030560657 *SE provided. No major changes made **See previous concurrence

OFFICE	PDI-1/PM	PDI-1/LA	SRXB/SC	SPSB/SC	RORP/SC	PDI-1/SC	OGC**
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DATE	2/13/03	2/14/03	10/07/02	10/07/02	12/17/02	2/24/03	01/29/03

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Mary O'Reilly, Attorney
FirstEnergy Nuclear Operating Company
FirstEnergy Corporation
76 South Main Street
Akron, OH 44308

FirstEnergy Nuclear Operating Company
Regulatory Affairs/Performance Improvement
Larry R. Freeland, Manager
Beaver Valley Power Station
Post Office Box 4, BV-A
Shippingport, PA 15077

Commissioner James R. Lewis
West Virginia Division of Labor
749-B, Building No. 6
Capitol Complex
Charleston, WV 25305

Director, Utilities Department
Public Utilities Commission
180 East Broad Street
Columbus, OH 43266-0573

Director, Pennsylvania Emergency Management Agency
2605 Interstate Dr.
Harrisburg, PA 17110-9364

Ohio EPA-DERR
ATTN: Zack A. Clayton
Post Office Box 1049
Columbus, OH 43266-0149

Dr. Judith Johnsrud
National Energy Committee
Sierra Club
433 Orlando Avenue
State College, PA 16803

J. H. Lash, Plant Manager (BV-IPAB)
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
Post Office Box 4
Shippingport, PA 15077

Rich Janati, Chief
Division of Nuclear Safety
Bureau of Radiation Protection
Deparment of Environmental Protection
Rachel Carson State Office Building
P.O. Box 8469
Harrisburg, PA 17105-8469

Mayor of the Borough of Shippingport
P O Box 3
Shippingport, PA 15077

Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Resident Inspector
U.S. Nuclear Regulatory Commission
Post Office Box 298
Shippingport, PA 15077

FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
ATTN: M. P. Pearson, Director Services and Projects (BV-IPAB)
Post Office Box 4
Shippingport, PA 15077

FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
Mr. B. F. Sepelak
Post Office Box 4, BV-A
Shippingport, PA 15077

PENNSYLVANIA POWER COMPANY

OHIO EDISON COMPANY

FIRSTENERGY NUCLEAR OPERATING COMPANY

DOCKET NO. 50-334

BEAVER VALLEY POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 253
License No. DPR-66

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

   A. The application for amendment by FirstEnergy Nuclear Operating Company, et al. (the licensee), dated March 14, 2002, 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. DPR-66 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 253, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Richard J. Laufer, Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: February 25, 2003

ATTACHMENT TO LICENSE AMENDMENT NO. 253

FACILITY OPERATING LICENSE NO. DPR-66

DOCKET NO. 50-334

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

Remove	Insert
XI	XI
3/4 5-1	3/4 5-1
3/4 5-2	3/4 5-2

PENNSYLVANIA POWER COMPANY

OHIO EDISON COMPANY

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

THE TOLEDO EDISON COMPANY

FIRSTENERGY NUCLEAR OPERATING COMPANY

DOCKET NO. 50-412

BEAVER VALLEY POWER STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 133
License No. NPF-73

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

   A. The application for amendment by FirstEnergy Nuclear Operating Company, et al. (the licensee), dated March 14, 2002, 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-73 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 133, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto are hereby incorporated in the license. FENOC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Richard J. Laufer, Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: February 25, 2003

ATTACHMENT TO LICENSE AMENDMENT NO. 133

FACILITY OPERATING LICENSE NO. NPF-73

DOCKET NO. 50-412

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

Remove	Insert
XI	XI
3/4 5-1	3/4 5-1
3/4 5-2	3/4 5-2

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 253 AND 133 TO FACILITY OPERATING

LICENSE NOS. DPR-66 AND NPF-73

PENNSYLVANIA POWER COMPANY

OHIO EDISON COMPANY

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

THE TOLEDO EDISON COMPANY

FIRSTENERGY NUCLEAR OPERATING COMPANY

BEAVER VALLEY POWER STATION, UNIT NOS. 1 AND 2

DOCKET NOS. 50-334 AND 50-412

1.0 INTRODUCTION

By application dated March 14, 2002, the FirstEnergy Nuclear Operating Company (FENOC, the licensee), requested changes to the Technical Specifications (TSs) for Beaver Valley Power Station, Units 1 and 2 (BVPS-1 and 2). The proposed amendments would modify TS 3/4.5.1, "Emergency Core Cooling Systems - Accumulators," to extend the completion time associated with an inoperable Emergency Core Cooling System (ECCS) accumulator, for reasons other than an out-of-specification boron concentration, from 1 hour to 24 hours. In addition to this change, the licensee proposed changes to TS 3/4.5.1 to make it consistent with NUREG-1431, "Improved Standard Technical Specifications, Westinghouse Plants," Revision 2, dated June 2001.

The BVPS-1 and 2 TSs allowed outage times (AOTs) for one accumulator range from "immediate" to 1 hour. However, the Westinghouse Owners Group (WOG) determined that a 1 hour or less AOT is insufficient for responding to accumulator inoperability. Therefore, the WOG submitted Topical Report WCAP-15049, "Risk-Informed Evaluation of an Extension to Accumulator Completion Times," to the Nuclear Regulatory Commission (NRC) on August 20, 1998, for review and approval. That topical report, which forms the basis for this proposal, generically evaluated the risk associated with extending accumulator AOTs up to 24 hours for reasons other than boron concentration out of specification at Westinghouse (W) plants. The WOG did not request an extension to the accumulator boron out of specification TS, which for most plants had been set to 72 hours. They determined that 72 hours is an adequate amount of time to correct boron related problems in the ECCS accumulators. By letter dated February 19, 1999, the NRC staff approved the methodology of WCAP-15049-A for

use. This topical report provides for the AOT extension at W plants, given the extension does not invalidate the licensee's safety analyses or pose an unacceptable risk. The February 19, 1999, NRC letter stated that the NRC staff will not repeat its review of the matters described in WCAP-15049-A when this topical report appears as a reference in license applications except to ensure that the material presented applies to the specific plant(s) involved.

In agreement with the WOG, FENOC determined that extending the accumulator AOTs would allow them to better manage inoperability issues. Therefore, they proposed these amendments in accordance with WCAP-15049-A. The licensee's proposed revisions to TS 3/4.5.1 for consistency with the NUREG-1431 involve changes in wording to match the terminology used in the NUREG-1431.

2.0 REGULATORY EVALUATION

Section 182a of the Atomic Energy Act of 1954, as amended (the Act), requires applicants for nuclear power plant operating licenses to include TSs as part of the license. These TSs are derived from the plant safety analyses.

The NRC staff reviewed the proposed changes for compliance with Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.36, and agreement with the precedent as established in NUREG-1431. In general, licensees cannot justify TS changes solely on the basis of adopting the model standard technical specifications (STS). To ensure this, the NRC staff makes a determination that proposed changes maintain adequate safety. Changes that result in relaxation (less restrictive condition) of current TS requirements require detailed justification.

In general, there are two classes of changes to TSs: (1) changes needed to reflect contents of the design basis (TSs are derived from the design basis), and (2) voluntary changes to take advantage of the evolution in policy and guidance regarding the required content and preferred format of TSs over time. This amendment deals with the second class of change; namely, the licensee is adopting the wording of NUREG-1431 and is implementing the extension of completion time supported by the generic analysis of WCAP-15049-A applicable to its facility.

Presently, the BVPS-1 and 2 TSs allow no more than 1 hour to correct accumulator problems or bring the plant to Hot Standby and proceed to the Hot Shutdown Condition. The NRC staff's review and approval of WCAP-15049-A supports extending this 1-hour completion time to 24 hours in order to provide sufficient time to correct the accumulator problem and avoid subjecting the plant to unnecessary power level changes.

Licensees may revise the TSs to adopt improved STS specification format and content provided that a plant-specific review supports a finding of continued adequate safety because: (1) the change is editorial, administrative or provides clarification (i.e., no requirements are materially altered), (2) the change is more restrictive than the licensee's current requirement, or (3) the change is less restrictive than the licensee's current requirement, but nonetheless still affords adequate assurance of safety when judged against current regulatory standards. The detailed application of this general framework, and additional specialized guidance, are discussed in Section 3.0 in the context of specific proposed changes.

The implementation of the extended completion time is consistent with previously approved TS amendments for the Wolf Creek, South Texas 1 and 2 and Prairie Island plants. Wolf Creek was the lead plant for the WOG program and received plant-specific approval for changes to the TSs on April 27, 1999 (License Amendment No. 124 to Facility License Number NPF-42).

3.0 EVALUATION

3.1 Description of Changes

The proposed change revises the completion time from immediately or 1 hour to 24 hours for reasons other than boron concentration for Action b of TS 3/4.5.1, "Accumulators," and the associated Bases. For an inoperable accumulator due to boron concentration the proposed change revises the completion time from 1 hour to 72 hours. The justification for this increase in completion time is discussed in Section 3.2.2 of this safety evaluation (SE). TS 3/4.5.1 currently specifies immediately opening the isolation valve to restore the reactor coolant system (RCS) accumulator to operable status when the accumulator is declared inoperable due to the isolation valve being closed. This is a less restrictive change to the current TS.

In addition to revising the accumulator completion time, the licensee is adopting some of the wording in TS 3/4.5.1 in order to establish a closer match with the terminology used in NUREG-1431.

3.2 Justification

3.2.1 Increasing the Accumulator Completion Time from 1 hour to 24 hours

Deterministic Evaluation

During Power Operation, Startup, or Hot Standby, when the pressurizer pressure is greater than 1000 psig, the BVPS-1 and 2 TS 3/4.5.1 states:

a. With one accumulator inoperable, except as a result of a closed isolation valve, restore the inoperable accumulator to OPERABLE status within one hour or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

b. With one accumulator inoperable due to the isolation valve being closed, either immediately open the isolation valve or be in HOT STANDBY within 1 hour and be in HOT SHUTDOWN within the next 12 hours.

Effectively, the TS sets a minimal AOT for the case where the isolation valve is closed, and it sets an AOT of up to 1 hour for all other conditions.

With one accumulator inoperable, the remaining two accumulators will be available to mitigate the consequences of a loss-of-coolant accident (LOCA). As part of the submittal, the licensee requested to increase the single accumulator AOT to 24 hours for all conditions other than the accumulator boron concentration being outside of its limits. The BVPS-1 and 2 Updated Final Safety Analysis Report (UFSAR) accident analyses include the assumption that all three accumulators are operable in case of design-basis accidents. These accidents do not consider

the case when the accumulators are in their AOT. After reviewing WCAP-15049-A and the licensee's UFSAR accident analyses, the NRC staff determined that extending the AOT to 24 hours does not change the design or the operating characteristics of the accumulators. Therefore, the NRC staff concludes that the proposed AOT modification does not invalidate the UFSAR accident analyses, and the AOT extension up to 24 hours for one accumulator is acceptable.

However, for the case where the boron concentration is not within limits, WCAP-15049-A does not cover extending the AOT to 72 hours. The licensee proposed this extension, but as mentioned in the Background Section above, the WOG did not propose extending the boron out of specification AOT for an inoperable accumulator. The WOG did not request this extension because many W plants have this AOT already set to 72 hours, which they consider adequate to correct the accumulator boron out of specification issues. BVPS-1 and 2, on the other hand, had only one TS AOT for all accumulator inoperability conditions other than a closed isolation valve. The NRC staff reviewed the BVPS-1 and 2 safety analyses and found that increasing the AOT to 72 hours for the boron out of specification condition is acceptable. The NRC staff made this determination because the analyses consider the boron concentration in the accumulators only during the recirculation phase of the LOCA, and a single accumulator's borated water volume does not significantly impact the accident when compared to the total borated water volume present during the recirculation phase. Additionally, the NRC staff compared the proposed TS change to the guidance of NUREG-1431, Revision 2, and determined that the change acceptably represents the intent of the NUREG.

Because the above TS changes for BVPS-1 and 2 do not invalidate the safety analyses, they in turn meet the intent of WCAP-15049-A. Therefore, the NRC staff finds the AOT extensions acceptable.

The NRC staff's deterministic review verified that the proposed TS changes comply with the requirements of WCAP-15049-A, that they do not invalidate the deterministic UFSAR safety analyses for the plant, and that they comply with the intent of NUREG-1431. However, the changes to the AOTs and completion times will affect the overall risk at the plant. Completion times are, by their nature, determined by conditions of risk. The impact of the proposed change on risk is reviewed in the following section.

Risk Evaluation

The requested changes to TS 3.5.1 include a risk-informed revision to Condition B, "Accumulators," and its associated Bases. The licensee indicates that the implementation of the proposed extension will relax an unnecessarily restrictive completion time for the accumulators and replace it with a time that provides a more reasonable opportunity to respond to the condition. The licensee's risk assessment is based on Topical Report WCAP-15049-A, Revision 1, and its evaluation by the NRC staff. Therefore, the plant-specific risk information, submitted for BVPS-1 and 2 in support of this license amendment application, was reviewed to ensure conformance to the referenced topical report and the associated NRC staff's SE.

Regarding the topical report, a three-tiered approach, consistent with Regulatory Guide 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," (RG 1.177) dated August 1998, was used by the NRC staff to evaluate the risk associated with the

proposed accumulator completion time, or AOT, extension from 1 hour to 24 hours. The need for the proposed change was that the current 1-hour completion time would be insufficient in most cases for licensees to take a reasonable action when an accumulator was found to be inoperable.

Tier 1: Quality of Probabilistic Risk Assessment (PRA) and Risk Impact

W used a reasonable approach to assess the risk impact of the proposed accumulator Completion time extension. The approach is generally consistent with the intent of the applicable NRC RGs 1.174[1] and RG 1.177. The quantitative risk measures addressed in the topical report included the change in core damage frequency (CDF) and incremental conditional core damage probability (ICCDP[2]) for a single Completion time. The change in large early release frequency (LERF) and incremental conditional large early release probability (ICLERP[3]) for a single Completion time were qualitatively addressed. Representative calculations were performed to determine the risk impact of the proposed change. Various accumulator success criteria were considered in these calculations to encompass the whole spectrum of W plants, e.g., two-, three- and four-loop plants. A reasonable effort was also made to address the differences in other components of risk analysis such as initiating event (IE) frequency and accumulator unavailability among W plants.

W considered a comprehensive range of IEs in the risk analysis. LOCAs in all sizes - large, medium and small - were included, and reactor vessel failure and interfacing system LOCAs were also considered. Modeling of accumulators for mitigation of events other than large, medium and small LOCAs was identified to have insignificant risk impact; therefore, the analysis was performed only on accumulator injection in response to large, medium and small LOCA events.

The success criteria considered are summarized as follows:

LOCA Category	**No. of Loops**	**Success Criteria**
Large	3	2 accumulators to 2 of 2 intact loops (2/2) 1 accumulator to 1 of 2 intact loops (1/2) no accumulators required (0/2)
Medium and Small	3	2 accumulators to 2 of 2 intact loops (2/2)

The success criteria considered in this analysis were comprehensive and considered conservative in many cases. For example, many plants indicated the accumulator success criteria for medium and small LOCA events resulted from their role in an alternate success path, in which high pressure injection (HPI) had already failed. Additionally, the staff review of a number of the original Integrated Plant Evaluations (IPEs) indicated that no accumulator was needed at all for many medium LOCA sequences and for most small LOCA sequences.

---

[1] RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," July 1998

[2] ICCDP = [(conditional CDF with the subject equipment out of service) – (baseline CDF with nominal expected equipment unavailabilities) x (duration of single Completion time under consideration)]

[3] ICLERP = [(conditional LERF with the subject equipment out of service) - (baseline LERF with nominal expected equipment unavailabilities) x (duration of single Completion time under consideration)]

The fault trees that model accumulator unavailabilities were evaluated. The assumptions made in the fault tree modeling were detailed and found to be reasonable. For example, the model assumed that the total Completion time would be used for each corrective maintenance, and this was considered conservative. A comprehensive list of failure mechanisms was considered, and potential common cause failures for check valves and motor-operated valves were also included. W used the Multiple Greek Letter technique to determine the common cause failure contributions to the accumulator injection failure.

The component failure rates were taken from the Advanced Light Water Utility Requirements Document.[4] Accumulator unavailabilities due to boron concentration out of limit and due to other reasons were calculated based on a survey of a number of W plants. The values for component failure rates and accumulator unavailabilities were within a reasonable range. The common cause factors used were also comparable to those used in other PRAs. The accumulator fault trees were quantified using the WesSAGE Computer Code. The code provided information on the unavailability and cutsets related to the component failures and maintenance activities modeled in the fault trees. A separate hand calculation was used to determine the unavailability due to potential common cause failures. Evaluation of some of the cutsets provided in the topical report did not reveal any unexpected results.

The NRC staff examined the accident sequence identification for each LOCA category. The probability of the sequence leading to core damage involving accumulator failure is summarized for each LOCA category as follows:

Large LOCA	(Large LOCA IE frequency) x (accumulator unavailability)
Medium LOCA	(Medium LOCA IE frequency) x (unavailability of HPI) x (accumulator unavailability)
Small LOCA	(Small LOCA IE frequency) x (unavailability of HPI) x (accumulator unavailability)

The LOCA IE frequencies used for WCAP-15049-A are summarized below. Also listed are the LOCA frequencies used in NUREG/CR-4550[5] (the NUREG-1150 study) for pressurized water reactors (PWRs) and those in the original IPEs.

	WCAP-15049	**NUREG-1150**	**IPE Average (High; Low)**
Large LOCA	$3x10^{-4}$/yr	$5x10^{-4}$/yr	$3.3x10^{-4}$/yr ($5x10^{-4}$/yr; $1x10^{-5}$/yr)
Medium LOCA	$8x10^{-4}$/yr	$1x10^{-3}$/yr	$7.9x10^{-4}$/yr ($2.6x10^{-3}$/yr; $1x10^{-4}$/yr)
Small LOCA	$7x10^{-3}$/yr	$1x10^{-3}$/yr	$8.9x10^{-3}$/yr ($2.9x10^{-2}$/yr; $3.7x10^{-4}$/yr)

[4] "Advanced Light Water Utility Requirements Document," Volume II, ALWR Evolutionary Plant, Chapter 1, Appendix A, PRA Key Assumptions and Ground Rules, Revision 5, Issued December, 1992

[5] NUREG/CR-4550, "Analysis of Core Damage Frequency: Internal Events Methodology," Volume 1, Revision 1, January 1990

W indicated that the IE frequencies for WCAP-15049-A were based on the plant-specific information contained in the WOG probabilistic safety analysis (PSA) Comparison Database, which documented the PRA modeling methods and results of the updated PRAs for W plants. The mean IE frequencies were used for the risk analysis. These were comparable to the values used for the NUREG-1150 study and the average values in the original IPEs. The staff also found that the IE frequency values in high range among the original IPEs were not much higher than those used for this topical report. The HPI unavailability values used were $7x10^{-3}$ and $1x10^{-3}$/yr for medium and small LOCA events, respectively. The NRC staff's examination revealed that the HPI unavailability values were generally comparable to those used in other PRAs, and were generally conservative.

The risk measures calculated to determine the impact on plant risk were based on three different cases. The risk measures considered in each case included the impact on CDF and ICCDP for a single Completion time, and the impact on LERF and ICLERP for a single Completion time were qualitatively considered. The three cases considered were:

Design basis case: This case required accumulator injection only for mitigation of large LOCA events (3/3 for 4-loop, 2/2 for 3-loop, and 1/1 for 2-loop).

Case 1: This case credited realistic accumulator success criteria (2/3 for 4-loop, 1/2 for 3-loop, and 0/1 for 2-loop) for large LOCA events and credited the use of accumulators in responding to medium and small LOCA events (3/3, 2/2, and 1/1 for 4-loop, 3-loop, and 2-loop, respectively) following failure of HPI.

Case 2: This case credited more realistic improved accumulator success criteria (no accumulator required) for large LOCA events and credited the use of accumulators in responding to medium and small LOCA events (3/3, 2/2, and 1/1 for 4-loop, 3-loop, and 2-loop, respectively) following failure of HPI.

The results for the 3-loop design were summarized in WCAP-15049-A as follows:

Case	**LOCA CDF(/yr) (Current)**	**LOCA CDF(/yr) (Proposed)**	**△CDF**	**ICCDP**
3-loop Design Basis	$4.62x10^{-7}$	$6.18x10^{-7}$	$1.56x10^{-7}$	$8.21x10^{-7}$
3-loop Case 1	$4.27x10^{-8}$	$5.31x10^{-8}$	$1.04x10^{-8}$	$5.48x10^{-8}$
3-loop Case 2	$3.05x10^{-8}$	$4.08x10^{-8}$	$1.03x10^{-8}$	$5.42x10^{-8}$

For both realistic cases, the △CDFs and ICCDPs were very small for the 3-loop plants, and were much below the numerical guidelines in RGs 1.174 and 1.177. The NRC staff also noted that the values were considered still bounding in the sense that the risk analysis used a multitude of conservative assumptions and data in the modeling. For many W plants, the realistic impact on risk would be much smaller than the values above.

A set of sensitivity cases were also calculated using higher IE frequencies for small and medium LOCAs. The results of the sensitivity calculations did not cause the overall risk impact to increase significantly.

W indicated that accumulator success or failure has no direct impact on the containment performance, and the LERF would therefore increase only in direct proportion to the increased CDF due to accumulator failures. W concluded that, since the impact on CDF was small, the impact on LERF would also be small. The staff found the W argument to be acceptable; therefore, the impact on LERF and ICLERP for a single Completion time was very small.

One of the potential benefits of the proposed extended Completion time was the averted risk associated with avoiding a forced plant shutdown and startup. The risk associated with a forced plant shutdown and ensuing startup due to the inflexibility in the current TS could be significant in comparison with the risk increase due to the proposed accumulator Completion time increase.

Based on the staff's Tier 1 review, the quality of risk analysis used to calculate the risk impact of the proposed accumulator Completion time extension was reasonable and generally conservative. It was also found that the risk impact of the proposed change was below the staff guidelines in RGs 1.174 and 1.177.

Tier 2 and 3: Configuration Risk Control

Tier 2 of RG 1.177 addresses the need to preclude potentially high risk configurations which could result if certain equipment is taken out of service during implementation of the proposed TS change (in this case accumulator Completion time). If such configurations are identified, the licensee should also identify appropriate measures to avoid them.

The accumulators are always needed to mitigate large size LOCAs. Large LOCAs require accumulators to inject as analyzed under Tier 1 in order to avoid core damage. This means that if a large LOCA occurs without the accumulator function, the core will be damaged independently of whether other systems, such as HPI, function properly or not. However, the probability that a large LOCA occurs in the 24-hour Completion time is extremely small (in the order of 1E-7 or less). Furthermore, no compensatory or other measures are possible. Due to the negligible risk increase associated with this scenario and the fact that there are no measures to take once a large LOCA occurs, no "high risk" configurations are associated with this scenario.

In general, medium LOCAs do not require accumulators if at least one HPI train is available. This means that if a medium LOCA occurs when minimum accumulator functionality is unavailable and at the same time HPI is unavailable, the core will be damaged. However, the probability that a medium LOCA occurs in the 24-hour Completion time and at the same time both trains of HPI are unavailable is extremely small (in the order of 1E-8 or less) because we assume that the plant is not operating at power with both HPI trains out of service. This assumption is based on current STS that limit operation at power with no HPI capability. Therefore, no Tier 2 restrictions beyond those currently in the STSs are deemed necessary.

Tier 3 calls for a program to identify "risk significant" configurations beyond those identified in Tier 2 resulting from maintenance or other operational activities and take appropriate compensatory measures to avoid such configurations. Because the accumulator sequence modeling is relatively independent of that for other systems, the Tier 2 analysis by itself is sufficient.

Furthermore, 10 CFR 50.65(a)(4) requires that licensees assess the risk any time maintenance is being considered on safety-related equipment. This requirement serves the objectives of Tier 3.

In summary, the Tier 2 evaluation did not identify the need for any additional constraints or compensatory actions that, if implemented, would avoid or reduce the probability of a risk-significant configuration. The current TS provisions were found to be sufficient to address the Tier 2 issue. Because the accumulator sequence modeling is relatively independent of that for other systems and the implementation of the 10 CFR 50.65(a)(4), the staff concluded that application of Tier 3 to the proposed accumulator Completion time was not necessary.

As suggested by the WCAP-15049-A Implementation Guidelines, the licensee provided an evaluation that demonstrated the applicability of the conclusions of the topical report to BVPS-1 and 2 by comparing key parameters and assumptions used in both the Beaver Valley-specific and the WCAP generic risk analyses. This comparison concludes that (1) the plant-specific initiating event frequencies are smaller than the generic WCAP model frequencies, (2) the BVPS-1 and 2 model also includes depressurization and low pressure injection as alternate success paths for a small LOCA event, and (3) the accumulators are not taken out of service for testing or preventive maintenance and have not had to be taken out of service for any corrective maintenance during plant operation at power. The staff finds that the WCAP analysis envelops or is comparable to the analysis performed for BVPS-1 and 2.

Risk Evaluation Conclusions

The staff reviewed the risk assessment information submitted by FENOC in support of its risk-informed revision request to TS LCO 3.5.1 Condition B, “Accumulators,” and its associated Bases. The proposed change would extend the AOT for one ECCS accumulator from 1 hour to 24 hours when an accumulator is out of service for reasons other than boron concentration being out of limits. The licensee’s risk assessment is based on topical report WCAP-15049-A, Revision 1, and an associated evaluation by the NRC staff. Therefore, the plant-specific risk information, submitted for BVPS-1 and 2 in support of this license amendment application, was reviewed to ensure conformance to the referenced topical report and the associated NRC staff’s SE. The NRC staff concludes that the generic justification proposed in WCAP-1549-A for extending the action statement completion time (CT) for accumulators can be used to justify the same relaxation in the BVPS-1 and 2 TSs.

The NRC staff finds that the proposed changes will allow safe operation with the changes in AOT from 1 to 24 hours for TS LCO 3.5.1 Condition B, “Accumulators,” and the associated bases. The NRC staff also finds that the proposed changes are consistent with the incremental conditional core damage probabilities calculated in WCAP-15049-A for the accumulator AOT increase and meet the criterion of 5E-07 in RGs 1.174 and 1.177. The analysis and acceptance provided in this SE, as demonstrated by WCAP-15049-A, covers all W nuclear steam supply system plants regardless of plant vintage and number of loops. The NRC staff, therefore, concludes that the proposed extending of the accumulator AOT from 1 to 24 hours for BVPS-1 and 2 is acceptable.

3.2.2 Revisions to the wording in TS 3/4.5.1

The licensee is proposing to change the wording of TS 3/4.5.1 in order to reflect the required actions and surveillance requirements of LCO 3.5.1, “Accumulators”, contained in NUREG-1431, “Standard Technical Specifications - Westinghouse Plants,” Revision 2.

Change Number 1

Change 1 involves replacing the existing action (“applicable to an accumulator being inoperable due to reasons other than a closed isolation valve”) with a new action (“applicable to an accumulator being inoperable due solely to the boron concentration not being within limits”). In addition, the proposed change includes changing the completion time from 1 hour to 72 hours. The new action is consistent with NUREG-1431 and allows 72 hours to restore the boron concentration to within limits.

The NRC staff concludes that the increase in completion time is acceptable based on the small probability of a LOCA, which would require the accumulators to function, occurring during the completion time of 72 hours. Additionally, the existing 1-hour completion time does not provide a reasonable time for restoring and verifying boron concentration after it is found out of limits. The proposed change allows sufficient time to correct the problem and avoids challenging the plant with unnecessary transients due initiating and placing the plant in the hot standby condition.

Change Number 2

Change 2 complements Change 1 by consolidating all reasons for accumulators being inoperable except for boron concentration being outside acceptable limits. Change 2 thus increases the current completion time for opening a closed isolation valve from immediately to 24 hours, as well as increasing the current completion time from 1 hour to 24 hours for all remaining inoperable conditions except for boron concentration not within limits. The justification for increasing the completion time to 24 hours is provided in WCAP-15049-A, “Risk Informed Evaluation of an Extension to Accumulator Completion Times,” which was approved by the NRC on February 19, 1999, and is discussed in Section 3.2.1 above. The NRC staff concludes that the proposed 24-hour completion time is acceptable for situations where accumulators are inoperable due to conditions other than boron concentration being outside of limits.

Change Number 3

Change Number 3 involves both a TS format change and a technical change that makes the Action requirements consistent with the Applicability requirements.

The proposed format adds Action c. The proposed TS 3/4.5.1 Action c specifies required plant actions when Actions a or b are not met. These actions specify times for restoring accumulators to operable status and the plant conditions that must be met if the accumulators remain inoperable past the completion time. Guidance in NUREG-1431 TS 3.5.1 uses 3 Actions to specify times to restore accumulators to operable status and plant conditions that must be met if accumulators remain inoperable. The addition of Action c is acceptable because

it is compatible with the NUREG format and does not result in any substantive changes in operating requirements.

The proposed technical change involves clarifying the end operational condition that must be met when the Actions are not met. When an accumulator is inoperable the proposed Action "c" instructs operators to bring the plant to Hot Standby in 6 hours and reduce pressurizer pressure to $\leq$ 1000 psig within 12 hours regardless of the cause of accumulator inoperability. When the pressurizer pressure is $\leq$ 1000 psig, the plant is in an operating mode that is outside the applicability of TS 3/4.5.1 and operability of the accumulators is not required. The current action statement in TS 3/4.5.1 instructs operators to bring the plant to hot standby in 1 hour when an accumulator isolation valve is closed and in 6 hours for all other causes. The current action statement also instructs operators to bring the plant to hot shutdown in 12 hours after reaching hot standby when the cause is due to a closed isolation valve and in 6 hours after reaching hot standby for all other causes. The current action statement leads to confusion because the TS is only applicable to hot standby with the pressurizer pressure > 1000 psig.

The proposed TS replaces placing the plant in hot shutdown with placing the plant in hot standby with pressurizer pressure $\leq$ 1000 psig. This new plant condition is acceptable since it places the plant is an operating condition where the accumulators are not required to be operable and at a pressure that allows the ECCS pumps to provide adequate injection to ensure that peak clad temperatures remain below the 10 CFR 50.46 limits in case of a LOCA. Therefore, ECCS accumulator operability is not an issue below these pressures. Because the licensee's proposed completion times are consistent with those of NUREG-1431, Revision 2, and do not adversely affect plant safety, we find them acceptable. The staff concludes that Change 3 is acceptable because the change maintains adequate safety margins while adopting the format of the improved standard TS.

Change Number 4

Change 4 revises Surveillance Requirement (SR) 4.5.1.a.1 by removing the requirement that the licensee must use alarms to verify accumulator water level and pressure and permits the licensee to determine the method for verifying these parameters. This change provides diversity for determining the levels of the accumulator parameters. Although diversity for determining the level of accumulator parameters is less restrictive than relying solely on the parameter alarms, this application of diversity provides plant operating flexibility and a reduction in common mode failure probabilities. This application of diversity equals or improves the present parameter verification method. The proposed change makes surveillance requirement 4.5.1.a consistent with the NUREG-1431, Revision 2, surveillance requirements 3.5.1.2 and 3.5.1.3. The staff concludes Change 4 is acceptable since it provides adequate safety by improving the diversity in verifying that the accumulator water level and pressure are within acceptable limits.

Change Number 5

Change 5 adds 2 qualifying statements to SR 4.5.1.b. The first phrase, "for only the affected accumulator," clarifies that the 6-hour SR applies only to the accumulator that has undergone a specific volume increase. The second phrase, "that is not the result of addition from the refueling water storage tank," is added to clarify that the 6-hour surveillance is not required if the refueling water storage tank (RWST) was used to increase the accumulator volume.

Adding water from the RWST would not cause a decrease in the accumulator's boron concentration because the boron concentration of the RWST is maintained at or above the required concentration for the accumulators. TS 3.1.2.8, "Borated Water Sources-Operating," sets the requirements that the RWST be maintained at or above the boron concentration required for the accumulators. Because the RWST TS already governs the boron concentration values, and these concentrations are at or above the values required for the accumulators, conducting this surveillance upon accumulator fill from the RWST is not necessary. Because this change is consistent with NUREG-1431, Revision 2, and does not adversely affect plant safety, the NRC staff finds that Change 5 consists of editorial changes that are clarifications of existing requirements and are, therefore, acceptable.

Change Number 6

Change 6 consists of deleting SR 4.5.1.2. This surveillance includes verifying the operability of the channel alarms associated with accumulator pressure and water level. The justification for removing these channel alarms is discussed in Change 4. As stated in the Change 4 discussion, the proposed change makes surveillance requirement 4.5.1.a consistent with the NUREG-1431 surveillance requirements 3.5.1.2 and 3.5.1.3. Operability of the instrumentation channel alarms is assured through compliance with plant procedures. The accumulator water level and pressure limits associated with the alarm channels, not the alarm channels, are required to be within correct limits in order to assure accident mitigation. Since the pressure and water level will continue to be verified every 12 hours as required by SR 4.5.1.a, the accident mitigation function of the accumulators is not affected by deleting the surveillances for the channel alarms associated with accumulator pressure and water level. The staff concludes that deleting the accumulator pressure and water level alarms is acceptable since adequate safety is maintained by the remaining surveillances.

Repagination

The addition of text regarding TS 3/4.5.1, "Accumulators," into TS Bases page B 3/4 5-1 results in displacement of other already existing text regarding TSs 3/4.5.2 and 3/4.5.3 from TS Bases page B 3/4 5-1 to Bases page B 3/4 5-1a. As a result, an update to TS Index page XI is required to reflect the correct pagination. Although this change to the index page was not reflected in the original submittal, the NRC staff finds that updating of the Index page to properly reflect the Bases pagination is strictly an editorial change and is appropriate. A new Index page XI is therefore issued with this amendment.

3.3 NRC Staff Conclusions

The licensee is proposing to revise the TSs in order to extend the AOT associated with an inoperable ECCS accumulator from 1 hour to 24 hours. Additionally, the licensee is proposing changes to TS 3/4.5.1 to make it consistent with the Improved STSs.

The NRC staff finds the proposed changes are technically justified in a manner consistent with an NRC-approved methodology, comply with 10 CFR 50.36, and are consistent with the STSs.

On this basis, the NRC staff concludes that the proposed changes to the TSs of BVPS-1 and 2 are acceptable.

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and change surveillance requirements. The NRC staff has determined that the amendments involve 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 amendments involve no significant hazards consideration, and there has been no public comment on such finding (67 FR 21289). Accordingly, the amendments meet 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 amendments.

6.0 CONCLUSION

The Commission 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 the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: P. Hearn
S. Peters
N. Santos
D. Collins

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